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ABSTRACTS

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P002

Total Extraperitoneal (TEP) Versus Transabdominal Preperitoneal (TAPP) Repair Among Patients of Inguinal Hernia in Tertiary Care Center: A Randomised Control Trial

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Introduction: Laparoscopic inguinal hernia repair is commonly done by Total extra peritoneal repair (TEP) and Transabdominal preperitoneal repair (TAPP). Both procedures have differences in approach and learning curves. It is important to establish the clinical effectiveness and efficiency of the procedures. In this study, we aim to compare various intra-operative and post-operative outcomes of TEP vs TAPP in patients with inguinal hernia.
Material and Method: A randomised control study of 3-year duration at a tertiary care teaching hospital where total 138 patients of inguinal hernia underwent either TEP or TAPP. The enrolled patients were alternatively randomised and operated after which they were compared in terms of various intra-operative & postoperative parameters. Early postoperative findings, return to activities, duration of hospital stay, and post-operative complications were assessed.
Results: There were 68 patients in TEP group and 70 in TAPP group. TEP was associated with lower morbidity as compared to TAPP. Various parameters like duration of surgery, intraoperative blood loss, postoperative pain were seen significantly less in TEP as compared to TAPP. There was no need for conversion to open or any adverse intraoperative events noted in both the groups. Local complications and early recurrence was assessed. There was no surgical site infection. Average duration of stay was 3.6 days for TEP and 4.7 days in TAPP.
PARAMETERS

TEP
TAPP
Postoperative pain
Less
Duration of surgery
Less
Intraoperative blood loss
Less
Cord edema
11 patients
14 patients
Hospital stay
3.6 days
4.7 days
Recurrence
No
No

Conclusion: TEP Offered advantages over TAPP in terms of reductions in operating time, operative morbidity, post-operative complications and hospital stay.

P003

Unraveling the Enigma of Parastomal Hernias: Exploring Risk Factors, Timelines, and Preventive Strategies After Stoma Reversal

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Introduction: Incisional hernia (IH) is a common complication after stoma reversal, with variable reported incidence rates from 0 to 50%. Current literature also suggests that IH is underreported without a definitive understanding of the timeline of its occurrence and recurrence, making IH prevention a clinical dilemma. Due to the difficulty in making risk-benefit analyses, it is not currently common for surgeons to include IH prevention measures during stoma reversal. This study identifies IH risk factors and diagnostic timeline to aid surgeons' clinical decision-making.
Methods: We conducted a retrospective chart review of 130 patients who underwent ostomy reversal at Froedtert Hospital between 1/1/2016 and 12/31/2021. We collected data on their demographics, medical history, course of ostomy treatment, and hernia diagnosis. Following chart review, we administered a short telephone survey to those patients without IH diagnosis. Patients who self-reported an IH diagnosis, described a bulge at the incision site, or reported constant physical pain during the survey were classified as IH cases. Logistic regression and Kaplan-Meier fit were used for analysis.
Results: The overall rate of IH occurrence over the entire course of treatment was 45.1% (n = 51). The occurrence rate after surgical

reversal of ostomy was 28.3% (n = 32). Significant risk factors identified were elevated BMI ($p < 0.001$), hypertension ($p = 0.00156$), and hernia noticed with ostomy (parastomal hernia) ($p = 0.0136$). Notably, a parastomal hernia carried a three-fold increase of IH after reversal (OR = 3.26). Similarly, obesity (BMI > 30) and hypertension both conferred higher odds (OR = 4.20 and 3.58, respectively). Kaplan-Meier analysis indicates that patients with either parastomal hernia, hypertension, or obesity have a greater than 50% likelihood of being diagnosed with IH within the first three years following reversal. Other risk factors, including steroid/biologics usage, chemotherapy, radiation therapy, previous ostomy, previous hernia, diabetes, smoking, and type of ostomy lacked statistical significance. The median time between ostomy reversal and the first IH diagnosis was 315 days, and most of the cases (78%, n = 25) were diagnosed within the first two years.

Conclusion: In summary, the likelihood of patients developing an IH throughout the entire span of ostomy treatment is substantial. Patients with a high BMI, hypertension, or a parastomal hernia are at even higher odds of developing IH and therefore reinforcement of the fascial closure could be considered and should be explored in future studies.

P004

Perioperative Outcomes of Open and Robotic Ventral Hernia Repair: A Propensity Score-Matched Analysis of 16,246 Patients

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Introduction: Ventral hernia repair (VHR) is one of the most common procedures done by general surgery. While open repair has historically been the standard of care, robotic VHR (R-VHR) has gained popularity due to potentially better clinical outcomes and surgical ergonomics. Large-scale studies comparing gastrointestinal (GI) complications and surgical site infection (SSI) are lacking.

Methods and Procedures: Analysis included adult patients who underwent open or R-VHR with 30 days of follow-up from a national hernia-specific registry (ACHQC). Propensity score matching (PSM) was used to create two comparable cohorts ($n = 8{,}123$ in each) adjusted for demographics, comorbidities, hernia and operative characteristics. Logistic regression analysis (LRA) for postoperative outcomes was carried out and multivariate LRA was used to compare risk factors for GI complications.

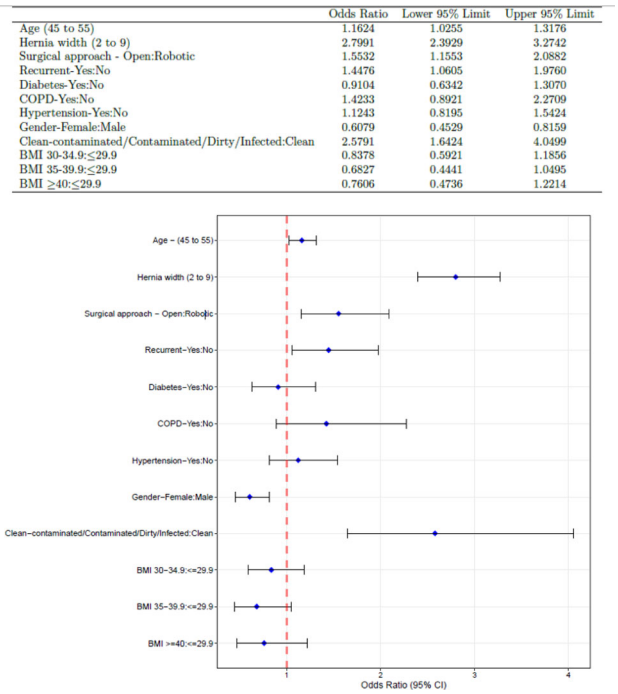
Results: After PSM, patients who underwent R-VHR had a lower rate of GI complications at 30 days compared to open repair (0.9% vs.1.6%; $p < 0.001$). 30-day rates of readmission, reoperation and hernia recurrence were similar between groups (overall 2.9%, 0.2%, and 1%, respectively). The robotic cohort had a significantly shorter length of stay (LOS), less SSI, less surgical site interventions and a higher seroma formation (Table 1). Multivariate LRA indicated patients with an open VHR (among other characteristics) had higher risk of GI complications (Fig. 1).

Conclusion: While rates of hernia recurrence, readmission, and reoperation were similar, R-VHR had a shorter LOS, less SSI, and less GI complications. In our large PSM analysis, R-VHR was not only safe, but a superior approach in carefully selected patients.

Table 1 30-day outcomes according to operative approach

30 day outcome	Open ($n = 8123$)	Robotic ($n = 8123$)	*p*
LOS, median (IQR)	0 (0–3)	0 (0–1)	< 0.001
GI Complication, % (n)	1.6 (131)	0.9 (74)	< 0.001
SSI, % (n)	2.4 (197)	0.6 (54)	< 0.001
SSO or SSI, % (n)	9.1 (736)	7.5 (611)	< 0.001
SSO or SSI with Intervention, % (n)	3.2 (257)	1.4 (113)	< 0.001
Seroma, % (n)	3.3 (270)	5.6 (456)	< 0.001

Figure 1 Multivariate logistic regression for gastrointestinal complications



P005

Single-incision Laparoscopic Percutaneous Extraperitoneal Closure for Treatment of Incarcerated Inguinal Hernia in Adolescent and Young Adult Generation

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Purpose: To examine the feasibility of single-incision laparoscopic percutaneous extraperitoneal closure (SLPEC) for traeatment of incarcerated inguinal hernia repair in adolescent and young adult (AYA) generation.

Methods: We make a 0.6 cm incision at the bottom of umbilicus. After small laparotomy, we insert the 5 mm port into the abdominal cavity. After creation of the 6-8 mmHg pneumoperitoneum, we inserted the 5 mm 30 degree laparoscope and detected the inguinal hernia. Our indication for SLPEC in AYA generation is the small incarcerated inguinal hernia under 2 cm. If the inguinal hernia was not indicated after checking by laparoscope, we performed the other operation methods, such as trans-abdominal pre-peritoneal repair (TAPP) or totally extra-peritoneal repair (TEP).
For the small incarcerated inguinal hernia, we added 2.1 mm forceps into abdominal cavity through the same transumbilical incision. A 19-gauge LPEC needle with non-absorbable suture material was inserted into the inguinal region. Using LPEC needle and forceps, the hernia orifice was closed extraperitoneally with circuit suturing without leaving a peritoneal gap.
Results: SLPEC was introduced to our hospital in April, 2023. Eight patients in AYA generation were performed for incarcerated inguinal hernia in our hospital between September, 2022 and August, 2023. In the first six months, we performed 2 mesh-plug procedure and 2 Lichtenstein procedure. After April, 2023We performed 3 SLPEC and 1 TAPP after April, 2023. The operation time was significantly shorter than the others. There were no complications and no evidence of early recurrence in any patients.
Conclusion: SLPEC is feasible and safe for incarcerated inguinal hernia repair in AYA generation.

P006

Chemical Component Separation for Large Ventral Hernia Repairs in an Asian Population: An Observational Case Series

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Background: Botulinum toxin A (BTA) is a protein produced by Clostridium botulinum with an inhibitory effect on presynaptic cholinergic nerve endings. Injecting calculated doses of BTA at specific points in the lateral abdominal wall allows paralysis of these muscles for tension free surgical closure. This was first reported by Ibarra-Hurtado et al. in 2009. Although BTA is a dangerous chemical, use of small well calculated doses at specific points on abdominal wall has good safety profile.
There has been no consensus on the size of complex abdominal wall hernias for BTA use. We recommend the use of BTA in large hernia with defect of 6-8 cm in size, to obtain a tension free repair without component separation. Other indications of BTA include that of surgeon preference or expected difficulty in closing midline wound, and as treatment adjuncts for muscle spasms.
Contraindications for BTA include pregnant or breast-feeding patients, allergy to BTA or its components, known neuromuscular disorder or sensitivity to BTA, chronic respiratory dysfunction and spinal problems.
Most common complications include that of weaker sneezing, weaker coughing, dyspnea, or abdominal distension/ bloating. This is due to the reduced effectiveness of abdominal wall muscle contraction after the lateral abdominal muscles are paralysed. Thus, we recommend patients to wear abdominal binder after BTA injection. Furthermore, by reducing the volume to BTA injected, and sparing the transversus abdominis muscle, core muscle strength maybe retained to reduce the side effects. Local complications such as bruising at injection site, back pain may also occur.
Methods: We performed a prospective observational study of all chemical component separation for large ventral hernia operated between 2018 and 2022, in a single tertiary institution.
Results: 16 patients had BTA injected prior to their large ventral hernia repair surgery between 2018 and 2022. Table 1 demonstrates the patient demographics, operative details, and surgical outcomes. 4 patients had grade 1 complications (1 patient had hematoma, 2 patients had seroma and 1 patient had wound infections), which were all managed conservatively. 1 patient had a 3 cm recurrence of ventral hernia at 6 months, which did not require reoperation. Mean follow-up duration was 9.5 months.
Conclusion: BTA is a useful pharmacological adjunct to aid fascial closure in complex abdominal wall hernia and open abdomen. It could be used to avoid the need for component separation in patients with largen ventral hernias.

P007

Robot-assisted Approach Has Potential to Shift Paradigms in Ventral Hernia Repair in Obese Population

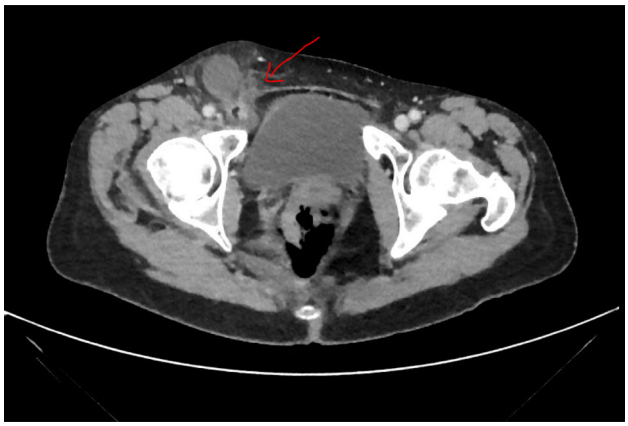
Jevgenia Zilberman-Rudenko, MD, PhD[1]; Jeffrey R Watkins, MD[2]; Daniel Tseng[2]; Sabrina Drexel, MD[2]; [1]Oregon Health and Science University; [2]Northwest MIS

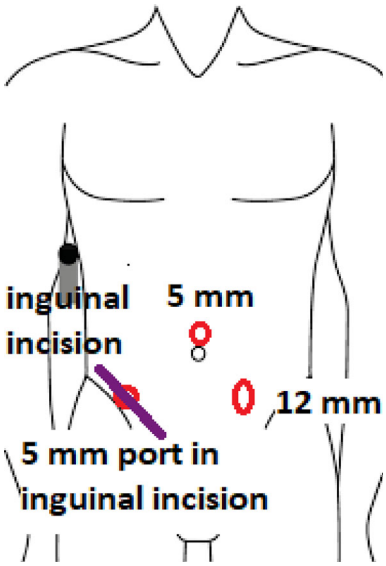
Introduction: The aim of this study was to show efficacy of robot-assisted surgery in obese patient populations deemed as high risk for ventral hernia repair (VHR).
Methods and Procedures: A prospective 2-year study looked at post-operative outcomes in two obese patient populations (BMI 35-50 and BMI $>$ 50 kg/m2) after robot-assisted VHR with bilateral retrorectus myofascial advancement flaps. Outcome measures included operative time, hospital stay, surgical site infections (SSI), other surgical site occurrences (SSO), re-admission rates, hernia recurrence rates and weight loss within 30 days post VHR. Outcomes were compared between two groups with t-test with Holm-Sidak correction for discrete values and Chi-square test for binary values.
Results: The study included 18 obese patients subdivided into two groups with mean BMI 40.3 $\pm$ 1.0 kg/m2 (n = 12) and 58 $\pm$ 3.1 kg/m2 (n = 6). Both groups had comparable ASA (2.8 $\pm$ 0.1 and 3.0 $\pm$ 0; respectively), hernia defect size (46.8 $\pm$ 9.2 and 67.5 $\pm$ 21.5 cm2) and operative times (170.9 $\pm$ 30.6 and 149.3 $\pm$ 22.9 min). There were no SSI nor hernia recurrence within 30 days post VHR in either group and they had comparable SSO rates in the form of a seroma (22% and 17%; respectively). Patients with BMI $>$ 50 tended to stay longer to regain mobility 2.2 $\pm$ 0.4 days (vs 0.8 $\pm$ 0.2 days for BMI 35-50 group). One patient with BMI of 40 was readmitted with acute renal failure in setting of diarrhea and colitis. Of note, while reporting was not consistent, there was no significant weight change in either group post surgery (2% and 1% weight loss).
Conclusion(s): Robot-assisted ventral hernia repair in obese patients is feasible and has a lower SSI rate compared to open VHR. This population needs to be further studied to practice a holistic approach to obese patients with hernias.

P008

That Does Not Belong There! A Case Report: Incarcerated Femoral Hernia Containing Appendix

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Femoral hernias account for 3% of groin hernias, are more common in females, and are at higher risk for incarceration secondary to a narrow femoral neck. It is caused by the protrusion of the sac through the femoral canal that lies beneath the inguinal ligament and medial to the femoral vein. It usually presents as a bulge below the inguinal ligament. Rarely (0.08-0.13%), a vermiform appendix travels through the femoral canal and presents as an incarcerated femoral hernia. De Garengeot first described this in 1731. In the literature, patients with de Garengeot hernia were treated with primary femoral hernia repair and appendectomy via inguinal approach or midline laparotomy, or both. Here we present a case where a hernia was managed using minimally invasive techniques (laparoscopic and inguinal approach) with quick postoperative recovery.

A 58-year-old female with a past medical history of right inguinal hernia presented with one day of pre-syncopal symptoms. She noticed a painless bulge in her right groin for 3 days, last bowel movement was on the morning of the presentation. Her abdomen was soft, non-tender, no guarding. There was a non-reducible, non-tender bulge in the right groin with no skin changes. She was afebrile and tachycardic. Her WBC was 11 g/dl and lactate was 2.4 mmol/L. Computed tomographic scan of the abdomen/pelvis indicated a perforated acute appendicitis with 3.2 × 4.3 cm fluid collection (appendiceal tip abscess) within a femoral hernia. She received intravenous antibiotics and underwent an open right femoral hernia repair. The appendiceal tip was hemorrhagic. The proximal appendix could not be delivered out secondary to the small hernia defect size. A 5 mm periumbilical port was placed, and pneumoperitoneum was established. A 12 mm port was placed in the left lower quadrant. The appendix was reduced in the abdomen. A 5 mm port was placed through the femoral canal. The base of the appendix and mesentery were divided using the stapler. The appendix was removed through the left lower quadrant incision. In the absence of an appendiceal perforation, the hernia defect was closed using an absorbable mesh plug. She tolerated the diet and was discharged home on postoperative day 1. Pathology was significant for benign appendix with peri-appendiceal fat inflammation.

Based on this case, we recommend using both minimally invasive and inguinal approaches to repair a de Garengeot hernia. This approach provides the benefit of hernia closure, reducing hernia recurrence, and fast post-operative recovery.

P009

Single Surgeon Experience with Extended Totally Extraperitoneal (eTEP) Technique for Robotic Hernia Repair

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Introduction: The surgical management of abdominal wall hernias continue to involve, with increasing use of the robotic platform. The objective of this study is to report outcomes associated with a case series of robotic abdominal wall hernia repair with the extended totally extraperitoneal (R-eTEP) technique.

Methods: Consecutive R-eTEP hernia cases were captured in a prospective database between 2020 and 2023 and analyzed retrospectively. Patient demographics, pre-operative comorbidities, hernia history, operative information, and 30-day outcomes were captured. Continuous variables are compared using Kruskal Wallis tests, while categorical variables are compared using chi-squared or Fisher exact tests.

Results: Fifty-four R-eTEP cases were analyzed, with a mean age and BMI of 62-years and 29.7 kg/m2. 74% were male. 18% had a prior incisional hernia repair, and 31% required concomitant enterolysis. Paravertebral block was utilized in 98%. Incisional hernia distribution included 33% epigastric, 48% umbilical and 20% infraumbilical. Hernia diameter distribution included 13% less than 4 cm, 61% 4-10 cm, and 2% greater than 10 cm. 91% had bilateral rectus myofascial release, while 3% and 6% required a unilateral or bilateral transversus abdominus release, respectively. Mean procedure time was 3.3-h (SD 0.89 h), including a mean enterolysis time of 66.7 min (SD 32.2 min). Conversion was 1.9%. Mean length of stay was 0.73-day (SD 0.81 day). Mean discharge and interval follow-up pain scores was 2.57 (SD 2.02) and 0.72 (SD 1.19), respectively. There were no reoperation or early recurrence. Complications included one hematoma (1.9%) and one skin complication (1.9%).

Conclusion: Robotic eTEP herniorrhaphy is a safe and effective technique for managing ventral abdominal hernias, as most can be done as outpatient procedures with excellent patient reported outcomes.

P010

Robotic Minimally Invasive Inguinal Hernia Repair with The Dexter Robotic System™: a Prospective Multicenter Clinical Investigation

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Introduction: Robot-assisted transabdominal preperitoneal inguinal hernia repair (rTAPP) has been proven safe and feasible with various robotic platforms. The Dexter robotic system is an open platform consisting in a sterile surgeon's console, two robotic instrument arms, and one robotic endoscope arm. This study aimed to confirm the perioperative and early postoperative safety and clinical performance of the Dexter Robotic System, in patients undergoing primary transperitoneal inguinal hernia repair.
Methods and Procedures: We conducted a prospective multicenter study at three centers in France, Germany, and Switzerland (ClinicalTrials.gov Identifier NCT05873582). The primary objectives of the study were to document the successful completion of the rTAPP procedures and to collect data on the occurrence of serious adverse events (Clavien—Dindo grades III-V), device-related events, and other adverse events perioperatively and up to 30 days post-surgery. The procedures were performed by three surgeons with varying levels of experience in robotic systems, including novice, intermediate and expert.
Results: Fourty seven patients were operated for inguinal hernia repair (30 unilateral, 17 bilateral). The mean age and BMI of the patients were 60 years (± 16) and 25.58 kg/cm2 (± 3.44), respectively. All surgeries were successfully completed as planned using three standard laparoscopy trocars sized 10/12 mm. Each procedure was performed with robotic assistance, and there were no conversions to open surgery or laparoscopy. Intra-operative complications and device deficiency were not observed. The mean skin-to-skin operative time was 56 min (± 14) for unilateral hernia repair and 94 min (± 24) for bilateral hernia repair. The mean robotic console time was 36 min (± 14) for unilateral hernia and 71 min (± 23) for bilateral hernia repairs. The patients were discharged within 1 day (± 1 day) after surgery.
Conclusions: Our experience with Robotic TAPP utilizing the Dexter system confirms its feasibility and safety, with operative times aligning with those reported in the literature for other robotic platforms. This study demonstrates the practicality and safety of the robotic approach, even when adopted by a surgeon new to robotic techniques. The Dexter system emerges as a valuable device in the toolkit of hernia repair, offering promising results for both experienced robotic surgeons and those entering the field.

P011

Repair of Recurrent Ventral Incisional Hernia After Single Pedicle TRAM Flap Neophallus Construction: A Case Report

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Introduction: Transverse rectus abdominis myocutaneous (TRAM) and deep inferior epigastric perforator (DIEP) flaps are commonly employed for breast reconstruction following mastectomies. While versatile, these procedures are associated with complications including hernia formation. This case report discusses the unique instance of a transgender male patient who underwent TRAM flap neophallus construction and presented with a recurrent ventral incisional hernia decades after neophallus construction.
Methods and Procedures: A 69-year-old transgender Caucasian male, assigned female at birth, with a history of bilateral mastectomy and rectus phalloplasty performed in the 1980s, presented with a recurrent ventral incisional hernia. He complained of a five-year history of an abdominal bulge and worsening left lower quadrant abdominal pain exacerbated by straining. Exam revealed a 4 cm right-sided ventral incisional hernia. The patient's surgical history was notable for urethroplasty for recurrent urethral strictures in 2009 and 2011, as well as incisional herniorrhaphy in 2011.
Results: Following multidisciplinary operative planning, the patient underwent laparoscopic robotic-assisted ventral herniorrhaphy with mesh. The defect was repaired via a transabdominal preperitoneal approach with self-fixating mesh. The operative course was uneventful, with only noted omental adhesions and the absence of the left rectus muscle intraoperatively. The patient's symptoms resolved postoperatively, and he remained symptom-free at three-month follow-up, without evidence of hernia recurrence on examination. This case highlights the successful management of a recurrent ventral incisional hernia in a patient who had undergone TRAM flap neophallus construction.
Conclusion: Complications related to abdominal hernias and bulging have been a concern in surgeries involving TRAM and DIEP flaps used in breast reconstruction. A recent Systematic Review and meta-analysis by Espinosa-de-Los-Monteros et al. (2021) indicated that the original TRAM flap technique was associated with the highest rate of hernia and bulge, with subsequent modifications demonstrating reduced rates but no significant differences among them. This case demonstrates that a laparoscopic robotic-assisted transabdominal preperitoneal approach is a viable option for these types of hernias. This case report underscores the importance of recognizing potential complications in patients with history of non-traditional uses of surgical techniques. Through a multidisciplinary approach and the use of laparoscopic robotic-assisted ventral herniorrhaphy with mesh placement, we achieved a favorable outcome in the management of a recurrent ventral incisional hernia following TRAM flap neophallus construction in a transgender male patient. Further research and awareness of complications in such cases are warranted to improve patient care in similar scenarios.

P012

Safety of Laparoscopic Incisional Hernia Repair After Liver Transplant: A Comparative Study from a Single Institution

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Introduction: Immunosuppression is both a risk factor for the development of ventral incisional hernia (VIH) and a risk factor for complications of VIH repair. The outcomes of laparoscopic VIH repair after liver transplant (LT) specifically, has not been thoroughly explored. Our objective is to compare the outcomes of laparoscopic VIH repair in patients after liver transplant vs. non immunosuppressed patients.
Methods and Procedures: We reviewed our prospectively maintained database in the Abdominal Core Health Quality Collaborative (ACHQC) from 2012-2022. Patients who underwent laparoscopic VIH repair following LT were identified and compared to a group of non-immunosuppressed patients who underwent laparoscopic VIH repair. Demographics, comorbidities, American Society of Anesthesiologist (ASA) Classification, and short-term outcomes including recurrence and surgical site occurrences (SSO) were analyzed.
Results: We identified 32 patients who underwent laparoscopic VIH after LT and 209 patients who underwent laparoscopic VIH repair in

the ACHQC database. There was no difference regarding mean age, BMI, or most comorbidities. Patients underwent hernia repair after LT had a higher ASA score ($p < 0.05$) and hospital length of stay (LOS) > 24 h (90% vs 40%, $p < 0.05$). However, no statistical difference was found between both groups regarding complications, operative time, readmission, or reoperation. Additionally, no significant difference was found regarding SSO or 30-day readmission.
Conclusion(s): Our results indicate that laparoscopic VIH repair on immunosuppressed patients after LT is safe and leads to comparable short term results to non- immunosuppressed patients.

P013

Laparoscopic Prosthetic Mesh Repair with Clean Contaminated Surgeries- Feasibility and Safety

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Introduction: Laparoscopy allows intervention for multiple pathologies under single anesthesia. According to dictum, prosthetic meshes are recommended for use in clean surgeries. We reviewed the feasibility and safety of use of prosthetic mesh for repair of hernia concomitantly with elective clean contaminated surgeries.
Materials and Methods: After approval from Institutional Ethics Committee, retrospective study was conducted including patients operated from January 2017 to June 2022.
Patients requiring cholecystectomy were selected based on not having acute symptoms and without any common bile duct intervention. Patients with collapsed gall bladder, thick wall, and severe adhesions on ultrasound were excluded.
Inguinal hernia was operated first with TEP technique following which cholecystectomy was completed placing standard ports. Cystic duct was milked and clipped. Specimen was bagged and extracted from epigastric port.

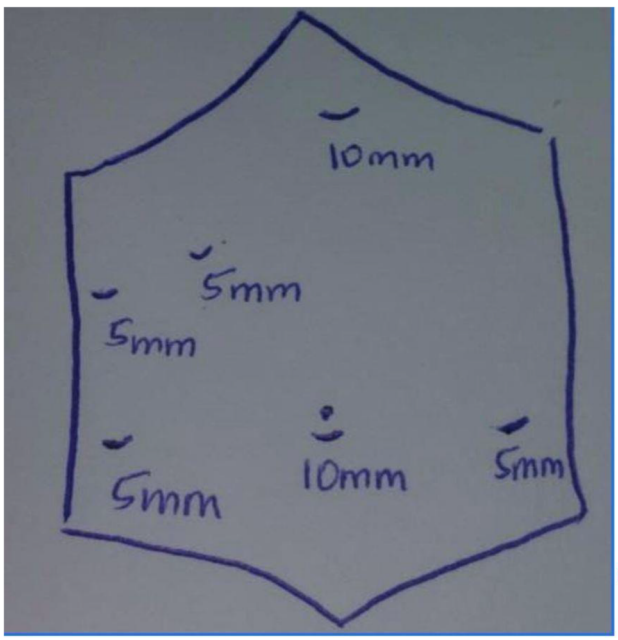


Figure 1: Port placement in laparoscopic cholecystectomy with TEP repair

Patients requiring prostate surgery were operated first with TURP followed by TEP repair. If extravasated irrigant fluid was present in extraperitoneal space, it was irrigated with normal saline before placing mesh.

Patients with umbilical hernia were operated for cholecystectomy first. Midclavicular port was placed more cranially than normal so that it does not interfere with mesh placement.

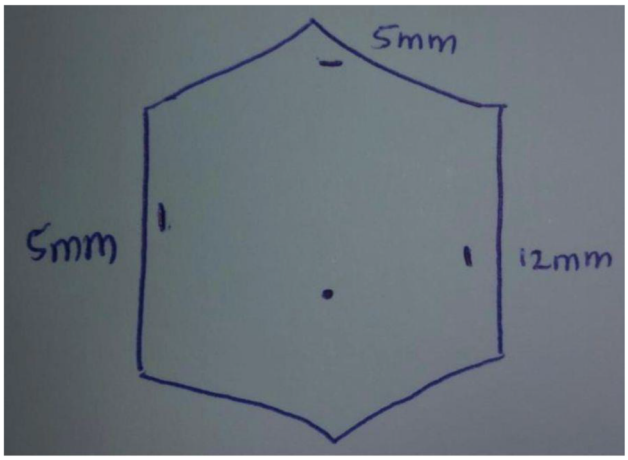


Figure 2: Port placement of laparoscopic cholecystectomy with IPOM-plus.

Patient with prolapse were operated for mesh rectopexy first with supraumbilical port following which, cholecystectomy was completed.
Results

	B/L TEP with TURP	B/L TEP with cholecystectomy	Lap cholecystectomy with umbilical hernia repair	Lap rectopexy with cholecystectomy
Number of patients (Total = 122)	56	32	32	2
Mean operative time (min)	92	58	94	122
Postop Day of starting orals	0	0	0	2
Mean hospital stay (days)	3	2	2	4

None required conversion to open procedure. In our study, other than bladder hematoma following TURP in one patient, no other complications such as infections or recurrence were noted with follow up upto 1 year.
Conclusion: Combining clean contaminated surgeries with prosthetic mesh repair does not significantly alter the outcome and can be considered a safe procedure as it not only reduces the duration of stay, cost of treatment, morbidity but also prevent the hazards of second surgery and anesthesia.

P014

The Lateral Approach TEP Method Based on Knowledge of Fascial Anatomy and Fascial Structure in the Inguinal Region

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Introduction: Landmarks are essential for the safe performance of laparoscopic inguinal hernia repair, and fascia is one of them and is even more critical in the TEP method, where dissection begins from the extraperitoneal space. However, the details of the fascia have not yet been clarified. The fascia is thinner than expected, and the significant individual differences in fascia make it challenging to elucidate the issue. We utilized several fascial structures that are relatively regularly observed during TEP for landmarks during dissection, VAS protection, creation of a robust peritoneal flap, and mesh fixation, which are helpful.

Methods and Results: TEP was performed using a 3-port technique in the midline of the lower abdomen under observation with a 4 K camera. The posterior layer of the rectus sheath is divided cranially into the tendinous part, attenuated part, and membranous part, and the medio caudal portion is thinned and unclear, so we dissected it caudally along the semilunar line. Proceed forward, enter the preperitoneal space at the membranous area where the peritoneum separates, and seek the peritoneal edge outward to reach the inguinal ring. After recognizing the hernia sac while the preperitoneal fascia still surrounded it, we performed parietalization on the dorsal half circumference and then ligated and transected the hernia sac. Distal ligation prevented inguinal ring dilatation and postoperative hematoma. We kept the VAS embedded in a Spermatic sheath, dissected it medially to the umbilical artery cord, and then treated the umbilical prevesical fascia to reach the Cooper ligament and Retzius space. We could prevent the mesh from contacting the VAS by keeping the Spermatic sheath embedded in the fascia and dissecting it without exposing it. On the outside, thickened areas of the fascia were observed in both the deep and superficial preperitoneal facias. The former is firmly adhered to the peritoneum and is often difficult to dissect, so it is cut sharply, and the dissected surface is moved into the preperitoneal space. We created a robust peritoneal flap by attaching connective tissue to the peritoneum as much as possible except at the parietalization site. The latter is a solid structure continuous from the IPT, and we can eliminate the need for tucking by sandwiching the mesh between this and the peritoneum, which has connective tissue.

Conclusion: By sequentially tracing the fascia while checking it, an appropriate dissecting layer was obtained, and safe and reliable TEP using each fascia became possible.

P015

The Impact of Unilateral Transversus Abdominis Muscle Release on Outcomes in Robot-Assisted Enhanced-View Totally Extraperitoneal Ventral Hernia Repair

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Perioperative data

Variable	Hemi-TAR	Non-hemi-TAR	*p*-value
Total size of hernia defect (cm^2), mean ± SD	74.6 ± 75.3	65.7 ± 169.9	**<0.05**
Number of defects			
Mode	1	1	
Mean	1.6 ± 1.0	1.6 ± 1.0	0.99
n = 1 (%)	21 (65.6)	45 (64.3)	
n = 2 (%)	5 (15.6)	14 (20.0)	
n = 3 (%)	3 (9.4)	6 (8.6)	
n ≥ 4 (%)	3 (9.4)	5 (7.1)	
Conversion to open	0 (0.0)	0 (0.0)	
Operative duration (hours), mean ± SD	4.4 ± 1.0	3.6 ± 1.3	**<0.001**
Postoperative length of stay, mean ± SD	0.5 ± 0.9	0.5 ± 0.8	0.73
0 – *n* (%)	23 (71.9)	47 (67.1)	
1 – *n* (%)	5 (15.6)	15 (21.4)	
2 – *n* (%)	2 (6.3)	6 (8.6)	
3 – *n* (%)	2 (6.3)	2 (2.9)	

Rates of Postoperative Complications.

Wound-related complications	Hemi-TAR *n* (%)	Non-hemi-TAR *n* (%)	*p*-value
Seroma	4 (12.5)	3 (4.3)	0.20
Hematoma	0 (0.0)	1 (1.4)	0.99
SSI (Surgical site infection)			
Superficial	2 (6.3)	0 (0.0)	0.10
Deep	0 (0.0)	0 (0.0)	
Skin necrosis	0 (0.0)	0 (0.0)	
Superficial wound dehiscence	0 (0.0)	1 (1.4)	0.99
Posterior layer breakdown	0 (0.0)	2 (2.9)	0.99
Mesh infection	0 (0.0)	0 (0.0)	
Hernia recurrence (anterior layer breakdown)			0.99
30 days	0 (0.0)	0 (0.0)	
1-year	0 (0.0)	1 (1.4)	
Non-wound-related complications			
Postoperative ileus	0 (0.0)	0 (0.0)	
Urinary tract infection (UTI)	0 (0.0)	0 (0.0)	
Acute renal failure (ARF)	0 (0.0)	0 (0.0)	
Respiratory	0 (0.0)	0 (0.0)	
DVT/PE	0 (0.0)	0 (0.0)	
MI	0 (0.0)	0 (0.0)	
30-day ED presentation	1 (3.1)	2 (2.9)	0.99
30-day readmission	0 (0.0)	3 (4.3)	0.55
Medical management	0 (0.0)	1 (1.4)	
Surgical management	0 (0.0)	2 (2.9)	

Objective: Robot-assisted enhanced-view totally extraperitoneal (eTEP) retro-rectus repair for anterior abdominal wall hernia have been demonstrated to be safe and feasible. Posterior component separation with transversus abdominis muscle release (TAR) and mesh placement has been shown to provide very durable repair with low morbidity even in comorbid patients with large defects. We aimed to determine the impact of unilateral TAR (hemi-TAR) technique on postoperative outcomes in patients undergoing robot-assisted eTEP ventral hernia repair.

Methods: All patients underwent robot-assisted eTEP retro-rectus repair at our Comprehensive Hernia Center. Patients were subcategorized into those who underwent retro-rectus repair with hemi-TAR and those who did not undergo hemi-TAR (non-hemi-TAR group). Patient demographics, comorbidities, hernia characteristics, operative duration, postoperative length of stay (pLOS), and 30-day postoperative outcomes were analyzed. Chi-square or Fisher's exact tests were used to analyze significance of associations between categorical variables and t-test or Mann Whitney U test were used to compare continuous data.

Results: 102 patients were included; hemi-TAR (n = 32) and non-hemi-TAR (n = 70) cohorts. The mean age was 56.3 years, 59.8% were male. Between the cohorts, there was no difference in age (mean ± SD, 55.09 ± 12.47 vs 56.81 ± 12.12, p = 0.47), BMI (32.28 ± 5.31 vs 31.98 ± 4.97, p = 0.72), or ASA scores (2.34 ± 0.55 vs 2.34 ± 0.51, p = 0.95). The hemi-TAR group had a

greater rate of hypertension as a comorbidity (37.5% vs 61.43%, $p = 0.03$), total hernia defect size (74.59 vs 65.68 cm^2, $p < 0.05$), and a longer mean operative duration (4.35 ± 1.01 vs 3.55 ± 1.26 h, $p < 0.005$). Posterior layer breaks (n = 2) and hernia recurrence (n = 1) only occurred in the non-hemi-TAR group and required operative intervention. There was no significant difference in pLOS or the incidence of wound and non-wound related complications.

Conclusion: Performing hemi-TAR in addition to robot-assisted eTEP retro-rectus ventral hernia repair is safe and effective in patients with larger anterior abdominal wall defects, increases operative duration but may decrease complications, such as early recurrence and posterior layer break.

P016

Complications of Ventral Hernia with Prone Position During Non-Abdominal Surgery: A Systematic Review

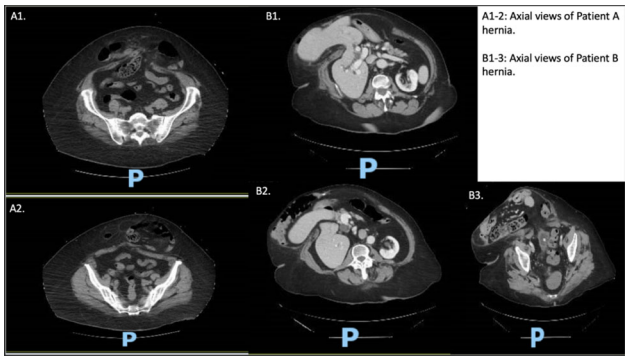
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Introduction: Prone positioning is used to access the posterior head, neck, spine, and retroperitoneum. It is associated with complications from increased anterior structure pressure, including postoperative vision loss, pressure ulcers, cardiovascular compromise, abdominal compartment syndrome, and brachial plexopathy. However, previous studies have not documented the epidemiology for hernia incarceration secondary to prone positioning and only emphasized that lateral and anterior approaches can lead to incisional hernias. We present two cases of ventral hernia complication after surgical prone positioning that we hypothesize are secondary to increased thoracoabdominal compression.

Case Presentation: Patient A is a 67YF with PMH of hypertension, hyperlipidemia, and umbilical hernia repair who presented for a C3 laminectomy and C4-C6 laminoplasty with prone positioning. Intraoperatively, she was observed to have a large ventral hernia with multiple anterior abdominal wall defects containing loops of nonobstructed small and large bowel. A postoperative CT demonstrated no acute obstruction with no significant small bowel dilatation. She experienced constipation and deteriorated with AMS, tenderness, and leukocytosis, which was concerning for large bowel obstruction with bowel strangulation. This required an exploratory laparotomy and extended right hemicolectomy for necrotic transverse colon and cecum. Postoperative recovery was uneventful and she was later admitted for rehabilitation.

Patient B is a 70YF with PMH of pseudotumor cerebri, hypertension, hyperlipidemia, diabetes mellitus, GERD, and chronic back pain who presented for lumbar spondylolisthesis repair with L4-L5 laminectomy and L5-S1 microlumbar discectomy with prone positioning. A large ventral hernia was recognized intraoperatively, with loss of domain demonstrated on CT. Her hernia contained a nonobstructed stomach, left hepatic lobe, and large and small bowel. Postoperative recovery was uneventful with hernia monitoring without surgical intervention. Erythema and swelling were demonstrated around the spinal incision site which necessitated uncomplicated wound revision and washout.

Conclusion: Two similar presentations resulted in dramatically variable outcomes. Of note, for Patient A, abdominal contents were not propped up like Patient B's was. B was also successfully treated with a bowel regimen after receiving high dose postoperative opioids. Prior studies regarding hernias illustrate that risk factors like prior abdominal wall hernia, prior abdominal surgery, constipation, and obesity are often unaddressed and lead to high hernia occurrence. For those needing emergency hernia surgery, 15.4% needed intestinal resection, with prolonged incarceration increasing the risk of resection. Because of the potentially rapid deterioration, history of abdominal hernias should be evaluated prior to proceeding with surgeries in the prone position and accounted for intraoperatively.



P017

National Outcomes of Open Inguinal Hernia Repairs before and After 2020. Do We Need to Go Back to the Basics?

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Introduction: During the COVID-19 pandemic, operative volumes dropped significantly in the United States. Some have suggested this could impact patient outcomes, especially when pertaining to open procedures, which are now less frequently performed. Here, we explored temporal trends in outcomes of open inguinal hernia repairs in the United States before and after 2020 using the Abdominal Core Health Quality Collaborative (ACHQC) database. We hypothesized outcomes have remained unchanged.

Methods: In this retrospective cohort study, all patients who underwent elective open unilateral inguinal hernia repairs from January 2016 to August 2023 within ACHQC, were included. After stratifying the cohort by year of surgery (2016-2019 vs. 2020-2023) we compared 30-day and 1-year outcomes [surgical site infection (SSI), surgical site occurrence (SSO), surgical site occurrence requiring intervention (SSOPI), reoperation, recurrence, and quality of life using Eura-HS score] using univariable analysis and multivariable logistic and linear regression models.

Results: A total of 10,137 patients were included. The median age in the cohort was 64 years (IQR 53-73), 91% (N = 9,242) were male, and 86% (N = 8,707) were White. Among them, 4,400 (43%) underwent surgery between 2016-2019 and 5,737 (57%) between 2020-2023. The operative time was < 60 min in 66% (N = 3,785) of the (2020-2023), and in 56% (N = 2,457) of the (2016-2019) group ($p < 0.001$). In terms of outcomes, those operated after 2020 had higher proportion of 30-day SSO (4.3% vs. 3.1%, $p = 0.024$), but better quality of life, as suggested by lower Eura-HS quality of life scores at 30-day (median score 12 vs. 14, $p < 0.001$) and 1-year (median score 1 vs. 5, $p = 0.017$) postoperatively. After adjusting for age, sex, BMI, and operative time, those operated after 2020 were more likely to develop SSO at 30 days than those operated before 2020 (adjusted OR 1.55, 95%CI: 1.16 to 2.10). The rest of the measured outcomes were comparable among groups.

Conclusions: This study suggests that the outcomes of open inguinal hernia repair in the United States after 2020 worsened in terms of surgical site occurrences at 30-days. Although this finding merit further investigation, other postoperative outcomes did not seem to be similarly affected.

Table 1 Postoperative outcomes after open inguinal hernia repair 2016-2023.

	Odds Ratio/Coefficient	95%CI	
	SSO at 30-days		
Surgery 2020-2023 Compared to 2016-2019	1.55	1.16	2.10
	Recurrence at 1-year		
Surgery 2020-2023 Compared to 2016-2019	0.61	0.25	1.46
	Quality-life at 30-days (Eura-HS Score) (Linear model)		
Surgery 2020-2023 Compared to 2016-2019	-0.46	-1.98	1.06
	Quality-life at 1-year (Eura-HS Score) (Linear model)		
Surgery 2020-2023 Compared to 2016-2019	-3.78	-42.94	35.38

*Adjusted by age, sex, BMI, operative time.

P018

Ovarian Inguinal Hernia After Oocyte Hyperstimulation in a 34-Year-Old Female: A Case Report

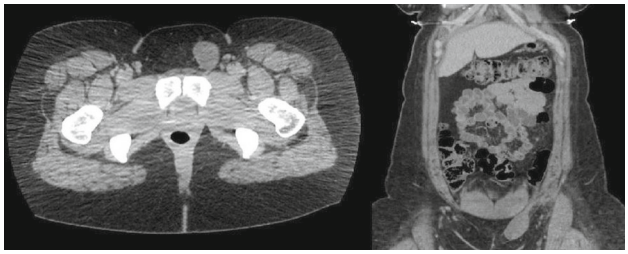
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Introduction: Inguinal hernia repairs are a commonly performed operation with an estimated 800,000 repairs every year in the United States. Only 10% of all inguinal hernias occur in women, and in rare instances, inguinal hernias will contain ovaries, fallopian tubes, or the uterus. Here, we describe a case of ovary-containing inguinal hernia after receiving oocyte hyperstimulation for infertility which has not been described in the current literature.

Case Report: A 34-year-old African American female was referred for vulvar mass after undergoing oocyte stimulation in preparation for in-vitro fertilization. The patient stated that she had always been able to palpate a soft mass in her left mons/labia since childhood, however, she never noticed any issues after undergoing stimulation. Subsequently, the mass had enlarged and abutted the labia majora, causing significant discomfort. Ultrasonography was suggestive of the presence of an ovary in the left labia. The reproductive endocrinologist was able to retrieve several eggs from the left labial. The patient was then referred to gynecology and general surgery to evaluate and treat the suspected ovarian inguinal hernia. CT of the abdomen and pelvis demonstrated a left inguinal hernia and a solitary right kidney (Fig. 1). The patient proceeded with robotic inguinal repair with oophoropexy versus oophorectomy.

The abdominal cavity was accessed and the robot was docked in standard fashion. Upon examination of the hernia sac, there were substantial adhesions in the inguinal canal and ovary at the internal ring. Mobilization of the internal ring and dissection of the inguinal canal required significant retraction, blunt dissection, and electrocauterization. Eventually, the ovary was successfully retracted into the abdominal cavity. Following the ovary down into the pelvic cavity revealed an aplastic fallopian tube and unicornuate uterus. An oophoropexy was performed by the gynecology surgeon. A synthetic ProGrip Mesh was used to cover the hernia defect and the abdomen was closed in standard fashion. The patient tolerated the procedure well and the postoperative course was unremarkable. The patient was discharged home on postoperative day one and doing well at her 2-week postoperative follow-up.

Discussion and Conclusion: Here, we described a case of ovarian inguinal hernia induced by oocyte hyperstimulation with successful percutaneous oocyte retrieval through the labia. This case highlights the importance of obtaining proper imaging as part of the infertility evaluation and having suspicion of herniated gynecological structures as a possible complication after oocyte hyperstimulation, particularly in the setting of existing Mullerian anomalies.



P019

Robotic Bilateral Transversus Abdominis Release with Single, Bottom Dock, Total Extraperitoneal Approach for Ventral Hernia Repair

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Background: The extended totally extraperitoneal (eTEP) approach is increasingly being used for the surgical repair of large ventral and incisional hernias. Similarly, the addition of a posterior component separation with transversus abdominis release (TAR) technique is a novel procedure for more complex abdominal wall reconstruction. We are experimenting and proposing a total extraperitoneal robotic approach with a single bottom docking that allows the completion of bilateral TAR for the repair of umbilical and supraumbilical hernias.

Methods: This study describes pre-operative patient selection, positioning, and critical surgical steps of this novel technique. This procedure requires appropriate positioning of the patient in order to decrease intraoperative collisions. Single and bottom docking is the key component of this technique. Initial access in the retro-rectus space is made via the placement of a spacer balloon directly into the pelvis. After ports are positioned at the pelvis area, the dissection is started in the pelvic preperitoneal space in a cephalad direction. Subsequently, transection of both posterior rectus sheaths is performed, completing a bilateral bottom-up TAR in patients that require further dissection for appropriate mesh overlap. After completing this step, the defect in the peritoneum, as well as, the midline defect in the linea alba is plicated with running barbed suture. Finally, a sub-lay retro-rectus polypropylene mesh is placed to cover the dissected space.

Results: The main goal of this technique is to perform a bilateral TAR with a single docking, as this usually requires double docking. The benefit of adding a bilateral TAR is to create enough space to develop a wider sub-lay retro-rectus mesh overlap and release the tension of the wide defects closure.

Conclusion: Robotic-assisted ventral hernia repair through eTEP approach with single, bottom dock bilateral TAR has multiple advantages and is an excellent alternative for umbilical and supraumbilical hernia repair.

P020

Retrospective Analysis of Enhanced View Total Extraperitoneal Repair for Ventral and Inguinal Hernia

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Introduction: Hernia surgery remains one of the commonest surgeries performed all over the world. There has been many advances in the field. eTEP is one such minimal access technique that was first introduced by Jorge Daes in 2012 for repair of difficult inguinal hernia.
Method: Retrospectively data was collected from electronically maintained database of patient since last January 2022. Data was collected including demographic profile, clinical examination, and type of hernia. All included patient underwent eTEP Mesh Repair. Post operative data was collected, analyzed and early outcomes assessed.
Result: Total 35 patient underwent eTEP procedure for ventral as well as inguinal hernia at AIIMS since January 2022. Out of all, 20 being male, and 15 females. There was 28 cases of ventral hernia—out of which, 6 were incisional, 8 epigastric and 14 were umbilical. There was total 7 cases of inguinal hernia. Median age was 44.Intraop inadvertent peritoneal tear was seen in 5 cases in which peritoneal cavity was decompressed by inserting veress needle. Patients who were discharged with drain in situ in view of significant output were 21, in whom drain was removed on weekly follow up. Post-op day 1, median VAS for pain was 2, there was zero incidence of seroma formation. And no readmissions were noted.
Conclusion: Based on our experience on eTEP technique, we believe that it has the potential to be the ideal technique for inguinal as well as ventral hernia repair with minimal early postoperative complications, reduced local wound morbidity, enhanced recovery and early discharge.
Keywords: Ventral Hernia, Inguinal hernia, eTEP, Laparoscopic hernia repair

P021

Hernia Repair Outcomes During the Transition to Extraperitoneal Parastomal Hernia Repair: A Single Surgeon Experience

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Background: Parastomal hernias represent a difficult challenge encountered after ostomy creation. Patients can present with acute obstruction and protrusions that may cause pain and make pouching challenging. Traditionally, parastomal hernias were managed with intraperitoneal mesh as a keyhole or Sugarbaker-type repair. However, the development of both open and minimally invasive extraperitoneal approaches have allowed for the use of uncoated mesh constructs isolated from intraabdominal viscera.
Methods: A single surgeon retrospective review of consecutive adult patients who underwent surgical intervention for parastomal hernias between June 2010 and April 2023. Primary outcome was parastomal hernia recurrence and complications. Secondary outcomes included type of ostomy revised, mesh, surgical approach, infection, hematoma, and reoperation.
Results: A total of 61 of patients were identified. Of these, 64% (39) had enterostomies or colostomies, and 36% (22) had urostomies. Operations were conducted via an open approach in 25% (15), laparoscopically in 34% (21), and robotically in 41% (25). Between 2010 and 2016, repairs were performed laparoscopically 72% (13) or open 28% (5). Biologic mesh was used in 56% (12) and synthetic mesh was used in 28% of cases. With the adoption of open retromuscular techniques, from 2017-2023, a retromuscular repair was performed 74% (32) while intraabdominal coated mesh was used in 19% (8) of repairs. During this time period, repairs were performed laparoscopically 19% (8), robotically 58% (25), or open 23% (10). Robotic extraperitoneal keyhole repairs were performed for paraursotomy hernias in 30% (13) of cases. Robotic extraperitoneal Sugarbaker repair was performed in 28% (12) of patients. Open retromuscular repair in 16% (7) or patients. Biologic mesh use declined to 5% (2), while synthetic mesh was used in 86% (37) of cases. The known recurrence rate was 8% (5). Complications were seen in 7% (6) of cases, with immediate issues of 2 hematomas (3%). Delayed complications were experienced in 3% (2) with infection and conduit erosion requiring reoperation for salvage. There were no significant differences in complications between cohorts.
Conclusion: Parastomal hernia repair has undergone a paradigm shift with the adoption of extraperitoneal open and robotic approaches. By doing so, parastomal hernias can be repaired via an extraperitoneal approachinstead of traditional intraperitoneal approaches. This protects viscera from the mesh prosthesis and allows for cost-effective and simplified mesh to be placed in a more favorable location with regards to adhesions, infection, and delayed complications. However, recurrence rates are still significant, representing the challenging nature of this difficult problem.

P022

Watchful Waiting for Ventral Hernias: Are There Disparities in Who Is Receiving a Repair?

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Background: In cases of minimally symptomatic ventral hernias, watchful waiting has been demonstrated to be non-inferior to opting for immediate surgical intervention. This variation in practice allows potential bias in the decision for operative and nonoperative approaches. We hypothesize that, despite matching for comorbidities, there is a disparity in who receives operative management for ventral hernias.
Methods: We utilized the TriNetX US Collaborative Research Network, a federated database with deidentified electronic health record data from approximately 100 million patients in 59 healthcare organizations. Using ICD-10 codes, we identified patients who presented with a ventral hernia and stratified whether they received a hernia repair within 5 years of initial presentation. We performed a 1:1 propensity score match between operative and nonoperative patients, adjusting for factors such as smoking, diabetes, hypertension, cerebrovascular disease, kidney disease, chronic lower respiratory disease, and ischemic heart disease. We compared the proportion of patients who received operative and nonoperative management based on race and ethnicity among these matched cohorts.
Results: We matched 282,291 pairs of patients who did, and did not, receive operative management of their ventral hernia. White patients made up a larger proportion of those who received hernioplasty within 5 years (70.29% vs. 60.87%, $p < 0.001$), whereas Black patients made up a larger proportion of those who did not receive a

repair (14.46% vs 15.65%, $p < 0.001$). Asian patients also had more representation in the nonoperative group. See table.

Conclusions: Using a federated database, we show that among patients with ventral hernias undergoing surgical management, there is a disproportionate under-representation of certain minority groups, particularly Black and Asian patients. While watchful waiting is acceptable for minimally symptomatic hernias, our study suggests that racial disparities and health inequities may exist in the proportion of minority patients who ultimately receive a hernia repair. This difference in likelihood of operative treatment, despite propensity matching for comorbidities, may point to inequitable utilization of surgical resources.

	Patients who received hernioplasty (% cohort)	Patients who did not receive hernioplasty (% cohort)	p-value
White	198,428 (70.29%)	171,843 (60.87%)	< 0.001
Black/ African American	40,821 (14.46%)	44,167 (15.65%)	< 0.001
Asian	3,094 (1.1%)	4,365 (1.55%)	< 0.001
Non-Hispanic	195,405 (69.22%)	167,095 (59.19%)	< 0.001
Unknown Ethnicity	59,324 (21.02%)	92,288 (32.69%)	< 0.001

P023

Robotic-assisted Sugarbaker Repair for Parastomal Hernias: A Single Surgeon Experience

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Background: Peristomal hernia are reported in up to 50% of stoma patients, a may predispose ot other complications such as obstruction or prolapse. Repairs with the Sugarbaker and keyhole techniques have shown a two to three-fold higher recurrence with keyhole repairs but has not accounted for use of the robotic platform which is increasing used for repair. Our objective is to present the experience of a single surgeon performing robotic-assisted Sugarbaker parastomal hernia repairs (PSHR) to assess safety and outcomes.

Methods: PSH repair cases were captured in a prospective hernia database. Procedures performed between 2020 and 2023 were retrospectively analyzed. Data points included demographics, comorbidities, hernia repair history, operative information, and patient reported outcomes. Continuous variables were compared using Kruskal Wallis tests, while categorical variables are compared using chi-squared or Fisher exact tests.

Results: Thirty-two robotic Sugarbaker cases were analyzed, with a mean age and BMI of 61 years and 28.5 kg/m2. 57% were female. 84% were ASA Class 3 or higher and functional status was independent in 96%. 38%, 19% and 19% had obesity, sleep apnea and T2D, respectively. Hernia classification included 16%, 28%, 47% and 9% type 1, type 2, type 3, and type 4 PSH, respectively. 93% received a paravertebral block. Fascial defect closure was 100% and coated-synthetic mesh was used. Mean procedure length was 3.9 h, including a mean enterolysis time of 118 min (SD 57). One (3.1%) intraoperative conduit enterotomy occurred and was suture repaired. Length of stay was 3.3 days (SD 1.98), with mean pain at discharge and interval follow-up of 2.96 (SD 2.47) and 1.53 (SD 1.78), respectively. Readmission and reoperation rates were 12.5%% (n = 4) and 3.1% (n = 1). Deep SSI occurred 6.2% (n = 2) and were managed with local colostomy revision (n = 1) and mesh salvage (n = 2). 6.2% experiences postoperative obstruction. Mean early follow up was 27.32 days with no hernia recurrence.

Conclusion: Robotic Sugarbaker repair using coated-synthetic prosthesis is a safe and effective treatment option for parastomal hernias, without or with concomitant incisional hernia repair, and is associated with excellent short-term outcomes.

P024

Transformational Flexible Robotic Platform for Ventral Hernia Repair: Novel Approaches to Reduce Burden of Core Abdominal Health

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Every year it is estimated that 750 K ventral hernia repairs are completed domestically [1]. The field of hernia repair has undergone rapid change over the past 20 years and there is increased demand for less invasive techniques driven by better clinical and aesthetic outcomes [1]. Innovation has mainly been driven through enabling technologies in minimally invasive and robotic approaches, with significant developmental efforts on reduced- or single-port access. A novel, small, cost-effective robotics platform has been developed that allows all instrument articulation to occur inside the abdomen by 2 flexible instrument arms inserted through a single < 2.0 cm incision laterally in the abdomen. It is well documented that lateral incisions improve overall healing times and decrease the risk of incisional hernias due to the three (3) fascia layers, specifically when you limit the fulcrum effect. The biomimetic instruments (with shoulder, elbow, and wrist joints) articulate inside the abdomen providing no fulcrum rotation about the point of entry into the abdomen. Consequently, the system has a minimal OR footprint as the robotic unit is stationary outside of the patient after docking.

We performed the first lateral "reduced port" transversus abdominis release ventral hernia repair with implantation of mesh in the retro muscular space in a live, 70 kg female porcine model with 15 mm Hg insufflation with the robotic system. The robotic arms were entered laterally and retroflexed to perform an initial 7.5 cm dissection of the peritoneum. The robotic arms progressed to create a 13 cm deep dissection, creating a clear plane within which the mesh was placed, enabling full clinical potential benefits of the technique [2].

With the rising costs associated with ventral hernia repair and the increasing number of ventral hernia repairs being performed domestically and globally, along with the growing number of robotic ventral hernias being performed, the design of this new robotic technology has the potential to realize the clinical benefits of a reduced port approach while minimizing port side trauma and reducing the potential for hernia recurrence [2, 3].

In addition, while traditional multiport robotics remains expensive and time consuming related to setup [4], this new novel single port robotic technology has the ability drive costs to be more in line with traditional laparoscopic approaches.

P025

Our Tailored Laparoscopic Approach to Large Groin Hernias Incorporating Our Novel Surgical Techniques

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Background: One of the most commonly performed surgeries in the world, groin hernia repair, has evolved dramatically from the days of primary suture repairs and the subsequent revolutionary "tension-free" anterior approach. In recent times, the laparoscopic approach to the repair of groin hernias has been extensively adopted worldwide owing to faster recovery times and lower risk of chronic pain. However, this approach, with its inherent risks of seroma formation and recurrence, is still an evolving paradigm for large groin hernias. In this talk, we propose our centre's tailored MIS approach for adult large groin (reducible and non-reducible inguinal, inguinoscrotal, and femoral) hernia surgery using our published novel techniques: TEP/TAPP + (for large direct hernias) and mTEP (for large indirect hernias) in combination with NATURE (intraoperative analgesic control).
Methods: Stemming from the modification of the eTEP procedure and use of local anaesthetic infiltration are our following three novel techniques in use:
TEP/TAPP + : direct hernia defect closure with incorporation of transversalis fascia

mTEP: division of arcuate line and posterior sheath beyond ASIS to incorporate larger mesh

NATURE (Nerves And Transversalis-fascia Using RopivacainE): infiltration of local anaesthesia at specific anatomical locations during laparosocpic hernia surgery
Results:
TEP/TAPP + : Compared to the group that didn't undergo direct defect closure, the group that had closure of the direct defects demonstrated a statistically significant reduction in recurrence (4.4% versus 0.9%, p = 0.036) and seroma formation (12.6% versus 6.4%, p = 0.045).

mTEP: 14 large inguinoscrotal and 4 large femoral herniae were repaired using the modified-TEP technique in 15 patients. These patients reported minimal pain after surgery. There were no reported seromas, complications, or recurrences up to 9 months follow-up period.

NATURE: The intervention group reported lower pain levels immediately after surgery (1.4 ± 1.7 versus 2.4 ± 1.9, $p < 0.01$) and at 4 h post-surgery (0.9 ± 1.1 versus 1.4 ± 1.2, p = 0.02). They also had lower levels of post-operative complications (4% versus 21.3%, p = 0.03).
Conclusion: Our tailored approach utilizing our novel endo-laparoscopic techniques (TEP + , mTEP, NATURE) minimizes morbidity (pain, seroma formation) and recurrence associated with the repair of large groin hernias (inguinal, inguinoscrotal, and femoral).

P026

Robotic Inguinal Hernia Repair for the New Robotic Surgeon—Safety and Early Outcomes in a Large Academic Medical Center

Daniel Tagerman[1]; Michelle Nessen[2]; Diego Lima[1]; Ryan Chin[1]; Nawaf Hindosh[1]; Xavier Pereira[3]; Prashanth Sreeramoju[1]; Flavio Malcher[3]; [1]Montefiore Medical Center; [2]Tulane University; [3]NYU Langone

Introduction: Inguinal hernia repair is one of the most frequently performed operations by general surgeons by both open and minimally invasive approaches. As the robotic platform has become more widely available, its use in inguinal hernia repair and beyond has expanded. For these reasons, robotic inguinal hernia repair (RIHR) is a useful tool for the less experienced general surgeon to grow basic skills and confidence. This work aimed to evaluate outcomes of RIHR in a large single institution study focusing on surgeons new to the robotic platform.
Methods and Procedures: A retrospective study of all patients with RIHR performed between July 2016 and September 2021 at a single academic institution was performed. Patients with concurrent ventral hernia repairs were excluded. Baseline characteristics and outcomes between surgeons with greater than five years of cumulative robotic experience were compared to those with less.
Results: A total of 297 cases of RIHR were included between July 2016 and September 2021 by nine surgeons. Mean age was 55.9 years (SD 15.3) with a strong male predominance (88.2%). Forty-four patients (14.8%) had a previous repair, 87 (29.2%) underwent bilateral repair and mean BMI was 27.3 (SD 4.8). Sixty cases were performed by one surgeon with greater than 5 years of robotic hernia experience (robotic experienced group) and the remaining 237 cases were performed by the other eight surgeons (robotic non-experienced). Robotic experienced group had more patients with previous repair (38% vs 8%, $p < 0.001$), previous abdominal surgery (48.3% vs 25.3%, $p < 0.001$) and more often had bilateral inguinal hernias (41.6% vs 26.1%, p = 0.018). Incarcerated hernias were more common in the robotic experienced group (35% vs 9%, $p < 0.001$). Mean operative time was higher in the robot experience group (132.8 min vs 106.2, p = 0.101). There was no difference in ED presentation within 30 days and complications at 30 days between the groups. Seroma was the most common complication in both groups and was higher in the robotic experienced group (robotic experienced 18.3% vs 12%, p = 0.103). There was no recurrence at 30 days.
Conclusions: While experienced robotic hernia surgeons may approach more complex situations, RIHR is safe for unilateral, bilateral, as well as recurrent or primary hernias for both novice and experienced surgeons.

P027

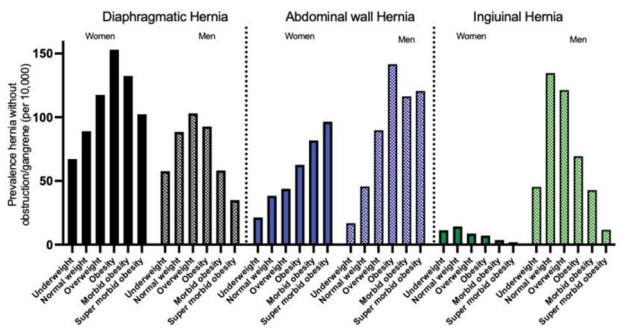
Relationship Between Body Mass Index and Prevalence of Both Diaphragmatic and Abdominal Wall Hernias

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Introduction: Obesity is commonly cited as a risk factor for hernia. Consequently, obese patients are often counseled to lose weight prior to surgery. However, there is a paucity of data objectively assessing the relationship between obesity and hernia.
Objective: To evaluate the prevalence of abdominal hernias in patients stratified by body mass index (BMI) who present for routine clinical care for a primary diagnosis of hernia.
Methods: Cohort study including all patients older than 16 years seen any UCLA Health outpatient clinic between January 2018 to June 2023. Only patients with ICD-10 codes for abdominal hernias coded as the primary reason for a clinic visit were included. Demographic data such as age, sex, race, BMI were obtained. Hernia diagnoses were grouped into the categories of diaphragmatic hernias (K44.9), ventral hernias (K42, K43, K45, K46), and inguinal/femoral hernias (K40, K41). The primary endpoint was prevalence of hernia type per weight group, defined as underweight (BMI ?18.5), normal weight (BMI 18.5-24.9), overweight (BMI 25.0-29.9), obese (BMI 30.0-39.9), morbidly obese (BMI 40.0-49.9), and super morbidly obese (BMI ? 50.0).

Results: A total of 1,362,440 patients were screened who had 41,703 hernias. The cohort was 57.6% male with a mean age of 62.5 years. Mean BMI was 27.6 kg/m2. The overall prevalence of hernia was 3.9% in men and 2.3% in women. Diaphragmatic hernias were most common (44.7%), with 28.7% ventral and 24.3% inguinal hernias. Less than 2.5% were complicated by obstruction or gangrene, and 2.1% were recurrent. Ventral hernia prevalence increasedwith BMI, with an odds ratio in overweight patients of 1.65 (CI 1.56-1.74), obese patients 2.42 (CI:2.29-2.56), morbidly obese patients 2.28 (CI 2.05-2.54), and super obese patients 2.54 (CI 2.03-3.17) relative to normal weight. The inguinal hernia prevalence however peaked with overweight status and decreased with obesity (OR = 0.6, CI 0.56-0.65) and morbid obesity (OR = 0.29, CI 0.23-0.37). The odds ratios for diaphragmatic hernias peaked with obesity (OR = 1.39 CI 1.33-1.45), but decreased in morbid obesity (OR 1.18, CI 1.07-1.30).
Conclusion: The relationship between BMI and hernia is not simple for patients presenting for healthcare primarily for hernia. Ventral hernias increased in prevalence as weight increased, while inguinal hernia prevalence decreased. Diaphragmatic hernias were the most common and peaked in prevalence with obesity but decreased in prevalence as weight increased further. There is an inconsistent relationship between obesity and hernia, suggesting more investigation is needed to assess the mechanisms by which weight affects hernia development and likely recurrence.

Figure 4. The prevalence of abdominal hernias stratified by BMI categories and sex



P029

Arcuate Line Hernia Masquerading as a Spigelian Hernia

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Introduction: Arcuate line hernia (ALH) is a rare type of anterior abdominal wall hernia often mistaken for another abdominal hernia, such as Spigelian hernia. The arcuate line serves as an important anatomic landmark that delineates the inferior border of the posterior rectus sheath. Anomalous separation of the posterior rectus sheath from the overlying rectus abdominis muscle can create an intraparietal space with the potential for hernia development. There is a paucity of literature regarding repair of ALH with few reports describing robotic-assisted approach.
Case Presentation: A 52-year-old female with a body mass index of 42 kg/m^2 presented to an outpatient surgical clinic with one-year of right-sided abdominal pain. Her surgical history included laparoscopic cholecystectomy. The patient described weight loss due to episodes of nausea and feculent emesis followed by robust diarrhea with partial relief of symptoms. Physical examination elicited right-sided abdominal tenderness to palpation without an appreciable underlying bulge or defect. Computed tomography (CT) imaging from previous hospitalizations did not identify a cause of obstruction. Therefore, CT enterography was performed and revealed incarcerated small bowel within the right abdominal wall reported as a Spigelian hernia (Fig. 1). Patient was consented for a robotic-assisted preperitoneal herniorrhaphy.
Intraoperatively, there was no evidence of a Spigelian-type hernia; however, a prominent arcuate line defect was observed (Fig. 2). After careful review of previous imaging, it became apparent the patient instead suffered from bilateral ALHs (Fig. 1, arrow). Robotic-assisted approach granted excellent visualization of the entire defect and complete reduction of the intraparietal hernia sac (Fig. 3). A bilateral preperitoneal arcuate line herniorrhaphy was performed with polypropylene mesh. The patient tolerated the procedure well and was discharged the same day of surgery. No complications were reported at six-months follow-up.
Discussion: Due to low prevalence, ALH is often misdiagnosed as another type of abdominal wall hernia. Cross-sectional imaging may be useful to differentiate ALH from other abdominal wall hernias. It is worthwhile for surgical clinicians to consider ALH as a differential to Spigelian hernia. Laparoscopic repair has been recommended for symptomatic ALH but reports of robotic repair are limited.
Conclusion: Robotic-assisted repair of ALH was successful and provided excellent visualization and range of motion when working around the difficult intraparietal hernia space.

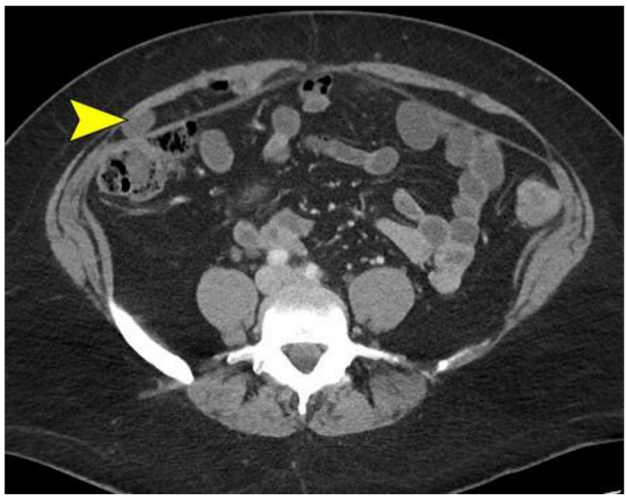


Figure 1 CT Enterography.

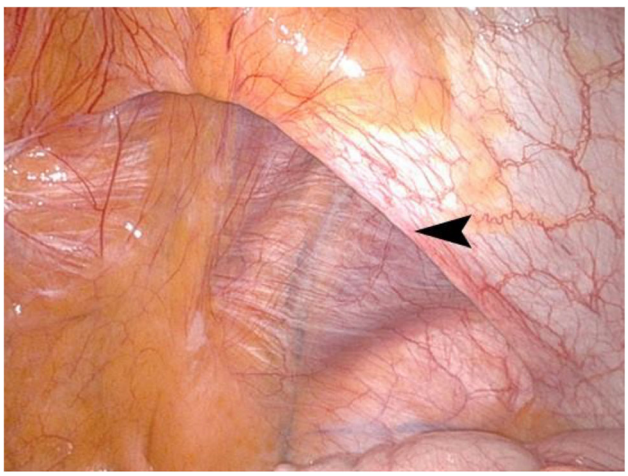


Figure 2 Intraoperative view of the ALH defect.

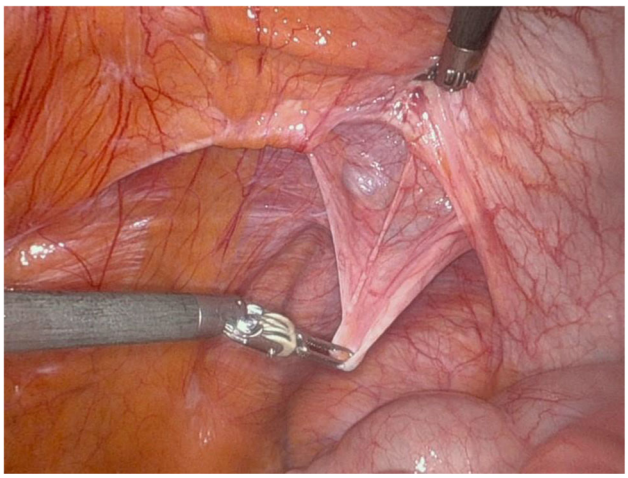


Figure 3 Reduction of the ALH sac.

P030

Management of Recurrent Hernia: An Opportunity for Improvement?

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Introduction: Despite being one of the most challenging clinical problems, management of recurrent abdominal wall hernias receives shockingly little attention. Therefore, we performed a retrospective study to characterize surgical care of recurrent abdominal wall hernias.
Methods: Patients from the Michigan Surgical Quality Collaborative Core Optimization Hernia Registry were included. The registry is a representative, random sample of adult patients from 70 hospitals across Michigan, and encompasses operations performed between January 1, 2020, to March 31, 2023. Descriptive analyses via t-tests and Fisher exact tests were conducted to evaluate sociodemographic, operative, and hernia-specific attributes associated with primary and recurrent repairs.
Results: We identified 9315 patients who underwent abdominal wall hernia repair. Of 782 (8.4%) patients undergoing recurrent repair, mean age was 57.9 years, 53.8% were female, average BMI was 34.0. Surgical approach (open, laparoscopic, robotic) did not differ significantly between repair types. Compared to primary hernias, recurrent hernias were larger (mean width 5.9 cm versus 3.1 cm, $p < 0.001$), more often converted to open intra-operatively (8.5% versus 3.1%, $p < 0.001$), and more often used mesh (90.4% versus 76.3%, $p < 0.001$). Location of mesh placement differed between repair types [Table 1]. Component separation was more frequently used for recurrence (17.5% versus 4.7%, $p < 0.001$). Within component separation, mean hernia width was 7.7 cm for primary repairs and 10.5 cm for recurrent repairs ($p < 0.001$). Recurrent repairs had higher 30-day complication rates (7.7% versus 2.5%, $p < 0.001$), including surgical site infections, but did not have higher rates of readmission ($p > 0.05$).
Conclusions: Significant variation exists within management of recurrent abdominal wall hernias. Importantly, not all recurrent hernias are managed with mesh. Understanding outcomes for these differing approaches is critical to optimize treatment of this complex clinical problem and prevent future recurrences.

Table 1 Primary versus recurrent abdominal wall hernias

	Primary repair (n = 8553)	Recurrent repair (n = 782)	p
Mesh use, n(%)	6511 (76.3%)	707 (90.4%)	< 0.001*
Location of mesh, n(%)			
Onlay	1667 (18.0%)	237 (21.7%)	< 0.01*
Inlay	635 (6.9%)	92 (8.4%)	> 0.05
Retrorectus	524 (8.0%)	128 (18.1%)	< 0.001*
Preperitoneal	2041 (31.3%)	128 (18.1%)	< 0.001*
Intraperitoneal	2468 (37.9%)	255 (36.1%)	> 0.05
Sublay, unspecified	15 (0.2%)	4 (0.6%)	> 0.05
Unspecified	226 (3.5%)	31 (3.0%)	> 0.05
Component separation, n(%)	402 (4.7%)	137 (17.5%)	< 0.001*

P031

Stop Using Drains: A Retrospective Review of Drain Placement in Robot-Assisted Enhanced View Totally Extraperitoneal Retro-Rectus Ventral Hernia Repair

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Introduction: Robot-assisted enhanced view totally extraperitoneal retro-rectus ventral hernia repair (eTEP) is an increasingly common approach. Many surgeons have adopted the routine use of drains in the retro-rectus space to mitigate seroma and hematoma formation. Our aim is to challenge the routine use of drains in this patient population. We hypothesize that avoiding drain placement during eTEP is not associated with increased surgical site occurence (SSO).
Methods and Procedures: We conducted a retrospective review of all robot-assisted eTEP retro-rectus ventral hernia repairs at our comprehensive hernia center from November 2019 to October 2022. Patients were divided into two groups; those with drains placed and those without. All patients were followed for 30 days of follow up. Summary statistics were calculated including median/interquartile range (IQR) for continuous variables and frequencies for categorical variables. Categorical variables were analyzed with Pearson chi-square analysis and continuous variables were analyzed with non-parametric Mann-Whitney U test/Wilcoxon Rank Sum test.
Results: A total of 102 patients underwent eTEP during the study period. 90 (88.2%) did not receive drains and 12 (11.8%) received drains. The two populations had no significant differences in age, demographics, or medical comorbidities. BMI was statistically higher in the no drain group 32.53 (29.32-35.78) versus 27.32 (25.96-28.81) for those with drains; $p < 0.007$. Rectus diastasis, total defect size, and number of hernia defects were similar between groups. Drains were more likely placed in patients undergoing surgery for recurrent hernia 66.67% versus 27.78%; $p < 0.007$. Operative time (hours) was longer in the drain group 5.00 (3.96-5.44) versus 3.63 (2.82-4.27); $p < 0.011$. Estimated blood loss, total mesh size, and mesh fixation were similar between groups. Post operative length of stay (days) was

longer in the drain group 1.00 (0.75-3) versus 0.00 (0-0.75); $p < 0.0001$. There was no difference in the frequency of SSO between groups. There was no significant difference between groups in terms of emergency department visits within 30 days, 30-day readmission, return to the operating room, or hernia recurrence within follow-up period. No patients in either group required intervention for seroma or hematoma formation in the retro-rectus space.

Conclusions: Avoiding drain placement in robot-assisted eTEP ventral hernia repair was not associated with increased SSO. This study challenges the routine use of drains placed in the retro-rectus space during robot-assisted eTEP ventral hernia repair.

P032

Laparoscopic Repair of Inguinoscrotal Hernia Containing The Urinary Bladder

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Introduction: Inguinoscrotal hernia (ISH) of the urinary bladder is an extremely rare condition involve in less than 1-4% of inguinal hernia. In most cases, it occurs to men older than 50 years who are overweight. Because most hernias are diagnosed through physical examination without preoperative radiological examination, only 7% of inguinal bladder hernias are diagnosed before herniorrhaphy. Moreover, 16% of these conditions are discovered after intraoperative or postoperative complications such as bladder injury or bladder leakage.

Herein we report an IHS of the urinary bladder diagnosed prior to operation and repaired by laparoscopic transabdominal preperitoneal repair.

Methods and Procedures: A 63-year-old Japanese man was admitted our hospital complaining of a bulge and pain in his right inguinal region. And he was diagnosed as inguinal hernia in America 20 years ago. His medical history includes an appendectomy and a cerebral infarction. He also has a penicillin allergy. Physical examination revealed a large, nonreducible right-side scrotal mass. The patient was 167 cm tall, weighted 93 kg, and had a body mass index of 33 kg/m2. The abdominal computed tomography and magnetic resonance imaging demonstrated an ISH containing fat and a substantial portion of the patient's bladder. An IHS of the urinary bladder was diagnosed and laparoscopic transabdominal preperitoneal mesh repair was planned after weight reduction.

The 12 mm camera port was inserted at the umbilicus with open method. Pneumoperitoneum was maintained with CO_2 and a flexible laparoscope was inserted. Two additional 5 mm ports were placed next to the right and left four fingers of the first port. Intraoperatively many hernia orifices were observed at the right-side inguinal region. Following incision of the peritoneum and right inguinal dissection, the bladder and fat were carefully mobilized from dense adhesions and completely released to the retroperitoneal space without injury. The final diagnosis of right indirect ISH containing the urinary bladder was made. A large 3DMax Light Mesh was laid over the myopectineal orifice.

Results: Total operative time was 247 min. The estimate blood loss was small amount. There was no conversion to open repair. The perioperative period was uneventful. The patient was discharged on 4 postoperative days and remained asymptomatic at six-month follow-up and had no evidence of hernia recurrence.

Conclusion: CT and MRI provide potentially the most detailed information for diagnostic and surgical planning purposes. Laparoscopic repair may be useful and one of the treatments of difficult case of IHS of the urinary bladder.

P033

Outcomes Following Robotic and Open Transversus Abdominal Myofascial Release for Complex Abdominal Wall Hernias

Mohammad Alomari, MD; Aaron Spaulding, PhD; Courtland Polley, MD; Michael Edwards, MD; Mayo Clinic Florida

Background: Transversus Abdominis Release (TAR) procedures have become a viable surgical approach for abdominal wall reconstruction. The robotic platform is also increasingly utilized for such cases. This study aims to present the experience of a single surgeon experience comparing open and robotic abdominal wall reconstruction.

Methods: Consecutive hernia cases were captured in a prospective database. Cases performed between 2021 and 2023 were retrospectively analyzed. Data points included demographics, pre-operative history, hernia repair history, operative information, and 30-day follow-up. TAR procedures and surgical approaches were identified. Continuous variables are compared using Kruskal Wallis tests, while categorical variables are compared using chi-squared or Fisher exact tests.

Results: Eighty-three cases were analyzed, including 61% (n = 51) robotic TAR (rTAR). The mean age of patients in the robotic cohort was 59.63 ± 12.80 years and 65.47 ± 13.28 years in the open cohort ($p = 0.027$). Those receiving an open TAR (oTAR) had higher ASA class 3 (88% vs. 55%, $p = 0.019$). History of previous abdominal operations was more frequently observed in the robotic cohort (36% vs. 13%, $p = 0.03$), while the open cohort exhibited a higher prevalence of prior incisional hernias repair (74% vs. 46%, $p = 0.013$). Paravertebral blocks were more commonly used in rTAR (82% vs 23%) and an epidural in oTAR (77% vs 0%) (< 0.001). Hernia diameter 4-10 cm was more common in rTAR (67% vs. 22%, $p < 0.001$), while diameter > 10 was more common in oTAR (75% vs. 35%, $p < 0.001$). Wound class 2 or 3 were more common in oTAR (45% vs. 27%, p 0.001). Mean operation length was longer with rTAR (5.67 ± 1.27 vs 4.55 ± 1.55, $p < 0.001$). Length of stay was shorter with rTAR (2.24 ± 1.08 vs. 5.27 ± 3.53, $p < 0.001$). There was no recurrence. Readmission (13% vs. 2%, $p = 0.045$), limited activity level (37% vs 14%, p 0.019), and deep SSI (10% vs. 3%, p 0.023) were more common with oTAR. Other complications were similar between rTAR and oTAR.

Conclusion: Robotic TAR is safe and effective for complex abdominal wall hernias. Cost associated with longer operative time may be offset by shorter lengths of stay and lower adverse outcomes such as SSI and hospital readmission.

P034

2023 Hernia CPT changes: Our Institution's Negative Change with the New Coding

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Purpose: to evaluate the changes in the 2023 ventral hernia CPT coding and wRVU earnings and determine what change in wRVU earnings, if any, would be expected for our institution's practice based on the new coding.
Methods: we retrospectively reviewed ventral hernia repair cases at our institution from January 2022 to December 2022. We included cases which would have their CPT code changed if performed after the CPT code revisions. We compared the actual wRVU earnings from these cases compared to what the wRVU earnings would have been with the 2023 changes.
Results: we identified 51 eligible cases. The actual wRVU earnings as they were coded was 1,565.5. The wRVU earnings with the 2023 CPT changes would be 1,474.4, for a change of -91.1 wRVU (-5.8%), or an average change of -1.8 wRVU per case.
Conclusion: the 2023 ventral hernia CPT coding and wRVU changes negatively impact the wRVUs earned at our institution by 1.8 wRVU per case (5.8%), if the calendar year 2022 is a representative distribution of our typical case volume.

P035

Body Mass Index Criteria and Procedural Selection for Abdominal Wall Surgery: Survey of Surgeon Preferences

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Introduction: Controversy exists as to optimal patient selection for elective hernia repair. The aim of this survey was to investigate surgeons' preferences regarding preoperative planning.
Methods: An anonymous, electronic survey of practicing surgeons (N = 282) was conducted. Surgeons responded to 20 multiple-choice items on their demographics, patient selection, and operative approach. Stata v17 was used to perform descriptive analysis.
Results: The majority of respondents were fellowship-trained (72.7%) and male (81.2%), with 52.5% in practice for > 10 years. Practice types included 36.5% in academics, 32.7% employed by a health system, and 30.8% in private practice (group or solo). Less than one third of respondents named smoking (28.3%), body mass index (BMI) (25.9%), or uncontrolled diabetes (31.3%) as contraindications to performing an elective component separation. Reported BMI restrictions varied by operation type: a cutoff of 35-39.9 kg/m2 was most commonly reported for open repairs (32.4%) and component separations (31.8%), 40-44.9 kg/m2 was most common for minimally invasive (24.3%) or intra-peritoneal underlay mesh (IPOM) repairs (23.1%), and 35-39.9 kg/m2 (26%) and 40-44.9 kg/m2 (26%) for laparoscopic extended total extraperitoneal (eTEP) repairs. Whereas 21.4% and 25.4% of surgeons reported no BMI restriction for minimally invasive and IPOM repairs respectively, less than 15% of surgeons had no BMI restriction for elective components separation, open, or eTEP repairs. The most common approaches to repairing medium-sized (5-10 cm) ventral hernias were robotic eTEP ± transversus abdominis release (TAR) (33.0%), laparoscopic IPOM (16.8%), open (15.6%), or robotic trans-abdominal (13.9%) repairs. In contrast, the most common approach to repairing large (> 10 cm) ventral hernias was open (49.1%) followed by robotic TAR (24.9%) and robotic eTEP ± TAR (16.8%). A majority (71.7%) of surgeons reported that robotic hernia repair composed less than half of their practice, with 49.1% reporting robotic approach used in the 0-25% range. Sixty-six percent of surgeons reported routinely performing component separation, of which 29.0% reported anterior and 70.1% posterior. With respect to mesh, sublay was the preferred placement location (67.1%) followed by underlay (20.2%), with 93.6% of surgeons using synthetic mesh.
Conclusion: Among surgeons performing elective hernia repair, considerable variation exists regarding BMI restrictions, operative approach, and robotics use. While a majority of surgeons include a BMI restriction as part of patient selection, cutoffs vary by surgeon preference and procedure type. Further investigation of patient selection criteria as contributors to hernia repair outcomes is warranted.

P036

How Much Overlap is Enough? Review of the ACHQC Database for Hernia Recurrence Following Ventral Hernia Repair

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Background: Historically, in the treatment of ventral and incisional hernias it has generally been accepted that mesh repairs should ensure at least 3-5 cm of overlap of mesh beyond the fascial defect to decrease the risk of recurrence. The exact amount of overlap to prevent recurrence is not known, yet this agreement likely stems from earlier approaches of ventral hernia repair (VHR) such as the open onlay and laparoscopic intraperitoneal sublay techniques. In these cases, the fascial defect was often not fully approximated and the planes into which mesh was placed were expected to provide poor tissue ingrowth into the mesh itself. Within the past two decades, however, technical and technological advancements now offer more options for fascial closure with concomitant sublay mesh placement. With such advancements, the need for 5 cm overlap may not still apply to modern VHR approaches where fascial defects are closed.
Methods: A retrospective review of the ACHQC database for all incisional and ventral hernia repairs utilizing mesh with intact 1 year follow up between the years 2013 and 2022 was performed. Fascia had to be closed and only clean or clean-contaminated cases were considered for inclusion. Groups compared were those in which mesh width was: 5 cm or larger than fascial defect width vs less than 5 cm. Propensity score matching was performed to balance confounding factors between comparison groups. The primary outcome studied was 1-year clinically-determined hernia recurrence.
Results: A total of 4835 subjects met inclusion criteria, 3322 (69%) undergoing an open VHR and 1513 (31%) undergoing VHR via an MIS approach. Of these patients, mesh overlap was 5 cm or greater in 3971 repairs and < 5 cm in 822 repairs. After propensity score matching, the study population was 2506, 1684 in the 5 cm or greater overlap group and 822 in the < 5 cm group. Hernias in the < 5 cm overlap group were generally smaller in width prior to closure (mean 2 cm vs 8 cm) and of lower VHWG grade yet were associated with a significantly higher rate of clinical recurrence at 1-year follow-up (19% vs 5%, $p < 0.001$).
Conclusions: In this retrospective evaluation of the ACHQC database, mesh overlap greater than 5 cm was associated with lower clinically-determined hernia recurrence at 1-year, despite closure of fascial defects.

P037

Transabdominal Retro-Rectus Mesh Repair for Ventral Hernia: Early Experience

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Introduction: The transabdominal retro-rectus mesh repair technique has emerged as a significant advancement in hernia surgery, offering a comprehensive approach to ventral hernia management. This presentation aims to provide an extensive overview of the technique, detailing its surgical technique, highlighting its advantages, and exploring its broad clinical applications.
Method: Retrospectively data was collected from electronically maintained database of patient of a prospective study. Data was collected including demographic profile, clinical examination, type of ventral hernia, no. of previous surgery. All included patient went under Transabdominal Retro-Rectus Mesh Repair. Post operative data was collected, analyzed and early outcomes assessed.
Result: A total patient Eight patients have undergone TARM procedures for incisional hernias at AIIMS since January 2023. All eight patients had incisional hernias, and three patients had a history of mesh hernia repair. 5 were female, and 3 were male patients. The mean age was 55 years. The mean duration of the procedure was 120 min. Intraop 3 patient went under TARM procedure without requirement of TAR. Two patients had unilateral TAR, one patient needed B/L TAR, and two patients were converted to open in view of the fact that midline approximation was not possible laparoscopically. In the post-op period, 5 patients had a pain VAS score of 3–4, and 3 patients had a score of 6-7. One patient reexplored due to increased drain volume on day 1. In long-term follow-up, one patient developed seroma.
Conclusion: Results from our experience so far indicate that TARM is a safe and effective method for treating ventral hernia. However, more information is required and is being gathered to solidify TARM's reliability as a secure and efficient treatment for ventral hernias.

P038

Robotic Transverses Abdominis Muscle Release Post Open Transduodenal Ampullectomy

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Introduction: Minimally-invasive incisional hernia repair has allowed for faster and smoother recovery postoperatively. While different approaches have been described, robotic transverses abdominis release is often utilized in patients with complex hernia and a wider defect to close with less tension. We demonstrate our approach to complex incisional hernia defects utilizing robotic transverses abdominis muscle release technique.
Patient and Methods: A case of a 64-year-old male status-post open transduodenal ampullectomy for an ampullary lesion that was noted to be benign on final pathology. he patient's past medical history is significant for type 2 diabetes mellitus, hypertension, dyslipidemia, and obesity with a body mass index of 38.1 kg/m2 at the time of the index surgery. The patient developed an incisional hernia six months postoperatively after strenuous physical activity. This was demonstrated in the cross-sectional imaging study obtained at the time to be 4×5 cm in dimensions containing small bowel. The patient was offered surgical repair for the incisional hernia as it became symptomatic albeit failure to lose significant weight.
Results: The procedure started with a diagnostic laparoscopy that revealed adhesions of small bowel and omentum to the abdominal wall. After performing extensive adhesiolysis, swiss cheese hernia defects were noted along the upper midline incision that were not accounted for on the preoperative cross sectional imaging study. The plan was to include the entirety of the hernia defects in the transverses abdominis muscle repair. After docking the robot, the posterior rectus sheath was opened and the neuromuscular bundle was exposed. Then, the transverses abdominis muscle was released. The same was performed on the contralateral side. The anterior rectus sheath was approximated using absorbable suture followed by placement of polypropylene mesh that was sutured to the anterior rectus sheath followed by placement of a drain anterior to the mesh. Finally, the posterior rectus sheath was approximated using an absorbable suture in a continuous fashion. The operative time was around 388 min with estimated blood loss of 25 mL. The patient was ambulating out of bed on postoperative day 0 and was discharged home on post-operative day 2.
Conclusion: We demonstrates in this poster our technique in performing a robotic transverses abdominis muscle release hernia repair for complex incisional hernia in challenging patients and the feasibility of performing such procedures following complex open foregut surgery. Furthermore, the implementation of minimally invasive surgery allows for enhanced recovery after surgery and early discharge.

P039

The Protracted Preoperative Clinical Paradigm in Women with Groin Hernias—Is It Reducible?

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Introduction: The objective of this study is to describe our experience of the natural history of groin hernias in women at a high-volume tertiary care medical center. Specifically, we abstracted the duration of symptoms prior to diagnosis, the imaging modalities used, and operative findings at elective surgical repair. We hypothesized that females would experience a protracted pre-operative clinical course and may initially consult non-surgical physicians.
Methods: This study is a retrospective review of a hernia database at our institution from January 2018 to July 2023. All adult females who underwent elective operative management of groin hernias were included. We excluded patients who had incidental groin hernias repaired at the time of abdominal wall reconstruction (n = 31) and those with incomplete records (n = 1). Analyses were used to measure and describe the demographics, pre-operative patient factors, operative findings, as well as 30-day outcomes.
Results: We identified 1331 patients who underwent elective groin hernia repairs during the five-year study period. Of these, only 8.4% were women; our final cohort included 80 female patients. Most of our patients were Caucasian (68.8%), and overweight (BMI 27.3 ± 5.8) with an average age of 61.2 years ($\pm$ 15.4). The most common symptoms encountered included non-specific groin pain (73.8%) and an intermittent groin bulge (48.8%). Many patients (40%) experienced symptoms for $>$ 1-year, while 33.8% experienced symptoms for less than 3-months. Patients averaged 1.2 clinic visits regarding their hernia prior to seeing a surgeon. Only 81.3% had a palpable defect on exam. Sixty-three patients (78.8%) had pre-operative imaging, including CT (56.8%), followed by US (39.2%) and MRI (4.0%). The robotic platform was the most common approach used (68.8%), followed by laparoscopic-TEP (22.5%). While only 13

patients (16.3%) were noted to have bilateral hernias in the pre-operative period, a total of 27 (33.8%) were noted intra-operatively. Indirect inguinal hernias were the most common type (81.3%), followed by femoral (35%) and direct (26.3%).
Conclusion: We have found that for our population of women with groin hernias, many will experience symptoms for over a year before seeking treatment. Additionally, the incidence of non-palpable, occult contralateral, and femoral hernia defects was relatively high, supporting the application of minimally invasive techniques. Future qualitative studies are needed to more thoroughly assess the female experience with groin hernias.

P040

Female Patient Involvement in Groin Hernia Research-A Systematic Review on the Gender Gasp in the Hernia Literature

Katie Marrero; Christian Perez; Carle Foundation Hospital

Intro: Groin hernia repairs are one of the most common surgeries performed in the United States. For female patients, the risk of developing a groin hernia over their lifetime is around 5%. Overall, women make up about 10-15% of the hernia repairs that are performed on a yearly basis. While women remain a consistent proportion of the hernia population, their inclusion in much of the hernia research completed has been sparce. Our goal was to assess the current hernia research to determine the rate at which female patients were included.
Methods/Procedures: We conducted a systematic review of all groin hernia related papers from 2000 to present. Our initial screen included 470 papers. We then did a screen to include only papers that looked at patient outcomes. With this, we narrowed it down to 140 articles. We then excluded any paper that did not include sex-related information on their participants, bringing us down to 73 papers. Once we had this final list, we examined the articles to determine the percentage of males and females included in each study.
Results: In the 73 articles, we found the range of male participants at 71%-99%. Of the 73 articles, 6 articles were found to include only male participants, while only 1 article was found to include only female participants. There were no articles that compared outcomes of males and females.
Conclusions: While groin hernia repairs are routinely completed for both male and female patients, the studies conducted report mainly on male participants. Furthermore, there is very limited data looking at female outcomes on their own. Thus, most of the research that has been used to develop our groin hernia standards has come from a male dominant pool of literature.

P041

Incidental Finding of Bilateral Femoral Hernias and Bilateral Inguinal Hernias in a Male: An Unusual Anatomic Case

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The presence of bilateral femoral with concomitant direct inguinal hernias is a rare phenomenon and is not well documented in the literature. We report a case of a 49-year-old male with symptomatic right sided inguinal hernia, asymptomatic left inguinal hernia, and incidental bilateral femoral hernias detected during the surgical procedure. Patient ultimately underwent robotic assisted bilateral inguinal hernia repair. Patient was seen 2 weeks postoperatively without any recurrences. Femoral hernias account for less than 5% of all abdominal wall hernias and higher predominance in females compared to males (1.8:1). Currently surgery remains the best option for preventing complications from inguinal and femoral hernias. Laparoscopic or robotic options provide the advantage of exposure and ability to cover the direct, indirect, and femoral spaces with mesh.

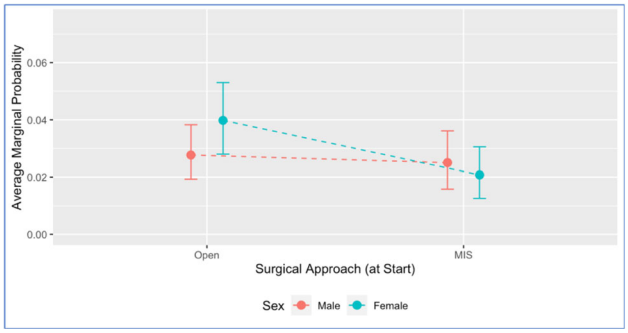
P042

Differential Effects of Surgical Approach on the Likelihood of Experiencing Complications Post Ventral Hernia Treatment Across Sexes

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Introduction: It is well known that female patients are more likely to experience poor outcomes following hernia surgery compared to males. However, little is understood about how decisions, such as surgical approach, may differentially influence the likelihood of post-operative complications between the sexes. In this context, we leverage robust data and analytic methods that account for similarities within, and variabilities across, treatment sites and surgeons.
Methods: Using the Michigan Surgical Quality Collaborative – Core Optimization Hernia Registry (MSQC-COHR), we identified adults (57% male and 43% female; aged 18 and older) who underwent ventral/incisional hernia surgery. This registry provides a representative, random sample of adult patients from 70 hospitals across Michigan, covering surgeries performed from January 1st, 2020, to March 31st, 2023. Analyses were limited to 9187 patients with hernia size corresponding to 25th percentile (1.5 cm) and 75th percentile (4 cm), to analyze for typical hernias. We employed a logistic mixed-effects model with full factorial interaction between surgical approach and sex, while controlling for hernia-specific attributes, comorbidities, patient characteristics, and year of surgery, to estimate the likelihood of post-operative (30 days) complications. Treatment site and surgeon were included as random intercepts. Average marginal probabilities and corresponding contrasts were used to compare risk between groups.
Results: An interaction was found between surgical approach and sex ($p < 0.05$). The increased probability of experiencing post-operative complications when comparing open to minimally invasive surgeries (MIS) was higher for female patients (1.9 × as likely) than for male patients (1.1 × as likely). Corresponding contrasts showed a significant difference in the likelihood of experiencing post-operative complications between the sexes in the group of patients receiving open surgery ($p < 0.05$) but not in those receiving MIS surgery ($p > 0.05$). There were notable variabilities in the likelihood of post-operative complications across different sites ($p < 0.001$) and among surgeons ($p < 0.001$).
Conclusions: Accounting for patient similarities and variabilities across sites and surgeons, we observed differential effects of surgical approach on post-operative complication likelihood between the sexes. These findings highlight areas for improvement and underscore the need for targeted research, particularly for female patients. Additionally, our results emphasize the necessity for further, in-depth investigation into minimally invasive techniques, suggesting that these methods might efficiently and equitably reduce the risk of complications for both sexes.
Figure 1 Interaction Between Surgical Approach and Sex on the Likelihood of Experiencing Post-Operative (30 days) Complications

Among Ventral/Incisional Hernia Patients in Michigan—MSQC-COHR, 2020–2023



P043

Reconstruction of a Major Abdominal Wall Defect Using a Tensor Fascia Lata Flap Reinforced with Mesh: A Case Report

Aleezay Haider; Grace Pyon; Alissa Greenbaum; Bridget Fahy; Richard Miskimins; University of New Mexico

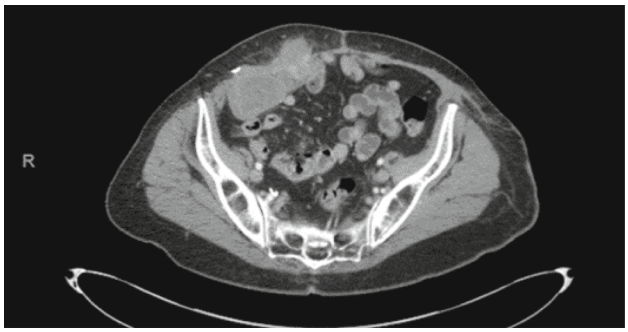
Introduction: Endometrial stromal sarcomas (ESS) are rare uterine mesenchymal tumors. Surgical resection is the recommended treatment for extra-uterine metastases. The abdominal wall is the most frequent site for recurrence with resection potentially resulting in large defects. Musculocutaneous pedicled flaps, such as the tensor fasciae lata (TFL) muscle, are useful for reconstruction as they provide adequate skin coverage with a strong fascial layer. The use of mesh to reinforce the repair is a proposed solution for hernia prevention.

Case: A 67-year-old female was diagnosed with ESS in 2005 followed by a recurrence to her lower abdominal wall in 2014 and 2016 requiring radical resection and primary repair. In 2021 the patient developed a fungating lesion along the left lower abdominal wall. She underwent cytoreduction followed by reconstruction using a left TFL flap. In 2023, CT imaging demonstrated an increase in the size of a previously surveilled mass involving the right lower rectus muscle (Image 1). The decision was made to proceed with radical resection and abdominal wall reconstruction.

A midline incision and subcutaneous flap anterior to the mass was created. During the inferior dissection, the mass was noted to be near the right pubis. The oncologic resection resulted in a large 17 cm × 16 cm fascial defect. A TFL flap was harvested. The abdominal incision was connected to the medial aspect of the flap to create a tract for the rotated flap to lay over the defect. Bone anchors were placed along the pubis with braided polyblend suture attached. The sutures were used to anchor a bridging polypropylene mesh along the pubic symphysis. The mesh was then sutured to the fascia circumferentially. The flap was rotated over the mesh and noted to be tension-free (Image 2). The flap was confirmed to have strong triphasic arterial signals and perfusion was also assessed with indocyanine green fluorescence. Drains and subcutaneous antibiotic beads were placed.

Postoperatively the flap remained well-perfused without evidence of venous congestion. She was subsequently discharged on her fifth post-operative day with excellent wound healing and no evidence of flap loss on subsequent clinic visits.

Conclusion: Resection of abdominal wall tumors can result in large defects requiring complex reconstruction. The use of a TFL flap reinforced with synthetic mesh can provide an effective solution especially in the setting of prior abdominal wall surgeries.





P044

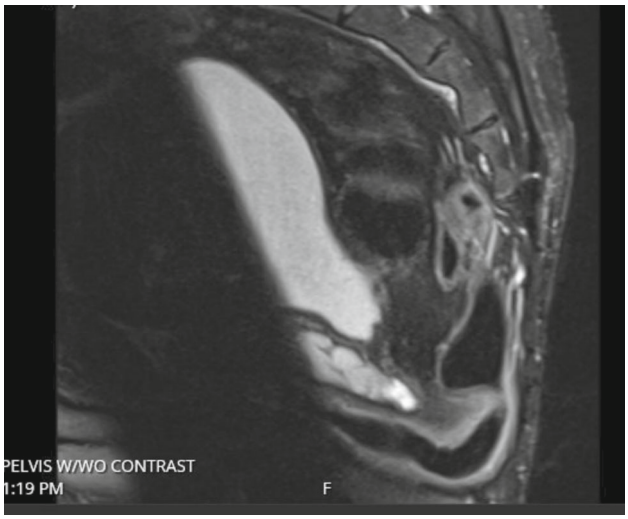
The Challenge of Post-Coccygectomy Perineal Hernia Repair

Jamie Benson, MD[1]; Saher-Zahra Khan, MD[1]; Ryan Juza, MD[2]; [1]University Hospitals Cleveland Medical Center; [2]University of Wisconsin

Introduction: Perineal hernias occur through a congenital or acquired defect in the pelvic floor. Acquired perineal hernias are classified as primary or secondary. Secondarily acquired perineal hernias are incisional hernias that arise from pelvic surgeries like abdominoperineal resection (APR) or pelvic exenteration. Options for surgical repair include an intraabdominal approach with mesh bridge of the pelvic brim, and a perineal approach with or without onlay mesh. Here we describe a case of a post-coccygectomy perineal hernia treated with a perineal approach and gluteal flap advancement.

Case Description: This 46-year old male underwent a radical resection of a sacrococcygeal chordoma 3 years prior. He developed a symptomatic perineal hernia. On imaging, the patient had herniation of his rectum with a posterior anal defect. As his coccyx and ileococcygeus muscle was completely excised in his prior surgery there was no support to the pelvic floor posterior to the anus. Because of the location of the hernia, we felt this would be best approached from the perineal approach. We coordinated with Plastic surgery for the gluteal flaps. Intraoperatively, the patient was placed in the prone position. We incised sharply down the midline of the gluteal cleft and dissected down to the hernia sac, which was freed circumferentially from the pelvic fascia. We then raised bilateral gluteal myofascial flaps which created a submuscular pocket for our mesh and permitted medial advancement of the muscles over the defect. The hernia was closed primarily and a 15 × 15 cm lightweight polypropylene mesh was secured to the pelvic fascia. We then closed the gluteal myofascial flaps in the midline over the mesh and placed drains in the sublay and subcutaneous planes. The patient's post-operative course was complicated by urinary retention that resolved spontaneously. He otherwise did well and was discharged on post-operative day 5 with an intense sitting protocol per Plastic Surgery. The patient has had 3 year follow up with good functional outcomes and no evidence of hernia recurrence.

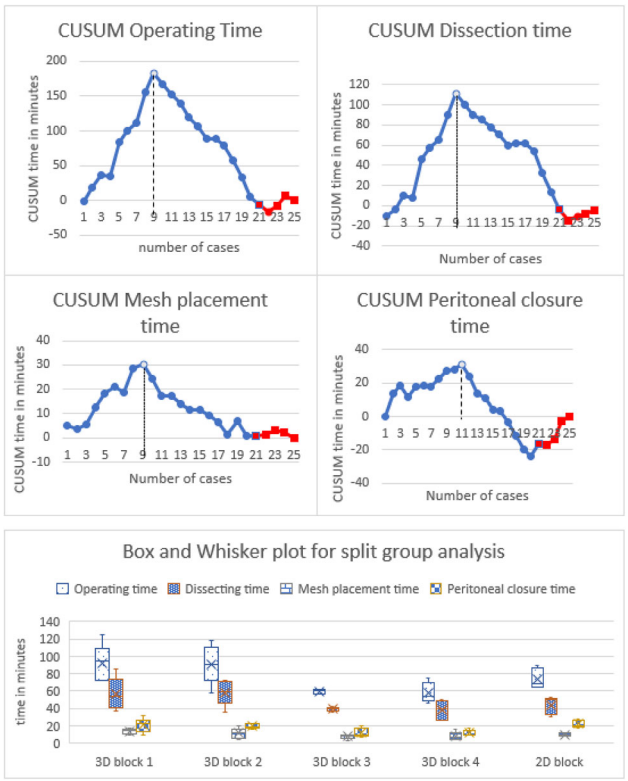
Discussion: Perineal hernias are uncommon but complex; most often occurring post-operatively following large pelvic surgeries. The rarity of these hernias requires dedicated research to determine optimal methods of repair. In our case, the location of the hernia posterior to the intact anus presented additional challenges. We felt the perineal approach was the more appropriate approach in this situation and the addition of a muscular flap provided additional reinforcement to the weakened pelvic floor.



P045

Learning Process of Laparoscopic Transabdominal Pre-Peritoneal (TAPP) Repair of Groin Hernia Using 3D Endovision System

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Background: Uptake for laparoendoscopic hernia surgeries is low. The reasons include the 2D environment of laparoendoscopic surgery and the long learning curve. We aim to assess the impact of the 3D Endovision system in the learning curve in TAPP hernia repair and its transferability of skills acquired from 3 to 2D environment.

Methods: A prospective observational study was undertaken in an academic tertiary care hospital. A surgical novice without prior laparoscopic groin hernia surgery experience did twenty cases of TAPP in a 3D Endovision system followed by five cases in a 2D Endovision system. Operating time and its phases (dissection time,

mesh placement time, and peritoneal suturing time) and faculty takeover time were recorded. CUSUM and split group analysis was done to assess the learning curve. we divided cases into blocks of five cases in chronological order. The economy of movement was assessed with validated Kinovea software. Trainee Operating time was compared with published historical data of the same group.
Results: The CUSUM method provided inflection points of Operating time at 9th case, peritoneal dissection at 9th case, mesh placement at 9th case, and peritoneal suturing at 11th case for the learning curve (Fig. 1). Pre-inflection and post-inflection values decreased significantly in operating time ($p = < 0.002$), dissection time ($p = 0.0011$), mesh placement time ($p = 0.0226$), and peritoneal closure time ($p = 0.044$). The Split group analysis showed a decrease in the third block in all phases and remained stable after the second block.
2D block average and distribution were not significantly different from the fourth block of 3D Endovision cases and significantly lower than the first block of 3D Endovision systems in all phases except peritoneal closure signifying skill transferability Fig. 1.

Trainee reached within the IQR of the expert cohort after inflection and there was moderate agreement according to Bland Altmann graphs.

Faculty takeover time decreased after 2nd block again increased when the 2D Endovision system was used. Pathlength of the needle holder and scissors showed earlier inflection points (5th and 6th case) and good skill transferability to 2D Endovision in terms of pathlength.
Conclusion: The learning curve achieved using the 3D Endovision system at the 9th case in operating time. Skill transferability was good in operating time, dissection time, and mesh placement time but less transferability in peritoneal suturing. Faculty takeover time decreased after 10th case.

P046

Trends in Minimally Invasive and Open Inguinal Hernia Repair: An Analysis of ACGME General Surgery Case Logs

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Introduction: The purpose of this study was to analyze trends in minimally invasive (MIS) and open inguinal and femoral hernia repairs in general surgery residency training over the past two decades. The use of MIS approaches to groin hernia repair have increased, driven by technological advances, faster recovery times, and decreased postoperative pain. Notwithstanding this development, open hernia repair remains an important surgical approach. Consequently, there is a clear need for general surgery residents to gain proficiency in both open and MIS hernia repair modalities.
Methods: Accreditation Council for Graduate Medical Education (ACGME) national case log data of general surgery residents from 1999 through 2022 were reviewed. Means and standard deviations of open and MIS inguinal and femoral hernia repairs were collected and analyzed. Linear regression and ANOVA were used to identify trends in the average annual number of open and MIS hernia repairs logged by residents. Cases were distinguished between level of resident trainees: surgeon-chief (SC) and surgeon-junior (SJ).
Results: From July 1999 to June 2022, the average annual MIS inguinal and femoral hernia repairs logged by general surgery residents significantly increased, from 7.6 to 47.9 cases ($p < 0.001$), and the average annual open inguinal and femoral hernia repairs logged by general surgery residents significantly decreased, from 51.9 to 39.7 cases ($p < 0.001$). SJ resident results were consistent with this overall trend. For SC residents, the volume of both MIS and open hernia repairs significantly increased ($p < 0.001$).
Conclusion: ACGME case log data indicates an overall trend of general surgery residents logging fewer open inguinal and femoral hernia repairs. However, SC volume in both approaches increased during the study period. If the trend of decreasing open repair training opportunities continues without remedy, a skill and knowledge gap may arise.

P047

Randomized Control Trial on Preoperative Withdrawal vs No Preoperative Withdrawal of Aspirin in Laparoscopic Inguinal Hernia Repair (Interim Report)

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Introduction: The incidence of inguinal hernias requiring routine surgical repair continues to rise amongst the ageing population worldwide. Cerebrovascular and cardiac comorbidities requiring utilisation of regular antithrombotic therapies remains prevalent in this population. Currently no consensus exists on perioperative management of antiplatelet therapy in patients who undergo an otherwise low surgical risk elective laparoscopic hernia surgery. The aim of this study is, therefore, to investigate the safety, benefits and risks of withdrawing aspirin preoperatively versus non withdrawal of aspirin preoperatively in patients undergoing laparoscopic inguinal hernia repair.
Methods: This is a prospective, randomised controlled trial that aims to recruit 96 patients with either a unilateral or bilateral fully reducible inguinal hernia undergoing a laparoscopic inguinal hernia repair surgery under general anaesthesia in a tertiary and a restructured hospital in Singapore and randomise them in a 1:1 fashion to Group A (preoperative aspirin cessation) or B (no preoperative aspirin cessation). Patients who are unfit for general anaesthesia, have obstructed / strangulated hernias will be excluded from this study. Risk and benefits of the technique with the role of aspirin will then be compared in term of bleeding, thromboembolic complications, wound infections, hematoma/seroma formation, length of hospital stay, postoperative pain, use of analgesics, return to work and recurrence.
Results: Of the 65 patients recruited into our study so far since 2015, 30 have been randomised to continue aspirin preoperatively (46.15%) and 35 have been randomised to stop aspirin pre operatively (53.85%). The majority of the patients are of the male gender in both groups with a comparative mean age of 66.13 (aspirin continued) and 69.57 (aspirin stopped), almost similar mean BMI (23.6 vs 24.0) and American Society of Anaesthesia (ASA) grading. Most hernias operated on in both groups were of primary origin, bilateral with comparable mean defect sizes (aspirin continued—1.62 vs aspirin stopped – 1.55) and underwent extra-peritoneal repairs. No statistically significant difference was noted in the development of surgical complications (bruising, haematoma, wound infections, recurrence and chronic pain) in both groups. Additionally, nil adverse thromboembolic events were noted in either group.
Conclusion: The preoperative non withdrawal of aspirin in patients undergoing laparoscopic inguinal hernia repair does not have a statistically significant difference in comparison to the withdrawal of aspirin in terms of adverse perioperative and postoperative bleeding or thromboembolic complications at the time of this interim report.

P048

Mesh Infections in Hernia: A Wake Up Call for the Surgical Fraternity?

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Introduction: The use of prosthetic materials in anterior abdominal wall repair has gone up manyfold over the last few years owing to easier availability, reducing costs and increased level of comfort of surgeons in usage of meshes. The obvious advantage of tension free repairs and a long term reinforcement of abdominal wall has immensely popularised the usage. But as the usage is increasing, so is the incidence of mesh related infections. This paper attempts to analyse the factors behind the mesh infections and the need to standardise the protocol for treatment of mesh infections particularly in Low resource settings.

Materials and Methods: A retrospective analysis of prospectively collected data of 14 patients presenting with mesh infections requiring mesh explantations from 2021-2022 was done to study the factors responsible, surgical technique followed and the antibiotic protocol given for the initial treatment.

Results: A total of 14 patients were studied who ultimately required the mesh to explanted. 9 cases had undergone laparoscopic inguinal hernia repair (6 TAPP & 3 TEP). 5 patients had presented with discharging sinus from anterior abdominal wall following IPOM repair of ventral hernia. The mean period of presentation was 13 months after the Index surgery. Patients had undergone varying antibiotic protocols including anti tubercular therapy and no coherence was found in the initial antibiotic therapy given.All patients underwent mesh explantation with laparoscopic technique & mesh as well as any collection was sent for culture.

5 patients had evidence of Non tuberculous mycobacteria while in others no growth was found in cultures. The ratio could not be compared to calculate the actual incidence of hospital infections since the index surgery of these patients had been carried out at other centres.

Conclusion: In view of the increasing use of prosthetic materials, there is a need to reinforce amongst surgeons the importance of following all aseptic protocols. Also due to the varying presentations of the mesh infections, there is a felt need to formalise the approach and revisit the existing protocols to control mesh infections and thereby reduce the need for explanation of mesh and the associated morbidity particularly in the resource constrained settings & LMIC

P049

Laparoscopic Totally Extraperitoneal Herniotomy Versus Laparoscopic Totally Extraperitoneal Mesh Repair for Unilateral Inguinal Hernia in Young Males: A Double Blinded Randomized Controlled Trial

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Introduction: Inguinal hernia is a common surgical condition. The use of mesh for hernia repair carries the possibility of complications like postoperative pain, discomfort and infertility due to entrapment of vas defrens. To avoid these potential complications of mesh repair, we devised and previously described mesh free Laparoscopic Totally Extraperitoneal Herniotomy (TEP-Hy) for unilateral inguinal hernias in young males with a normal posterior wall of the inguinal canal. The present study compares the outcomes of Laparoscopic Totally Extraperitoneal Herniotomy with Laparoscopic TEP in this subset of patients.

Methods: The study was conducted in a large University teaching hospital in New Delhi over a period of 3 years. Forty male patients aged 18-30 years with Nyhus category 1/2 inguinal hernia were included and randomized into laparoscopic herniotomy and laparoscopic TEP groups of 20 patients each. The primary objective was recurrence at 12 months. Secondary objectives were post-operative pain (VAS), time to resume activities of daily living (days), complications, and patient satisfaction (Capuzzo score). All the patients were operated as day care procedures. The patient and the observer were blinded towards the allocation groups to prevent any bias in reporting.

Results: The followup ranges from 15 to 36 months (mean 21 months). There was no difference in the recurrence rates between the two groups at 12 months (nil in both). Postoperative pain was comparable between laparoscopic herniotomy and TEP groups on day 0 (VAS 1.7 ± 0.55 versus 1.5 ± 1.1, $p = 0.72$) and day 30 (VAS 0.2 ± 0.67 versus 0.4 ± 0.55, $p = 0.307$). Laparoscopic herniotomy group took slightly longer time to resume activities of daily living compared to the TEP group (2.78 ± 0.55 days versus 2.4 ± 0.6 days, $p = 0.5$). Patient satisfaction score on Day 0 was 9 ± 0.71 in laparoscopic herniotomy group versus 10 ± 0 in TEP group ($p < 0.05$) while that on Day 30 was 10 ± 0 in both the groups. There were no complications observed in any of the patients during the follow up.

Conclusion: The present study is the first to compare laparoscopic herniotomy with laparoscopic mesh repair (TEP) for inguinal hernia in young males. Both the procedures were found to have comparable outcomes in terms of recurrence rates, post-operative pain, time to resume daily activities, and patient satisfaction. Laparoscopic Totally Extraperitoneal Herniotomy is a viable option for a select subset of patients of uncomplicated unilateral inguinal hernia. More studies with a larger sample size and a longer followup will help in further elucidating the place of this new procedure.

P052

Impact of Obesity on Hernia Recurrence and Recurrent Symptoms after eTEP Ventral Hernia Repair with a Mean Follow-up of 46 Months

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Background: As robotic enhanced-view totally extraperitoneal (eTEP) hernia repair becomes a more frequently used hernia repair technique, we continue to evaluate the safety and long-term efficacy of this procedure especially in patients with risk factors such as obesity. Since obesity defined as BMI > 35 kg/m2 is an independent risk factor for increased morbidity after ventral hernia repair (VHR), we evaluated the long-term impact of obesity on clinical outcomes. We aim to evaluate this hernia repair technique in long-term clinical outcomes and patient reported symptoms in high-risk patients (BMI $\geq$ 35 kg/m2). We clinically followed 95 patients through clinic follow-up or imaging and a patient survey.

Methods: A retrospective cohort analysis of patients undergoing incisional hernia repair using the robotic eTEP technique was performed over a two-year period with interval phone survey. Patients were asked for ongoing pain at hernia site, palpable bulge, redness or swelling, hernia recurrence. Patient demographics and comorbidities, perioperative variables, 30-day and most recent follow-up status outcomes were stratified according to BMI < 35 kg/m2

(acceptable risk) and BMI $\geq$ 35 kg/m2 (high risk). Statistical analysis was performed employing student's t-test for nominal variables and chi-squared analysis for categorical variables.

Results: 95 eTEP procedures were performed from April 2018-2020. 59 patients were in the acceptable risk cohort (mean 29.0 kg/m2) and 36 patients were high risk (mean 40.9 kg/m2). There was no difference in age (55.4 acceptable vs. 53.5 high, p = 0.48), gender distribution (42.3% male acceptable vs. 33.3% male high, p = 0.39), diabetic status (13.8% acceptable vs. 28.6% high, p = 0.08), or smoking status (16.9% acceptable vs. 11.1% high, p = 0.44) between the two cohorts.

There was no statistical difference in recurrence rates in the high-risk group. Time at last clinical follow-up was not significantly different (23.6 months acceptable vs 19.5 months high, p = 0.21). Hernia recurrence confirmed by CT imaging post-operatively was equivocal (15.3% acceptable vs. 8.3% days high, p = 0.32)

Surveillance for recurrent symptoms was conducted with a total response rate of 57% (54% acceptable, 61% high). The average follow-up period was (45.5 months acceptable, 47.6 months high, p = 0.53). There was no significant difference in recurrent symptoms (33.9% acceptable, 25% high, p = 0.12) with the most common symptom reported as ongoing pain at hernia site.

Conclusion: The robotic eTEP hernia repair is safe and efficacious in high-risk patients with BMI ($\geq$ 35 kg/m2) and recurrence rates of ventral hernia were similar at two year post-operatively, and recurrent symptoms similar at 46 months postoperatively.

P053

Consensus Guidelines in Ventral Hernia Repair: The Chasm Between Recommendation and Practice

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Introduction: The establishment of guidelines to standardize variation in practice to improve outcomes is well accepted, yet often poorly implemented and followed. Ventral hernia is no exception. To identify opportunities for targeted quality improvement efforts, we evaluated population level surgeon adherence to the Ventral Hernia Outcomes Collaborative (VHOC) guidelines.

Methods: The VHOC guidelines for Ventral Hernia Management were published in 2017 following deliberation of an expert panel as to essential elements of hernia care. Adherence to these recommendations was then evaluated in patients from the Michigan Surgical Quality Collaborative Core Optimization Hernia Registry (MSQC COHR). The registry is a representative, random sample of adult patients from 70 Hospitals across the state of Michigan and it encompasses surgeries performed between Jan 1, 2020 to March 31, 2023.

Results: All adult patients in the Michigan Surgical Quality Collaborative Core Optimization Hernia Registry (MSQC COHR) were included in this study (n = 15306). 10 recommendations within the VHOC guidelines were evaluated across the dataset. (Table) Among the recommendations, adherence to avoiding elective repair in patients with BMI > 30 was the lowest (40.5%) followed by use of sublay mesh placement in open ventral hernia repair (42.3%). Of the 10 recommendations evaluated, 6 demonstrated > 80% compliance.

Conclusion: On a population level, VHOC guidelines were generally well adhered to. Two areas; however, were identified for improvement. Based on these findings, statewide and society initiative should continue to specifically focus on preoperative optimization and technique related initiatives.

Recommendation	Grade of Evidence	Clinical Adherence
Smoking		
Avoid elective surgery on current smokers.	Grade A	In the elective setting, 11108 of 13842 (80.2%) cases were performed on patients who had not smoked within a year of surgery.
Obesity		
Obesity [body mass index (BMI) = 30 kg/m2 is associated with poor outcomes after VHR.	Grade A	In the elective setting 5609 of 13842 (40.5%) of cases were performed on patients with BMI <30.
Avoid elective surgery in patients with BMI = 50.	Grade C	In the elective setting 13509 of 13842 (98.3%) of cases were performed on patients with BMI <50.
Diabetes		
There is an increased risk of complications in patients with HbA1c > 6.5%, and elective repair should not be undertaken without individualized preoperative intervention.	Grade B	In the elective setting 2160 of 2944 (73.3 %) of patients had a HbA1c <6.5.
Avoid elective surgery on patients with HbA1c > 8.0%.	Grade B	In the elective setting 2801/2944 (95.1%) of patients had a HbA1c <8.
Mesh		
Mesh reinforcement is recommended for elective repair of ventral incisional hernias and primary VH = 2 cm in width with no contamination.	Grade A	In elective, clean, cases with defect with = 2 cm 3266 of 3768 (86.3%) were repaired using mesh.
Mesh reinforcement should be evaluated on a case by case basis for emergency VHR, open repair of primary hernias <2 cm width, and in the face of contamination.	Grade D	In hernias with defect width >2 cm repaired emergently 23 of 52 (44.2%) used permanent synthetic mesh. Of hernias with defect width >2 cm repaired in a contaminated setting, 54 of 147 (36.7%) employed permanent synthetic mesh.
Sublay is the optimal mesh location in open, elective VHR, but there is a role for other positions of mesh placement.	Grade C	In elective repairs using an open approach, 3476 of 4836 (42.3%) were repaired using mesh placed in the sublay position.
Component Separation		
Avoid component separation without mesh reinforcement.	Grade C	In cases requiring myofascial release 742 of 788 (94.2%) employed mesh.
Surgeons should be cautious and use discretion in creating flaps or performing other complex procedures (such as component separation) in emergency settings.	Grade D	733 of 788 (93%) myofascial releases were performed in elective setting. 55 of 788 (6.9%) were performed in emergent cases.

P055

Phytobezoar After Gastrectomy Requiring Surgical Intervention: A Rare Case Report and Review

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Background: Bezoars are collections of undigested materials that build up in the gastrointestinal tract (1,2), and phytobezoars are a subtype composed of plant fibers (1,3). Abdominal surgery, particularly gastrectomy, is the primary risk factor for bezoar formation (1). Gastric surgeries reduce gastric motility and acidity, and if involving the pylorus, contribute to rapid transit of undigested material into the jejunum (1). The incidence of small bowel obstruction (SBO) secondary to bezoars is rare (2-3%), but of that small percentage, postgastrectomy bezoar incidence ranges 5-12% (1,2).

Case Presentation: 64-year-old female with a history of gastric cancer status post (s/p) gastrectomy and Bilroth II reconstruction and additional transverse colon segmental resection > 5 years ago s/p chemotherapy without evidence of recurrence for > 5 years who presented with symptoms and imaging findings consistent with a SBO (Fig. 1). Due to acute decompensation, she was taken promptly to surgery. Laparoscopy revealed a firm mass (Fig. 2) in the proximal small bowel with decompressed bowel distally; decision was made to convert to an open laparotomy. The area of obstructed bowel was brought up, a small enterotomy performed proximal to the obstruction, and a dense, fibrous mass was found inside consistent with a phytobezoar. The mass was completely removed, sent to pathology, and the remainder of the surgery was uneventful.

Conclusions: Although a rare source of SBO, surgeons should possess a high index of suspicion for bezoars in patients with prior gastric surgeries, especially gastrectomies (1). Patients can present within months from gastrectomy and up to 30 years postoperatively with obstructive symptoms (1). Treatment includes milking the bezoar to the cecum, dissolving the mass with nasogastric lavage or endoscopic cola infusions, lithotripsy to break up the mass, or most aggressively, surgical removal (4).

Keywords: Phytobezoar, Gastrectomy

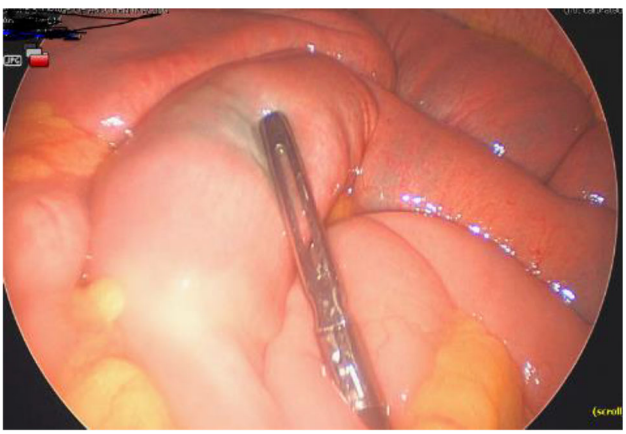
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Figure 1 CT axial imaging of small bowel obstruction from phytobezoar.



Figure 2 Laparoscopic images of phytobezoar in-situ.



P056

Gastric Perforation After Splenic Artery Embolization and Splenectomy

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Background: Gastric perforation following splenectomy, is associated with degree of morbidity and mortality. The risk of gastric perforation following splenectomy is reported as less than 1% but has a mortality index of 60%. Herein, we present a case of a gastric perforation following a traumatic splenectomy in the setting of a ruptured splenic artery aneurysm.

Case Presentation: We present a case report of a 43-year old female with a history of multiple prior surgical interventions including appendectomy, cholecystectomy, Hartmann procedure for perforated diverticulitis, and subtotal colectomy with end ileostomy for cecal perforation, who presented with sudden onset severe abdominal pain, tachycardia, and hypotension without any known inciting factor. On admission, was found to have large volume hemoperitoneum secondary to a distal splenic artery aneurysm rupture on cross-sectional imaging, was taken emergently for an exploratory laparotomy and underwent empiric mid-splenic artery embolization with return for repeat abdominal washout, removal of packing, and fascial closure on multiple subsequent days. Postoperatively, she developed a fluid collection, increased drainage from drains, concerning for a gastric perforation on repeat imaging. This required multiple IR drainage procedures, and endoscopic repair of the gastric perforation. Ultimately, the patient was successfully advanced to a regular diet and was discharged home on antibiotics.

Discussion: Although rare, gastric perforation after splenectomy has a high degree of morbidity and mortality and should prompt serious consideration and treatment. Gastric perforation should be included in the differential diagnosis for all patients who present with pain in the left upper quadrant and left shoulder, along with fever, tachycardia and upper abdominal tenderness after splenectomy. Chest radiographs may show the presence of a pleural effusion in the left hemithorax, and, if drains are placed post operatively, increased drainage in the left subphrenic space. As in this particular case, placement of drains in the subphrenic space allowed for the early recognition of this complication. Small perforations may be amenable to endoscopic repair, and it is possible to avoid taking these patients back to the operating room for open repair.

Keywords: Splenectomy, Splenic artery embolization, Gastric perforation

Figure 1 CT axial imaging of splenic artery aneurysmal rupture.

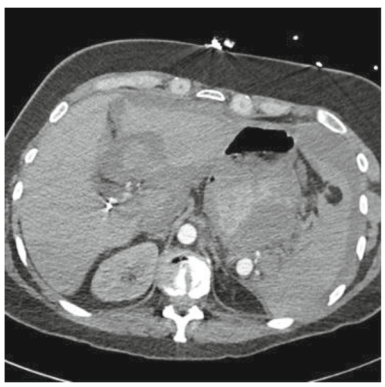
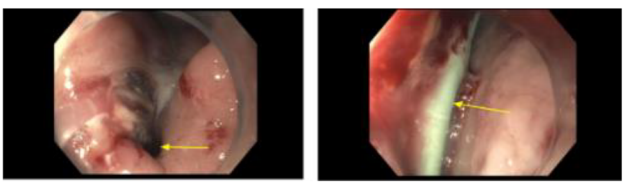


Figure 2 Gastric perforation with pigtail catheter visible through defect.



P058

Laparoscopic Management of Small Bowell Obstruction Caused by Single, Thick, Adhesive Band and Suture of an Intestinal Perforation: 1 Case Report

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Introduction: Small bowel obstruction is a frequent reason for admission in surgery departments with 60 to 80% of those caused by postoperative adhesions. About 35% of patients with prior abdominal or pelvic surgery, after 10 years are likely to develop at least once, an acute SBO. Conventionally and historically, the cases of SBO were managed by laparotomy, but laparoscopy tends to expand in the surgical management of the acute abdominal conditions including SBO.
Case Report: We report here 1 case of a patient, a 55 years old woman, presenting with clinical signs of small bowel obstruction, for 5 days prior. She was apyretic and had normal blood pressure and heart rate. Blood tests showed CRP 57 mg/l and WBC count: 12G/l. Surgical history and comorbidity: 3X C-sections, BMI:45. The CT scan examination showed a small bowel obstruction located in the left flank, dilated intestinal loops, no intraperitoneal fluids nor signs of bowel ischemia. Initially, the patient was treated by conservative management. The patient was clinically and biologically improved, but still no transit and day 3 after admission, a diagnostic laparoscopy has been decided. Surgical findings: thick adhesion between the left colon and the first jejunal loop, no intestinal ischemia. We performed the resection of the adhesive band, during the procedure, a small bowel perforation has been observed at the band insertion site. Closure of the perforation, laparoscopically, with separate stitches, intracorporeal knots, double layer. Uneventful postoperative follow-up with discharge day 6 after the intervention; histology revealed a 47 × 23x12 mm fibrotic and fatty tissue band.
Conclusion: Laparoscopic management of SBO is feasible in selected patients, when the conservative treatment fails. Preoperative management including insertion of a nasogastric tube, NPO, i.v. fluids and electrolytes help reducing the distension and oedema of the intestinal loops, allowing an acceptable working space. Great attention must be paid in manipulating the bowel in order to avoid intestinal injury. Advanced laparoscopic skills are needed to asses and resolve intraoperative events or difficulties like intestinal injury or correct exposure. Laparoscopy is a valuable and safe alternative to laparotomy, in selected patients, performed by experienced surgeons, resulting in better patient satisfaction, shorter hospital stays, lower morbidity.

P059

Incidental Morgagni Hernia Diagnosed After Blunt High Force Trauma

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Congenital diaphragmatic hernias are generally identified in childhood; however rarely may present in adulthood. The anterior retrosternal defect develops during embryological development of the diaphragm.

We report a case of a 29 year-old male trauma victim of a motor vehicle collision who presented with a sternal fracture and an anterior diaphragmatic hernia, and was successfully managed minimally invasively. There was preoperative data and clinical index of suspicion to consider this might have been a congenital or chronic defect as opposed to an acute traumatic rupture, and so a diagnostic laparoscopy was performed to confirm this. Once it was confirmed that this was not an acute traumatic rupture, laparoscopy was completed and patient was referred for elective repair.

Acute traumatic diaphragmatic hernias warrant immediate surgical repair in the acute setting. While the discovery of a diaphragmatic hernia on imaging in a trauma patient with a high force mechanism should raise index of suspicion for an acute rupture, care should be taken in a case where physical examination and detailed review of the imaging would suggest a chronic process. In such cases, confirmation with a minimally invasive approach may be warranted, and the patient may then be optimized for definitive elective repair at a later date.

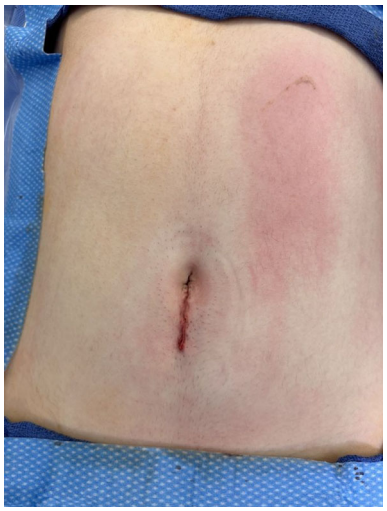
P060

Single Incision Laparoscopic Appendectomy and Meckel's Diverticulectomy: A Unique Case Report and Review of the Literature

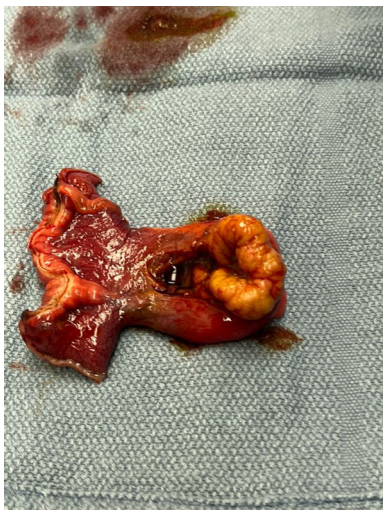
Joseph A Sciacca, DO; Michael Goldberg, MD; David Palange, DO; ChristianaCare Hospital

Introduction: In this case, we display a unique utilization of a Single Incision Laparoscopic Surgery (SILS) technique for appendectomy and Meckel's diverticulectomy in a patient with chronic abdominal pain and a pelvic mass concerning for malignancy. This unique approach highlights the benefits of SILS as a novel surgical approach in managing a Meckel's diverticulum.
Case Presentation: 22-year-old transgender male with history of ADHD, migraines and recurrent abdominal pain, presented to the Emergency Room (ER) with nausea, vomiting, diarrhea and worsening acute on chronic lower abdominal pain. Computed tomography (CT) revealed acute appendicitis, along with a concerning 3 × 2 cm enhancing mass near the ileum, located within the pelvis. The patient underwent a SIL appendectomy with exploration of the mass, which intra-operatively was noted to be a 6 cm pedunculated ileal diverticulum. It contained a large firm nodule and was segmentally resected with 6 cm of ileum, due to the concern for malignancy. The infraumbilical vertical incision measured 3.5 cm in length, accommodating 3 trocars via Gel port. Post-operative course was uncomplicated. The patient was doing well and was pain free on his follow-up visit. Pathology demonstrated a large polypoid mass of gastric mucosa in a Meckel diverticulum.
Discussion: Single incision laparoscopic surgery offers the benefits of reduced peritoneal tissue trauma, faster recovery and enhanced cosmesis. Current literature is sparse regarding use of SILS techniques for Meckel segmental resection, especially in adult patients. We discuss a unique SILS case for acute appendicitis, in a patient with an enhancing ileal mass that raised concern for malignancy. Through a SILS approach, we successfully performed our intended appendectomy, with segmental resection of the ileal mass, later identified as Meckel's diverticulum. Our case demonstrates successful use of SILS technique for varying indications and emphasizes a more minimally invasive approach for operations that are typically performed through conventional laparoscopic methods.
Conclusion: We present a unique case of SILS appendectomy and Meckel's diverticulectomy in an adult patient with appendicitis and a mass in a large ileal diverticulum.











P061

Rare Finding of Low-grade Appendiceal Mucinous Neoplasm (LAMN) in an Appendiceal Torniquet Causing Closed Loop Small Bowel Obstruction

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Acute appendicitis is one of the most common presenting cases in surgical emergency, which makes appendectomy a common emergency surgery. Rarely do we find associated bowel abnormalities in these cases or suspect malignancy in patients of a younger age group. Furthermore, phenomenon of an appendiceal torniquet causing a complete closed loop obstruction of small bowel is an extremely unusual case. We report such a rare case of an appendiceal torniquet causing small bowel obstruction with the finding of an equally rare appendiceal malignancy on histopathology. A 34-year-old male patient presented with clinical manifestations and imaging evident of acute appendicitis, and during laparoscopy, an appendiceal tourniquet

was discovered to be the causative factor of complete obstruction of terminal ileum. The patient underwent laparoscopic appendectomy. The histopathological examination of the specimen reported Low-grade appendiceal mucinous neoplasm (LAMN).The oddity of this case is multiplied by the fact that appendiceal torniquet is a rare presentation itself and the pathology in this case is one of the uncommon appendiceal malignancies, especially in younger patients. Both conditions presenting in the same patient is a statistical improbability. This case highlights the importance of considering these rare presentations and pathologies when operative management is being planned, especially for the young surgical trainees without much experience of such deviations.









P062

Acute Abdomen in a Patient with a Dormant Peritoneal Dialysis Catheter

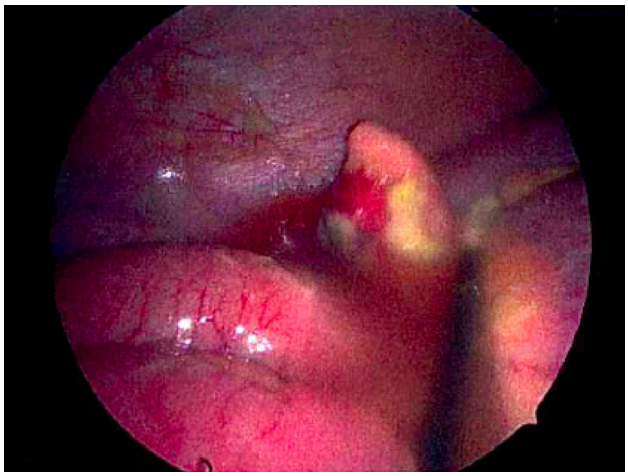
Shubham Bhatia, MD[1]; Catherine Olang[2]; Jane Y Tian, MD[1]; Youssef Mourad, MD[1]; Martine A Louis, MD[1]; [1]Flushing Hospital Medical Center, New York; [2]St Georges University School of Medicine

Introduction: Indications for PD catheter removal include dysfunction, infections, and transition to IHD. However, the timing of catheter removal remains unclear, and PD is associated with a higher risk of intra-abdominal infections.

Case Report: We present a case of a 41-year-old male with hypertension, type 2 diabetes, and end-stage renal disease (ESRD) on IHD presenting with fever, chills, nausea, and diffuse abdominal pain. He had an unused PD catheter with purulent drainage. His temperature was 101.2°F and exhibited peritoneal signs. Labs were significant for WBC 14,000/mL and CRP 26.4. He was septic with elevated troponin and type 2 Myocardial infarction. CT scan revealed acute appendicitis with a dilated 1.8 cm appendix containing a 2.6 cm appendicolith.



He underwent laparoscopic appendectomy with findings of a gangrenous appendix. The PD catheter was also removed g. Patient's postoperative course was uncomplicated. Blood cultures were positive for E. coli.



Discussion: PD is chosen for its convenience and improved quality of life, but it carries the risk of exit site and tunnel infections. Contamination from skin flora and external organisms can introduce peritonitis-causing gram-positive cocci into the abdominal cavity. Less frequently, gram-negative bacteria like E. coli, Klebsiella, and Proteus are responsible for PD-related infections, often originating from intra-abdominal sources such as intestinal perforation, ischemic bowel, or cholecystitis. Delays in diagnosing PD-related peritonitis can lead to severe complications, progressing rapidly to sepsis and death. Clear guidelines for the timing and indications of PD catheter removal are lacking.
Prompt surgical intervention is recommended for PD patients with peritonitis, but it carries an overall operative mortality rate of 16-50%, with a 33% mortality rate in cases of acute appendicitis.
Conclusion: Acute appendicitis is one of several abdominal surgical conditions that can occur in ESRD patients with a functional or unused PD catheter. Unused PD catheters should be removed as they may serve as conduits in acute abdominal processes. This may lead to sepsis, major cardiac events, and fatal outcomes. Early abdominal CT scans, careful resuscitation, empiric antibiotics, and expedited appendectomy can improve survival by promptly addressing the source of infection.

P063

Laparotomy Mortality Rates in Patients with Blunt Abdominal Trauma Following Diagnostic Algorithm-Based Group Classification: A Systematic Review

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Introduction: Blunt abdominal injuries form an important cohort of traumatic injuries. Uncontrollable haemorrhage is a common cause of mortality in these patients, necessitating quick diagnosis and redressal. The focussed assessment of sonography for trauma (FAST) scan and CT scans form an effective mode of diagnosis in these patients. The ISS is a score that predicts mortality outcomes after traumatic injuries. These indicators facilitate a choice between the different modalities of treatment. This study compares the mortality rates between patients who have undergone laparotomy versus other treatment choices.
Methodology: A systematic literature search was carried out on PubMed and Scopus from 2000 to 2023 on the treatment choices and outcomes following blunt abdominal injury in the adult population. The studies were categorized based on diagnostic methods for further analysis. A total of 20 full texts were found and data collection and screening were performed by two independent teams. An analysis of laparotomy rates and outcomes was performed for each study. Following the PRISMA guidelines, all the studies included out of 1288 studies included the ISS scoring, FAST scan OR CT scan done in patients of blunt abdominal trauma with laparotomy and mortality rates were given.
Result: A total of 20 studies met the above inclusion criteria. Included studies included different patient groups from different geographic regions. Furthermore, sub-group independent analysis based on methodology: demonstrates the pooled analysis revealed average mortality rates of 44% (95% CI:42.9-45.1%) in positive CT scan findings of 23% (95% CI:20.6-25.4%) in positive FAST scan findings of 12.94% (95% CI:12.4-13.4%) in ISS Score > 15 findings among blunt abdominal trauma patients who underwent laparotomy.
Conclusion: Based on the results of our comprehensive study, we conclude that performing early laparotomy in patients with blunt traumatic abdominal injury can significantly reduce mortality in cases of ISS scoring followed by laparotomy but not in identifying the site of organ injury.
This suggests that early detection, careful patient selection, and prompt surgical intervention by the above predictors play a key role in rapidly detecting and treating life-threatening injuries, which ultimately improve patient outcomes.

P064

Chronic Abdominal Pain in Adulthood: Unmasking Malrotation—A Case Report

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Introduction: Malrotation, typically diagnosed in infancy, is a rare anatomical anomaly that results from improper rotation of the midgut during embryonic development. While it predominantly presents in the pediatric population, adult-presentation malrotation is a seldom encountered entity. We present the case of a 26-year-old female who was referred for surgical intervention due to chronic intermittent abdominal pain and nausea, ultimately diagnosed with malrotation.

Case Report: A 26-year-old female with no significant medical history presented with chronic intermittent abdominal pain and nausea persisting for 1-2 years. She denied emesis, changes in bowel habits, or weight loss. A CT scan of the abdomen and pelvis revealed evidence of malrotation. The patient underwent an elective diagnostic laparoscopy, lysis of adhesions, and an appendectomy (Ladd's procedure). Complete nonrotation of the bowel was noted, with all small bowel on the right side and large bowel on the left. Multiple adhesive bands (Ladd's bands) were found causing partial blockage and kinking. These bands were meticulously released, restoring proper bowel alignment. A prophylactic appendectomy was performed. The patient was discharged on the same day.
Discussion: Adult-presentation malrotation is exceedingly rare, with most cases diagnosed in infancy. Patients may present with vague abdominal symptoms, making diagnosis challenging. Bilious emesis, distention, and metabolic alkalosis are cardinal signs in pediatric cases, but these may be absent in adults. Imaging studies, such as CT or upper gastrointestinal series, are essential for diagnosis. Our case highlights the importance of considering malrotation as a differential diagnosis in adult patients with chronic abdominal complaints.
Conclusion: This case highlights the importance of considering adult-presentation malrotation in patients with chronic abdominal symptoms. Timely diagnosis and surgical intervention, often involving laparoscopy and a Ladd's procedure, can provide relief even in cases with prolonged symptoms. Continued research and comprehensive case reporting are essential to further understanding this rare presentation of malrotation and refining management approaches.

P065

Analysis of Outcomes of Traumatic Colon and Rectal Injuries Managed with or Without Fecal Diversion

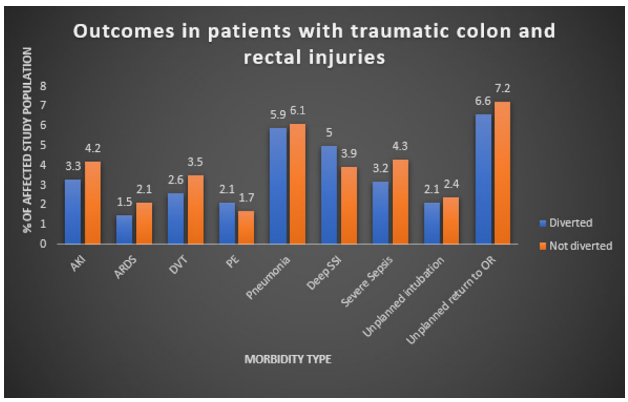
Taha Mallick[1]; Mahera Hasan, MBBS[2]; [1]Tug Valley Appalachian Regional Healthcare Medical Center; [2]Harlem Hospital Center

Introduction: Traumatic colorectal injuries can be managed by primary repair / anastomosis or fecal diversion. We aimed to study differences in outcomes in adult patients managed with or without fecal diversion at time of initial operation.
Methodology: Using ICD-9 codes adult patients (18 years and older) in the National Trauma Databank with colonic and rectal injuries were identified for the years 2013-2015. Subjects with missing data or cardiac arrest at time of arrival were excluded. Patients were divided into two groups based on whether or not fecal diversion was performed at time of initial operation.
The following datapoints were collected: age, gender, race, injury severity score (ISS), pulse rate, systolic blood pressure (SBP) and length of stay (LOS). Incidence of the following morbidities was analyzed: acute kidney injury (AKI), acute respiratory distress syndrome (ARDS), deep vein thrombosis (DVT), pulmonary embolism (PE), pneumonia, deep surgical site infection (SSI), severe sepsis, unplanned intubation and unplanned return to OR.

Statistical analysis was conducted using SPSS for windows. P-value < 0.05 was considered statistically significant.
Results: Of 2,598,467 patients, 8434 (0.32%) sustained a colonic or rectal injury. Mean age was 32.1 years. 87.8% were male. 665 patients (Group 1) underwent fecal diversion while 3866 (Group 2) underwent resection / anastomosis or primary repair.
Groups 1 and 2 were noted to be similar in terms of ISS (median of 14 in both groups), age (33.9 vs 33.1 years; p = 0.15), percentage of male patients (87.1% vs 88.7%; p = 0.23), SBP (125 vs 123 mmHg; p = 0.051) and pulse rate (95.8 vs 97.3; p = 0.46) respectively.

No statistically significant differences were found in the incidence of AKI (3.3 vs 4.2%; p = 0.26), ARDS (1.5 vs 2.1%; p = 0.30), DVT (2.6 vs 3.5%; p = 0.22), PE (2.1 vs 1.7%; p = 0.47), pneumonia (5.9 vs 6.1%; p = 0.85), deep SSI (5.0 vs 3.9%; p = 0.18), severe sepsis (3.2 vs 4.3%; p = 0.18), unplanned intubation (2.1 vs 2.4%; p = 0.64) and unplanned return to OR (6.6 vs 7.2%; p = 0.56) between groups 1 and 2 respectively.

LOS was 15.3 and 15.2 days for groups 1 and 2 respectively (p = 0.92).
Conclusion: There does not appear to be a difference in outcomes between patients who undergo fecal diversion and those who do not. Therefore the decision to perform resection / anastomosis or primary repair should not be influenced by a concern for post-operative fecal leakage and subsequent morbidity but should be based on hemodynamic status and extent of injury.



P066

Bad Things Happen in Threes: A Case Series of Perforated Small Bowel Diverticula

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Background: Small bowel diverticulitis is an atypical cause of abdominal pain with sequelae that can mirror colonic diverticulitis. Despite robust experience with the latter, optimal management of small bowel diverticulitis remains unclear. It is often treated with surgical intervention, however there are reports of successful non-operative management. We experienced three cases of perforated small bowel diverticulitis within one-month, all successfully managed operatively.
Cases:
Patient A: A 46-year-old male presented with one-day of abdominal pain, non-bloody diarrhea, and chills. Laboratory evaluation revealed a leukocytosis of 14.9 × 109/L and normal lactic acid. Computed tomography (CT) demonstrated jejunal diverticulum with concern for perforation. Broad spectrum antibiotics were initiated, and the patient was taken for exploratory laparotomy and small bowel resection. The area of the diverticula was 20 cm distal to the ligament of Treitz. Pathology demonstrated ruptured jejunal diverticulum.
Patient B: A 78-year-old female presented with a one-day history of acute onset abdominal pain progressively worsening over several hours following one non-bloody bowel movement. Evaluation showed no leukocytosis, elevated BUN and creatinine (43 mg/dL, 2.00 mg/dL), and acidemia with bicarbonate of 16 mEq/L. CT revealed mesenteric gas concerning for perforation. Exploratory laparotomy and resection of small bowel was performed. An area of perforation was visible 60 cm from the ligament of Treitz. Pathology

demonstrated diverticular abscess and transmural perforation. See Photo Below.
Patient C: A 78-year-old female with stage III CKD presented with severe abdominal pain for several days associated with nausea and fatigue. Evaluation revealed leukocytosis (20 × 109/L) and acidemia (bicarbonate 17 mEq/L). CT was concerning for perforated small bowel diverticulum with air and abscess. Exploratory laparotomy and small bowel resection was performed. The area of perforation and mesenteric thickening was located 30 cm proximal to the terminal ileum.
Conclusion: We demonstrate three separate presentations of perforated small bowel diverticulitis within one month. For such a rare clinical phenomenon, we found it surprising it occurred not once nor twice, but thrice within this short period of time. Each patient was managed with upfront surgery and recovered well. It is unclear if they could have recovered with non-operative management, as only a few case reports have described. Despite our brief uptick in experience, it is unlikely this represents a broader increase in incidence that would yield the potential for randomized control trials. Until more data arises, we recommend thoughtful patient selection and counseling in the treatment of small bowel diverticulitis.



P067

Adult Intussusception in a Minority Population, Analysis of a Single Center Community Hospital

Sebastian Valdivieso, MD[1]; Shamon Gumbs, MD[1]; Max Murray-Ramcharan, MD[1]; Pamela Castillo, MD[2]; Brian Donaldson, MD, FACS[1]; [1]Harlem Hospital Center; [2]Nicklaus Children's Hospital

Introduction: Adult intussusception (AI) is an uncommon diagnosis, with an incidence reaching up to 5% of all intussusceptions. There are few studies analyzing AI in minority populations, we aim to identify and report the clinical and demographic parameters AI from an Inner-City Hospital.
Methods: A retrospective review of adult patients diagnosed with Intussusception between March 2019 to December 2022 was performed. Pediatric patients were excluded. Statistical analysis was performed with SPSS.
Results: A total of 26 adult patients were found to have a diagnosis of intussusception (Female 46.15%, Male 54.84%), mean age 43.81 (19-75, SD 16.76), and Mean BMI 25.25(SD 4.94). The majority of patients were African-American (57.69%), and Hispanics(42.30%). 23.07% had prior history of bariatric surgery. Small bowel-small bowel intussusception was the most prevalent diagnosis with an incidence of 84.61%, vs Ileo-colic (15.38%). 30.7% of patients underwent surgical intervention, 50% had an open procedure vs 50% a laparoscopic procedure. The recurrence of intussusception was 11.53%. CT scan was used for the diagnosis of AI, 15.38% of our cohort had a repeat CT scan, 15.38% had a repeat abdominal X ray. The Mean Dose Length product(DLP) of the group that had only one CT was 635.69 SD 258.08(330-1438), mean DLP for the group with repeat CT was 1807.75, (692-3157, SD 1284.18).
Conclusion: Adult intussusception is a rare diagnosis, with the wide availability of CT scan, the diagnosis of intussusception has increased. The most frequent intussusception was small bowel-small bowel and most of them were managed conservatively. After resolution, patients continue to have a significant risk of recurrence. About one third of our patients underwent a repeat radiological study, hence more exposure to radiation.

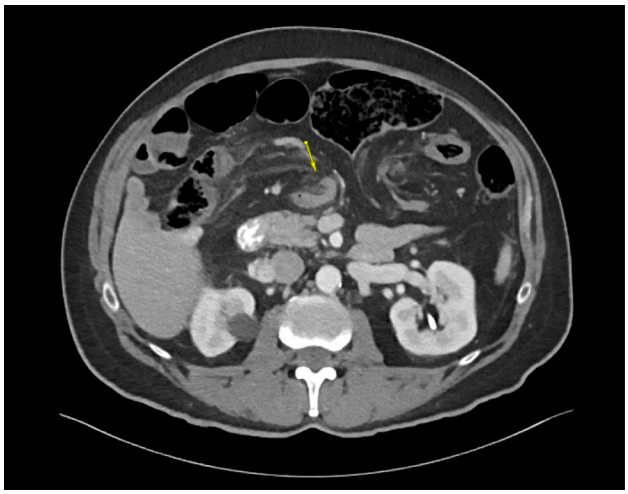
P068

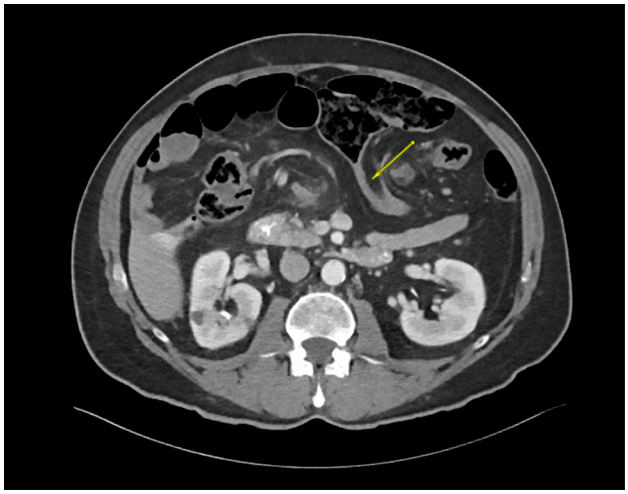
Partial Small Bowel Obstruction Caused by Ingestion of Plastic Bag Containing Methamphetamine Leading to Small Bowel Necrosis

Thurston Kallas, DO; Maria Osipova, MD; Gerrit Dunford, MD; Jane Spann, MD; Ascension St. Joseph Hospital, Chicago

Introduction: Small Bowel obstructions are one of the most common pathologies treated by general surgeons, the majority of these obstructions are caused by adhesions and hernias. Less than 2% of SBOs are caused by foreign bodies. Body packing has been described in medical literature as the swallowing of small amounts of loosely wrapped drugs due to the fear of arrest. Body packers usually present to the hospital due to the toxic effects of drugs, bowel obstruction, or medical assessment after arrest. When Bowel obstruction develops from such instances, surgical intervention is often indicated.
Case Presentation: Patient is a 46 year old male with a history of HIV, IV drug use, Kaposi sarcoma, and neurosyphilis who presented to the hospital with 5 days of abdominal pain. Patient had no prior history of abdominal surgeries or hernias. He was found to have a partial small bowel obstruction. Patient was not forthright with his history and often refused treatment. During his hospital course he would demonstrate encouraging signs of return of bowel function only to then oscillate back to symptoms of abdominal pain and distension. After trialed cycles of conservative management, patient eventually disclosed that he had swallowed a plastic bag. He underwent surgical intervention. A short portion of the ileum was very inflamed and densely adhered to the pelvis. The bowel was resected and a small plastic bag was found within the bowel. Pathology revealed full thickness necrosis and acute inflammation of mucosa with extension into submucosa. Postoperatively patient admitted that he swallowed a plastic bag containing methamphetamine.
Conclusion: Small bowel obstructions caused by body packing is relatively uncommon. We present a case of a partial small bowel obstruction secondary to the ingestion of a plastic bag containing methamphetamine that led to small bowel necrosis. This case highlights the importance of having a high clinical suspicion of foreign body and drug packing causing SBO in patients with a history of drug use, who provide different histories, and have no history of prior surgeries or abdominal pathologies. Not having this as a differential could delay needed surgical intervention and shows the deleterious effects of methamphetamine on the tissue of the small bowel.









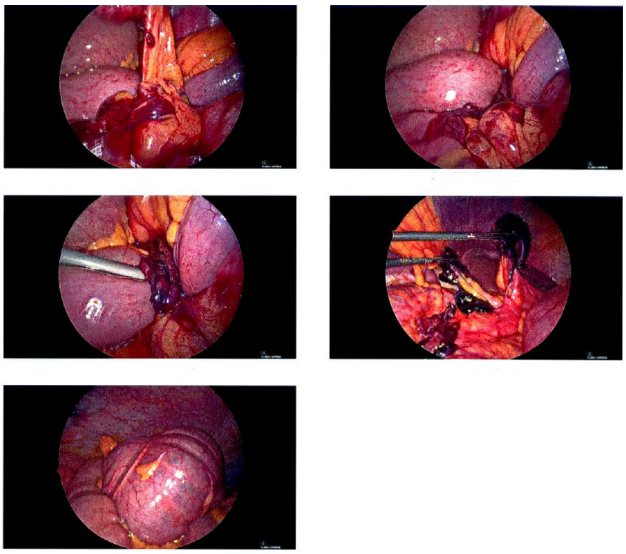
P069

Cecal Bascule Presenting as Internal Hernia

Jane Tian, MD; Shubham Bhatia, MD; Youssef Mourad, MD; Martine A Louis, MD, FACS; Noman Khan, DO; Flushing Hospital Medical Center

Introduction: Cecal volvulus is the second most common type of colonic volvulus, predominantly affecting females and younger patients in their 2nd or 3rd decade. Presentation is either insidious or mimics small bowel obstruction with abdominal pain, distention, and nausea/vomiting. Internal hernias are an uncommon cause of intestinal obstruction seen in 0.5-4% of cases. Prompt diagnosis and treatment prevent ischemia, necrosis, or perforation. We present a patient with a cecal bascule and an internal hernia due to an adhesive band in a virgin abdomen.

Case Presentation: A 68-year-old male with hypertension and no past surgical history presented with a two-day history of diffuse abdominal pain, anorexia, and nausea. Vitals: Temp 98.2°F, BP 149/79, Pulse 64, and SpO2 97%. Physical exam demonstrated a mildly distended abdomen with umbilical and epigastric tenderness. Labs were unremarkable. CTA/P showed two separate areas of mesenteric swirling: one in the distal small bowel resulting in small bowel obstruction and another involving the distal transverse colon. The cecum was noted to be in the RUQ (Fig. 1-3). The patient underwent an emergent diagnostic laparoscopy. A cecal bascule was noted with a thick adhesive and necrotic band arising from colonic mesentery and omentum causing an internal hernia (Fig. 4). The bowel was viable and the band was resected. The transverse colon was tortuous without herniation. A RLQ cecopexy was performed. The patient was discharged after an uneventful post-operative course.



Discussion: Cecal bascule is a rare type of volvulus, accounting for 5-20% of cases. The hypermobile cecum folds anteriorly and superiorly on itself. Due to the lack of axial rotation of the colon, mesenteric vascular compromise is rare, and patients typically present with less critical illness. Clinical symptoms include abdominal pain, nausea, vomiting, and decreased bowel movements. Imaging shows a displaced cecum in the mid or upper abdomen, a transition zone between the ascending colon and cecum, and/or perihepatic free fluid. Internal hernias can be congenital or acquired from trauma, inflammation, or prior surgery and can potentially be life-threatening, as bowel entrapment can lead to strangulation and ischemia. Cases of cecal bascules herniating through the foramen of Winslow or in patients with prior surgery have been reported, unlike our case in a virgin abdomen.
Conclusion: Cecal bascule and/or internal hernia can occur with prior surgery or in a virgin abdomen. Once diagnosed or suspected, they should prompt surgical intervention, either with resection ± ileostomy creation or detorsion and cecopexy.

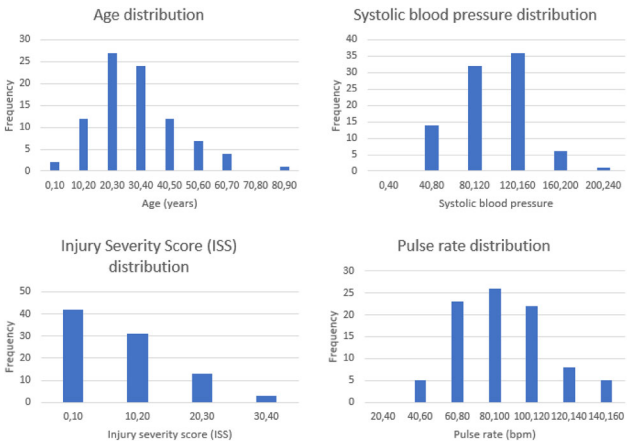
P071

Use of Laparoscopic Surgery in the Management of Traumatic Colon and Rectal Injuries

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Introduction: Laparoscopy is increasingly used in the operative management of abdominal trauma. We aimed to study characteristics of patients in the National Trauma Databank (NTDB) who undergo laparoscopic surgery for traumatic colorectal injuries within 1 day of presentation.
Methodology: Traumatic colon and rectal injuries were identified for years 2013-2015 using ICD-9 codes. Subjects with missing data or cardiac arrest at time of arrival were excluded. Patients undergoing laparoscopic colon or rectal surgery within one day of presentation were identified.
Data was collected for age, gender, race, injury severity score (ISS), pulse rate, systolic blood pressure (SBP), respiratory rate (RR) and length of stay (LOS) and mortality. Incidence was analyzed for acute kidney injury (AKI), acute respiratory distress syndrome (ARDS), deep vein thrombosis (DVT), pulmonary embolism (PE), pneumonia, organ space surgical site infection (SSI), deep SSI, severe sepsis, superficial SSI, unplanned intubation and unplanned return to OR.

Statistical analysis was conducted using SPSS for windows.
Results:
Of 2,598,467 patients, 8434 (0.32%) sustained a colonic or rectal injury. 89 (1.0%) patients underwent laparoscopic surgery. 88.1% were male.
Ages ranged from 7-86 years with median 32 years and interquartile range of 18 (24-42 years).
ISS ranged from 9-38 with median 13 and interquartile range of 9 (9-18).
Mean SBP ranged from 41-220 mmHg with median 120 mmHg and interquartile range 44 (96-140 mmHg).
Mean pulse rate ranged from 52-155 bpm with median 92 and interquartile range of 35 (77-112 bpm).
Mean RR ranged from 10-58 per minute with median 20 and interquartile range of 6 (18-24 per minute).
Incidence of post-operative morbidity were as follows: AKI (5.6%), ARDS (1.1%), DVT (3.4%), PE (1.1%), pneumonia (3.4%), organ SSI (4.5%), deep SSI (5.6%), severe sepsis (2.2%), superficial SSI (3.4%), unplanned intubation (1.1%) and unplanned return to OR (3.4%). Mean LOS was 15.0 days.
6 patients (6.7%) died subsequently. Non-survivors appeared to have higher ISS (23.3 vs 14.4;p = 0.09) although this did not reach statistical significance.
Conclusion: Majority of patients undergoing laparoscopic surgery for traumatic colon or rectal injuries appear to be young or middle aged with ISS scores below 15 without major hemodynamic instability (SBP > 90 mmHg, pulse < 100 bpm). Patients with higher ISS should be approached with caution.



P072

Patent Omphalomesenteric Duct Causing Small Bowel Obstruction in an 85-year-old Female

Lorna Kang, MD; Christina Scarr, MD; Brandon M Larson, MD; Laura Crankshaw, MD; Summa Health System / NEOMED

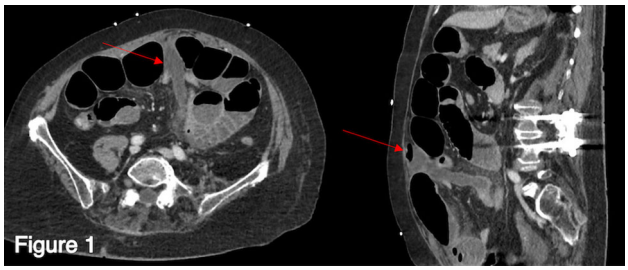
Introduction: Omphalomesenteric duct (OMD) anomalies represent one of the most frequent congenital malformations at 2-3% of the general population, the majority being Meckel's diverticulum. In rare instances a fistulous connection from the umbilicus to the terminal ileum forms a patent OMD which can remain asymptomatic until adulthood. There are few published cases of patent OMD presenting as obstruction in adults, ages ranging from 20-45 years old. We describe a highly unusual presentation of small bowel obstruction caused by patent OMD in the oldest described patient to date.
Case Presentation: The patient is an 85-year-old female with no prior abdominal surgical history who presented to the emergency

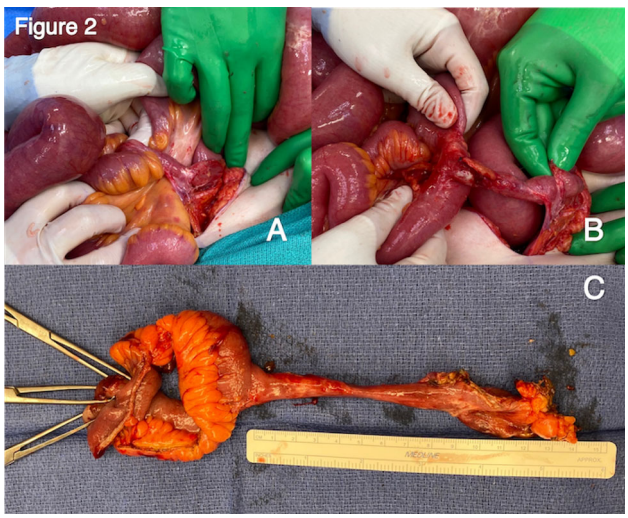
department with three days of abdominal pain and emesis. CT of the abdomen and pelvis demonstrated closed loop bowel obstruction around a tubular structure extending to the midline (Fig. 1). Laboratory values were significant for hyponatremia, azotemia, and leukocytosis with reactive thrombocytosis. Physical exam revealed peritonitis. A nasogastric tube was placed for decompression and intravenous fluids and piperacillin-tazobactam were started. The patient was recommended to proceed with emergency laparotomy.

Operative Discussion / Clinical Course: The operation began with a midline laparotomy incision. Exploration revealed a closed loop small bowel obstruction around a persistent OMD. There was evidence of chronic inflammation as demonstrated by a small bowel stricture proximal to the diverticulum and mesenteric scarring (Fig. 2A). The closed loop obstruction was untwisted, and the involved segment appeared viable (Fig. 2B). A stapled small bowel resection and anastomosis was performed. The specimen was sent for pathology (Fig. 2C). The mesenteric defect was closed with a running 3-0 Vicryl suture. The fascia was closed and a suprafascial wound vacuum was placed.

The patient's postoperative course was uncomplicated and she was discharged to a skilled nursing facility on postoperative day eight after return of bowel function and incremental diet advancement. Intraoperative cultures grew clostridium perfringens requiring a short course of intravenous antibiotics. Pathology of the surgical specimen was consistent with Meckel's diverticulum.

Conclusion: We describe a case of small bowel obstruction caused by a persistent OMD in an elderly patient, the oldest documented to date. This case highlights the importance of considering a wide differential in patients presenting with bowel obstruction in a virgin abdomen, especially in the older population. When other causes of obstruction have been ruled out, the differential should expand to include omphalomesenteric anomalies, including persistent OMD.





P073

Acute Traumatic Appendicitis-Not Just a Coincidence

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Acute appendicitis caused by luminal obstruction and secondary bacterial overgrowth is one of the most common causes of abdominal pain in the emergency department, classically presenting as 1-2 days of migratory right lower quadrant (RLQ) pain with associated fever, anorexia and leukocytosis. Similar clinical findings have been described in patients following blunt abdominal trauma, referred to as traumatic appendicitis. It is rare, with 28 cases reported over a 20-year period and may be difficult to diagnose. The exact pathogenesis is unclear, with proposed mechanisms including direct compression, shear forces or mesenteric injury. Some consider traumatic appendicitis to be a logical fallacy rather than a true diagnosis, citing the high incidence of both trauma and appendicitis within a population. This report highlights a case with findings proving a causal relationship between blunt abdominal trauma and acute appendicitis.

A healthy adult male presented with generalized abdominal pain and fever one day after being struck in the right flank by a heavy dolly. The pain gradually worsened and became localized to the RLQ. He was febrile, tachycardic and normotensive. Labs revealed leukocytosis and elevated CRP. CT of the abdomen showed RLQ hemorrhagic fluid with a nonvisualized appendix. After improvement initially on antibiotics, the patient experienced worsening pain and fevers. Repeat imaging showed organized hemoperitoneum and inflammation in the RLQ. The patient was taken for diagnostic laparoscopy. After evacuating the intraperitoneal hematoma, neither the appendix nor other injuries were identified, prompting conversion to laparotomy. There was demarcated necrosis of the cecal base and appendix where the mesentery had clearly been avulsed (Fig. 1). A partial cecectomy was performed and the remaining exploration was negative for purulence, succus or missed injuries. Postoperatively the patient developed intra-abdominal abscesses but was discharged after twelve days. Pathology showed transmural necrosis and inflammation without evidence of perforation or malignancy, consistent with acute appendicitis.

Here, we describe a case of acute appendicitis clearly caused by blunt abdominal trauma. The patient had no prior symptoms, and suffered a mechanism of injury consistent with causing the mesenteric avulsion leading to abdominal hematoma and ischemic necrosis of the appendix as seen in Fig. 1. This was no coincidence.



Figure 1

P074

Risk Factors for Conversion to Open Surgery in Patients Undergoing Diagnostic Laparoscopy for Small Bowel Obstruction

Alex Richard, BS[1]; Adam Skura, BS[1]; Richard Perugini, MD, FACS[2]; James Carroll Jr., MD, FACS[2]; [1]UMass Chan Medical School; [2]UMass Memorial Medical Center

Introduction: While conservative, nonoperative management is typically regarded as first-line for small bowel obstruction (SBO), operative intervention may be indicated for patients who worsen or fail to improve. Diagnostic laparoscopy and laparoscopic interventions represent minimally invasive approaches; however these techniques are not always tenable and intraoperative conversion to open procedure may be required. Existing work has identified risk factors in patients associated with conversion to open in various general surgical procedures, although no work to date has examined surgical management of SBO. We conduct analysis in our population to examine whether these previously described factors, as well as other factors specific to SBO are associated with conversion from laparoscopic to open procedure.
Methods and Procedures: Patients who underwent diagnostic laparoscopy for radiographically confirmed SBO from 10/2017-8/2023 were identified. Operative notes were reviewed to determine if conversion to exploratory laparotomy was performed. Demographic data were collected on all patients to analyze factors that may be associated with intraoperative conversion to open procedure.
Results: 148 patients met inclusion criteria and 54 (36%) required conversion to open procedure intraoperatively. Female sex ($p = 0.02$) was significantly associated with conversion to open. Appearance of threatened bowel (38/54, 70%) and technical limitations of laparoscopy (16/54, 30%) were described rationale for converting to open. BMI ≥ 25, transfer status, age ≥ 70, communication between interpreting radiologist and ordering physician, and radiographic concern for closed loop obstruction did not predict conversion.
Conclusion: Diagnostic laparoscopy and laparoscopic intervention is an accepted minimally invasive surgical option for management of SBO. However, technical considerations or intraoperative findings may require conversion to open procedure for optimal care. Risk factors associated with conversion to open have not yet been explored in the context of this approach. We demonstrate that female sex was significantly associated with conversion to open, while other previously described as well as novel factors of interest were not. Further work may expand on outcomes related to conversion to open in these patients and root cause analysis surrounding intraoperative decision making.

P075

Validity Evidence for AI-generated Complexity Scores of Laparoscopic Cholecystectomy

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Introduction: Evidence supports the association between surgical skill and patient outcomes, highlighting the need for robust tools to evaluate performance. Video-based assessment is promising but the time required for expert review is a barrier to implementation. Artificial Intelligence (AI) may reduce this burden by providing automated assessments that should account for case complexity. In this study, we evaluated the validity of an AI-generated complexity score for laparoscopic cholecystectomy (LC) performed by general surgical trainees.
Methods & Procedures: This study included supervised LC cases performed by surgical trainees collected in a previous trial. Case difficulty was assessed intraoperatively by the supervising surgeon using a Visual Analogue Scale (VAS; 1 = Not difficult to 10 = Very difficult). Intraoperative video recordings were uploaded to a secure web-accessible platform (Theator Inc, Palo Alto) which uses AI to generate a case complexity score based on the Parkland Grading Scale (AI-PGS; 1 = normal appearing gallbladder to 5 = perforation/necrosis/obscuring adhesions). Case difficulty (VAS) for a subset of videos (n = 44) was evaluated by a blinded expert reviewer. Validity of the AI-generated complexity score was investigated by testing the primary hypotheses that AI-PGS correlates with: (H1) supervising surgeon case difficulty score and (H2) blinded reviewer case difficulty score. Additional analysis explored the secondary hypotheses that AI-PGS is correlated with (H3) procedure time, (H4) diagnosis (AI-PGS would be higher for cholecystitis/choledocholithiasis/pancreatitis compared to biliary colic/polyp) and (H5) booking priority (AI-PGS would be higher for emergency compared to elective cases). Hypotheses 1-3 were tested using Spearman's rank correlation. Hypotheses 4-5 were tested using the Mann Whitney test to detect between-group median differences. H1-3 were considered 'confirmed' if correlation coefficients were at least moderate (rho ≥ 0.4) while H4-5 required a ≥ 1 median difference between groups.
Results: 108 LC cases (47% biliary colic/polyp, 62% elective) were performed by 31 trainees supervised by 16 surgeons; 3 surgeons served as blinded reviewers. Mean (SD) AI-PGS complexity score was 2.66 (1.09), supervising surgeon case difficulty score was 4.00 (2.69) and blinded-surgeon case difficulty score was 3.89 (2.64). The data supported both primary hypotheses (H1 rho = 0.42, $p < 0.01$; H2 rho = 0.60, $p < 0.01$) and 1 of 3 secondary hypotheses (H4).
Conclusions: This study contributes evidence supporting the validity of AI-generated complexity scores for videos of laparoscopic cholecystectomy performed by surgical trainees. Further data and machine learning are needed to train the computer to account for complexity in video-based assessment.

P076

Automated Surgical Phase Recognition for Laparoscopic Hiatal Hernia Repair using Artificial Intelligence

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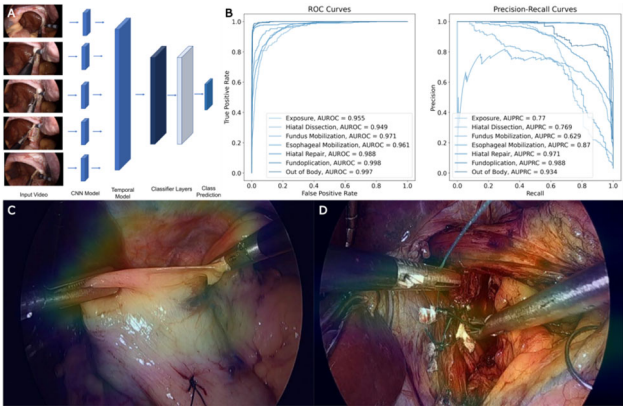
Introduction: Automatic phase recognition is a useful tool in surgical workflow analysis that has been enabled by advances in deep learning and computer vision. It can be used for improving case timing, identifying outliers in duration of phases, reviewing critical portions of long recordings, and assessing the development of standard operative fields. Automatic phase recognition tools have been previously developed for procedures such as cholecystectomy, sleeve gastrectomy, and partial colectomy, but not for hiatal hernia repair. We sought to develop a deep learning-based model for automatic phase recognition for hiatal hernia repair.
Methods: Seven surgical phases were developed for hiatal hernia repair, adapted from the SAGES video-based assessment tool. A dataset of 46 videos was labeled accordingly and split per video into

training, validation, and test sets. A combined convolutional neural network (CNN) and transformer model was developed, where visual features were extracted from individual video frames using the CNN, then passed in a series to the transformer for temporal analysis (Fig. 1A). The model was assessed using area under the receiver operating characteristic curve (AUROC), area under the precision-recall curve (AUPRC), and overall accuracy. Visual explanations of the CNN model were generated using Gradient-weighted Class Activation Mapping (Grad-CAM).

Results: A dataset of 46 videos was included for analysis. 28 videos were used for training, 8 for validation, and 10 were held out in the test set. The model had an overall accuracy of 75%. AUROC per class was > 0.95, while AUPRC per class ranged from 0.63 to 0.99 (Fig. 1B). The most common phases showed the highest accuracy. Visual explanations generated by Grad-CAM showed that the model identified relevant anatomy for each phase in an unsupervised manner (Fig. 1C).

Discussion: This study developed and internally validated a visual-temporal deep learning model for automatic phase recognition in laparoscopic hiatal hernia repair. Future directions include pre-training the CNN model using other laparoscopic videos and prospectively validating the model. Automatic phase recognition models are useful in themselves for quality improvement and education purposes but will also form the foundation for more complex surgical artificial intelligence tools for intra-operative guidance and skill assessment.

Figure 1 A. Diagram of model design, B. Receiver operating characteristic and precision-recall curves per surgical phase, C. Visual explanations of model decision-making, red marks highest attention, fundus mobilization phase, D. Visual explanations of model decision-making, red marks highest attention, hiatal repair phase



P077

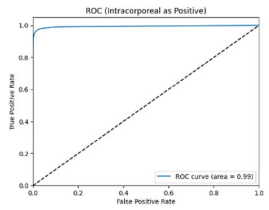
Protecting Privacy from Surgical Videos: Development and Validation of an Open-Source Artificial Intelligence-Based Pipeline for Automated Extraction of Extracorporeal Recording

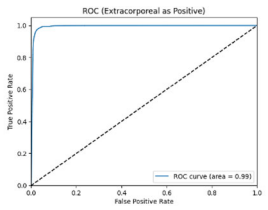
Michal Roztocki, BEng[1]; Mohamed Saif Hameed, MBBS, DNB[2]; Takuto Yoshida, MD, MPH[2]; Amin Madani, MD, PhD[3]; [1]Georgia Institute of Technology; [2]Surgical Artificial Intelligence Research Academy, University Health Network, Toronto, ON, Canada; [3]Department of Surgery, University of Toronto, Toronto, ON, Canada

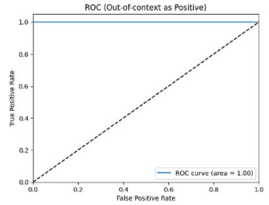
Introduction: The rapid proliferation of surgical videos from a wide range of procedures has proven extremely beneficial for education, research and quality-improvement. However, it has also raised significant privacy concerns. Elimination of all Protected Health Information (PHI) with anonymization of surgical data is imperative for applications of surgical videos. One challenge includes systematically eliminating portions of video feeds that are out-of-body and that could potentially lead to unintended identification of both patients and providers. There is a need for automated scalable solutions to remove this data. This study aims to develop and validate an artificial intelligence (AI)-based pipeline for automated identification and removal of extracorporeal scenes in surgical videos.

Methods and Procedure: An initial dataset of minimally-invasive procedures was used to train the AI model. Every frame of each surgical video was annotated according to the following classes: extracorporeal, intracorporeal (includes intra-trocar view) or out-of-context (e.g. color bars). After initial testing, the model was subsequently validated against a larger and more diverse multicenter dataset of surgical videos. Outcomes include Dice coefficient and Receiver Operating Characteristic Area Under the Curve (ROC AUC) metrics. The final data pipeline includes the AI algorithm that runs inference on each individual frame and subsequently applies a script that either extracts or blurs the frames that are classified as extracorporeal or out-of-context.

Results: A total of 10,008 frames from 9 right laparoscopic and retroperitoneoscopic adrenalectomy videos (total 9:00 h footage) was used to train a model based on the EfficientNetV2 architecture with additional standard data augmentation steps, using a 50/50 split in the dataset between the extracorporeal and intracorporeal classes to account for class imbalance. Initial testing included a Dice score of 0.96 for the extracorporeal class and 0.99 for the intracorporeal class. The validation dataset consisted of 66,234 frames from 30 laparoscopic videos of inguinal hernia repair (TAPP/TEP), cholecystectomy, colectomy, distal pancreatectomy, and gastrectomy (distal and total), obtained from 20 different institutions. Dice coefficient on the validation dataset (weighted due to class imbalance) was 0.955 and weighted One-vs-One ROC AUC was 99.58% (summary shown in Fig. 1).







	Precision	Recall	Dice (F1-score)
Intracorporeal	0.92	0.99	0.95
Extracorporeal	0.99	0.93	0.96
Out-of-context	0.81	1	0.89

		Actual		
		Intracorporeal	Extracorporeal	Out-of-context
Predicted	Intracorporeal	27891	414	10
	Extracorporeal	2371	34376	186
	Out-of-context	0	0	835

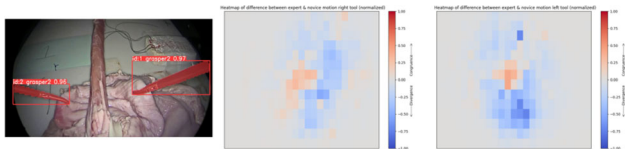
Conclusions: We developed an open-source scalable AI-based pipeline for automated identification and removal of out-of-body scenes from surgical videos as a means to preserve patient and provider privacy, while preserving the innate value of this surgical data. This framework is both effective and practical for real-time application.

P078

One Working Model Is All You Need to Implement Surgical Tool Segmentation and Tracking on Any Procedural Video Using Segment Anything Model (SAM)

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Introduction: Surgical tool tracking is vital for activity detection and performance assessment. AI based tool tracking requires annotating many images which is very labor intensive. Moreover, models trained using one data may not transfer well to others. Segment Anything Model (SAM) is an AI model that can segment any objects in an image without the need for additional training. The goal of this work is to develop a training pipeline that eliminates the need for manual annotation of images for surgical tool detection on any laparoscopic surgical procedures by using SAM.
Method: 500 images were randomly extracted from each video recording of a previously conducted study in which participants from varying experience levels performed laparoscopic Nissen fundoplication on an explanted porcine stomach model. The extracted images were then fed to a YOLOv8 model which was pretrained on Cholec80 dataset to detect and track laparoscopic surgical tools, generate bounding box prompts. The images along with their prompts were then provided to SAM to generate accurate segmentation masks. The resulting images and the masks were then split into test, training, and validation sets to train a new YOLOv8 model for the detection of tools in every frame of the videos. Performance of the surgical tool detection model was evaluated using mean average precision (MAP) for the range of intersection over union (IoU) thresholds and the F1 score. Heat maps of tool motions were generated and analyzed for differences.
Results: A total 64 videos were collected from 38 participants of which 19 (expert = 2, intermediate = 11, novice = 6) videos were used in this study. A total of 996 images were used for training of which 36 were background images, 306 for testing and 136 for validation. The mean average precision for IoU thresholds from 50 to 95% was 0.952. The F1 score for single class detection was 0.99. A bin size of 75 by 75 pixels was used to generate motion heatmaps for all the videos. Visual inspection of difference heatmaps of normalized motion densities show a clear difference in concentration of motion both between experts and intermediates and novices.
Conclusion: By using SAM and a pretrained tool detection model, we demonstrated the generation of training images without the need for manual annotation. The new model trained using this approach showed outstanding performance and this approach can be used for tool detection and tracking in any surgical videos.



P079

Surgical Intelligence in Action: Harnessing Computer Vision to Define and Monitor Data-Driven Best Practices

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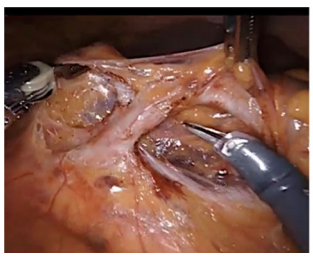
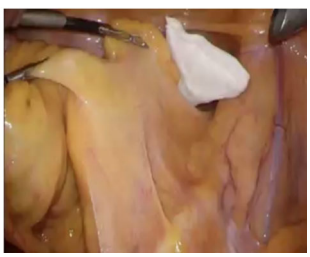
Introduction: Variability in surgical outcomes is largely explained by variability in practices within surgeon control. Standardization of intraoperative techniques based on validated best practices would contribute immensely to the uniformity and quality of outcomes. Until recently, however, we could not routinely and objectively document and monitor intraoperative activity to identify best practices. Today, computer vision and increasingly accessible endoscopic video footage are changing this. Surgical Intelligence harnesses AI to facilitate routine, automated video capture and analysis, and connects resulting intraoperative data with patient and outcome data. To methodically produce validated best practices from this knowledge, we must define relevant techniques, examine existing support for their utility, accurately monitor their routine, real-world use, and evaluate associations with outcomes. Here, we describe a novel method, enabled by an advanced Surgical Intelligence platform, for identifying surgical best practices. We then present pilot results from its initial application in bariatrics.
Method: We begin by identifying potential best practices, based on literature and expert inputs. For each practice, we assess clinical utility, adoption variability, and feasibility of AI-based detection. We then train and implement computer vision models in a Surgical Intelligence platform, enabling automatic monitoring of endoscopic videos for practice adoption. The collected data are the basis for selecting quality and standardization initiatives. Here, we describe an initial pilot on two bariatric procedures.
Results: We identified 5 potential best practices, implemented them in the platform, and began monitoring at 3 medical centers. Centers 1, 2, and 3 conducted 229, 109, and 40 sleeve gastrectomies, and showed 56%, 72%, and 57% adoption of gastric transection ending at least 1 cm from angle of His, and 73%, 72%, and 78% adoption of staple line reinforcement, respectively. The total number of gastric bypasses at centers 1, 2, and 3 were 21, 911, and 85, with 38%, 54%, and 64% adoption of viewing the Treitz ligament, 100%, 97%, and 86% adoption of leak tests, and 100%, 12%, and 15% adoption of closing mesenteric defects.
Conclusions: Utilizing a novel methodology, we showed dramatic variability between and within medical centers in the adoption of surgical practices. Enabled by AI-based video analysis, this data-driven process both facilitates multicenter studies connecting best practices to better postoperative outcomes, and enables assessment of practice adoption in daily surgeon workflow. Through focused interventions aimed at increasing adoption, this methodology lays the foundation for large-scale, proactive quality initiatives at multiple levels, from individual surgeon to hospital administration.

P080

Feasibility of Automatic Verification of the Critical View of the Inferior Mesenteric Pedicle Ligation with Artificial Intelligence

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Introduction: Developing a standardized critical step in a surgical procedure has challenges from inherent patient, surgeon, and team heterogeneity. For automation and development of artificial intelligence (AI) algorithms, an objective view of the step with measurable performance metrics is required. Video-based assessment may reduce contextual variability and improve the machine learning process. However, expert agreement is first needed for the feasibility, annotation, and development of explainable AI. Our goal was to assess the clinical need and feasibility for validating and automating a critical view of safety in left-sided colorectal resections.
Methods: A mixed-methods approach was employed, with a quantitative survey administered to international key colorectal surgery opinion leaders. The critical step definition was reviewed, then the distinct critical step of Inferior Mesenteric Artery(IMA) ligation evaluated. In stepwise fashion, the clinical need for a critical view of safety around this step, then the ability to recognize, reproduce, and teach the step were surveyed. Consensus was defined as 70% or greater agreement(Yes/No). Then, qualitative analysis was performed by a panel of data scientists and engineers on the proposed critical view illustration and video-based assessment(10 videos sequences of 5 laparoscopic and 5 robotic left-sided colorectal resections) for the feasibility, challenges, and insights into AI automation.
Results: Twenty-one surgical experts participated. Initial survey consensus was reached on the following: a)IMA ligation was a distinct and critical step b)there was a need to standardize this critical view, and c)the critical view was reproducible and teachable. Key features of the critical view included the IMA takeoff from the aorta, the ureter down, and a clear mesenteric window around the IMA. After qualitative analysis by the technical team, there was understanding of the view and structures from the illustration. The view and distinct structures were not recognized in the laparoscopic videos(0/5). The view and distinct structures were recognizable in 3 of the 5 robotic videos(60%).

Conclusions: There is a need for a critical view of safety in left-sided colorectal resections, but a gap across the multidisciplinary team in the ability to recognize these structures; in translation, a computer would not be able to reliably recognize the structures in video-based assessment. A better method for universal learning could improve the quality of AI algorithms. Improving surgical vision, segmentation of steps, and annotation in advance of training algorithms can help ensure quality and explainable AI in clinical practice pending development.

P081

Automatic Assessment of Training Level Using Computer Vision

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Introduction: Video Based Assessment (VBA) is the most popular way to assess technical skills of trainees in minimally invasive surgery but it has major limitations mostly related to its subjectiveness and the large time commitment. In our study, we designed a computer vision artificial intelligence (AI) model capable of automatically assessing the trainee level on a suturing robotic task.
Methods: Twenty-seven surgeons performed a robotic suturing task on a bench-top model. Videos were recorded of participants performing the task of back-handed suturing on a dry lab model. Bounding box annotations were created to identify the surgical instruments in each video by 2 senior surgical residents for 231,069 frames (Fig. 1). Each participant was ranked based on their post graduate year level of training. ResNet features were extracted from padded instrument bounding boxes in order to focus on visual information alone. An 11-layer 1D convolutional neural network was used to predict the experience level of the surgeon. For training and evaluation, 10 s clips randomly extracted from the middle 60% of the training videos were used.
Results: The average level of training for our participants was 2.74 years with a standard deviation of 2.07. Our model achieved a mean absolute error (MAE) of 1.43 on a threefold cross-validation over 27 participants (with 9 in the validation sets per fold) indicating predictions made by this model, based on a 10-s clip, will be on average off by 1.43 years of training from the actual year of training of the participant.
Conclusion: We were able to successfully train a computer vision algorithm to automatically assess the training level of a surgical trainee from one surgical task to within 1.43 years. This model can be used in the future to design a robotic education curriculum where surgeons in training can see if they are at an adequate point in their technique and work to improve their skills in a dry lab setting.



Figure 1 Bounding box annotations of instruments on one frame

P082

Does Diet Composition Impact Reflux qnd Eating-Related Symptoms in Metabolic Surgery Patients? A Natural Language Processing Powered Analysis of Free-Text Dietary Recall

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Introduction: Gastroesophageal reflux disease (GERD) symptoms are known to be influenced by dietary choices, yet limited research has explored their impact on Patient Reported Outcome Measures (PROMs) such as GERD Health-related Quality of Life (HRQL) and Body-Q scores in bariatric surgery patients. This study leverages Natural Language Processing (NLP) to analyze free-text dietary recall from patients undergoing metabolic and bariatric surgery (MBS) to estimate their food intake composition. We hypothesize that patients consuming a low-carbohydrate diet will experience less severe GERD symptoms, compared to those with a high-carbohydrate diet before and after MBS.

Methods: All patients at a major academic institution undergoing bariatric surgery evaluation were given a 24 h free text diet recall, GERD HRQL and Body-Q electronic questionnaires at their preoperative evaluation and at each postoperative follow-up. GERD-HRQL, a validated 15-question survey, was scored from 0 to 75, with higher scores reflecting more severe symptoms. Body-Q (Table 1) evaluated three domains: Eating related eating behavior (ER Behavior), distress (ER Distress), and symptoms (ER Symptoms); with scores ranging from 0 (poor health) to 100 (optimal health). Employing rules based NLP, diet recall free-text was parsed and matched with nutritional data from a comprehensive food database, allowing the calculation of daily macronutrient totals converted into percentages of daily calorie intake. A carbohydrate intake exceeding 50% of daily calories was categorized as a high-carbohydrate diet.

Results: Overall, 305 dietary recall questionnaires were completed: 224 pre-operatively and 81 post-operatively. Survey compliance was 82%. The baseline demographics of pre-operative and post-operative groups did not differ significantly in age or gender, but the post-operative group had significantly lower BMI (41 vs. 46, $p < 0.001$). Patients adhering to a "Low Carbohydrate" diet before surgery showed significantly worse GERD-HRQL, BODY0Q ER Symptoms, and ER Behavior scores postoperatively (Table 2). Conversely, the "High Carbohydrate" group demonstrated no significant differences in preoperative and postoperative scores (Table 3).

Conclusion: Patients adhering to a preoperative low-carbohydrate diet experienced worsening of GERD and eating-related symptoms following bariatric surgery, despite improvements in eating-related distress and behaviors. In contrast, individuals following a high-carbohydrate diet showed no significant changes in their preoperative and postoperative measures. These findings suggest that while a low-carbohydrate diet may enhance GERD-related quality of life measures before surgery, these benefits appear to diminish following bariatric surgery.

Table 1 Body-Q Eating Related Behavior Survey Format

HOW ARE YOUR EATING HABITS?

Think about the FOOD you ate in the past week. How often did you:

	Never	Sometimes	Often	Always
1. Feel satisfied after eating?	1	2	3	4
2. Eat healthy food that your body needs?	1	2	3	4
3. Show self-control when you ate?	1	2	3	4
4. Feel in control of what you ate?	1	2	3	4
5. Chew food thoroughly before swallowing?	1	2	3	4
6. Eat the right amount of food?	1	2	3	4
7. Eat at the right speed (not too fast)?	1	2	3	4
8. Avoid unhealthy snack foods?	1	2	3	4
9. Stop eating before you felt full?	1	2	3	4

Table 2. Low Carbohydrate Analysis

Questionnaire	PRE Op	POST Op	P-value
GERD-HRQL	4.48	6.72	0.04
BODY-Q ERS	79.8	73.2	0.0005
BODY-Q ERD	58.8	66.2	0.0003
BODY-Q ERB	81.68	86.44	0.07

Table 3. High Carbohydrate Analysis

Questionnaire	PRE Op	POST Op	P-value
GERD-HRQL	7.45	6.6	0.70
BODY-Q ERS	76.0	73.35	0.47
BODY-Q ERD	58.15	62.1	0.35
BODY-Q ERB	83.07	84.55	0.76

P084

Value of Cloud-based Artificial Intelligence (AI) Driven Video Analytics in General Surgery

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Background: New age computing tools such as cloud computing and Artificial Intelligence (AI) may lead to a revolution in the generation of insights based on surgical video analytics, particularly for laparoscopic and robotic surgery. Existing use-cases are nascent and these technologies may fundamentally change training and quality paradigms. Our objective was to better understand clinical use cases and value of video-based performance insights in General Surgery.

Methods: A narrative literature review was conducted utilizing PubMed, restricted to studies from the past 5 years. Additional perspective of an academic center's experience with a cloud-based AI driven video analytics platform over the past one year was also included. Data on use-cases were extracted.

Results: Studies in the literature highlight broad clinical use cases. Currently,prominent use case was in automated recognition of the various phases of surgery. Such phase recognitions were documented in procedures such as laparoscopic cholecystectomy, sleeve gastrectomy, Roux-en-Y gastric bypass, colectomy, hernia repair. In sleeve gastrectomy, for instance, the surgical videos weresegmented into phases such as – port insertion, gastric dissection, gastric sleeve creation, leak test, specimen removal and closure. Phase specific times were analyzed in multiple studies and were used to benchmark performance by attending surgeons, residents, and fellows. Studies also document the gradation of surgical skills using Global Evaluative Assessment of Laparoscopic Skills (GOALS), and Global Evaluative Assessment of Robotic Skills (GEARS) scales, and procedure specific scales such as Colorectal Objective Structured Assessment of Technical Skill (COSATS) for right hemicolectomy. Procedure specific analytics such as achievement of critical view of safety (CVS), gradation of operative complexity in laparoscopic cholecystectomy have been documented as well. Additional applications such as instrument recognition, economy of motion, critical structure identification and automated generation of operative notes were also documented, with less frequency. Surgeon awareness of phase specific times may represent a path to achieving efficiency, surgeon skills improvement and clinical outcomes improvement. Barriers related to hospital Information Technology (IT) stakeholders and medico-legal concerns remain.
Conclusion: New age video analytics present a powerful tool with potential to revolutionize surgical practice and care delivery. Further procedure specific, large scale validated use cases need to be highlighted in the medical literature and linked to outcomes.

P085

Dr. GPT Will See You Now: The Ability of Large Language Models to Provide Colorectal Cancer Screening Recommendations

Bright Huo[1]; Tyler McKechnie[1]; Monica Ortenzi[2]; Yung Lee[1]; Stavros Antoniou[3]; Julio Mayol[4]; Hassaan Ahmed[1]; Vanessa Boudreau[1]; Karim Ramji[1]; Cagla Eskicioglu[1]; [1]McMaster University; [2]Università Politecnica delle Marche; [3]Papageorgiou General Hospital; [4]Universidad Complutense de Madrid

Introduction: This study assessed the accuracy of colorectal cancer screening advice from Large Language Model (LLM)-based chatbots for both clinicians and patients.
Methods & Procedures: ChatGPT, Bing Chat, Google Bard, and Claude 2 were queried from July 27th – 28th, 2023 for screening advice using nine patient cases. Chatbots reported which screening test was indicated, the frequency of interval screening, and management for patients with positive test results. Clinical advice for both physician and patient inquiries were compared to guidance from major North American societies.
Results: Table 1 lists chatbot-generated screening recommendations for both clinician and patient inquiries. Relative to U.S. Multi-Society Task Force (USMSTF) on Colorectal Cancer guidelines, advice for clinicians aligned in 7/9 (77.8%), 5/9 (55.6%), 6/9 (66.7%), and 3/9 (33.3%) cases when querying ChatGPT, Bing Chat, Google Bard, and Claude 2, respectively (Table 1). ChatGPT demonstrated the ability to exercise clinical reasoning. Conflicting clinician and patient advice was given for 2/9 (22.2%), 1/9 (11.1%), 2/9 (22.2%), and 3/9 (33.3%) cases with ChatGPT, Bing Chat, Google Bard, and Claude 2, respectively.
Conclusions: LLM-based chatbots have promise in providing colorectal cancer screening recommendations, but still perform with inconsistent accuracy. Clinicians and patients must be aware of the pitfalls of using these platforms for health advice.

Table 1 Alignment Chatbot-Generated Recommendations with Colorectal Cancer Screening Guidelines.

Chatbot	ChatGPT		Bing Chat		Google Bard		Claude 2	
Clinician (CI) or Patient Inquiries (PI)	*CI*	*PI*	*CI*	*PI*	*CI*	*PI*	*CI*	*PI*
Total Frequency Aligned with USMSTF	7/9	5/9	5/9	4/9	6/9	6/9	3/9	4/9
Cases								
49 y/o, average risk	No	No	X	X	No	No	X	No
44 y/o, average risk	‡X	X	Yes	X	Yes	X	X	X
53 y/o, average risk	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
77 y/o, average risk	Yes	Yes	X	X	X	X	X	No
44 y/o. Sister CRC at 59 y/o	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
44 y/o. Sister CRC at 61 y/o	Yes	Yes	Yes	Yes	Yes	Yes	No	No
44 y/o. Mother CRC at 59 y/o	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
77 y/o. Son CRC at 59 y/o	Yes	X	X	X	X	Yes	No	Yes
77 y/o. Son CRC at 61 y/o	Yes	X	X	X	Yes	Yes	No	No

‡X = Did not give clinically meaningful advice.

P086

Development of a Surgical Vision System that Uses Artificial Intelligence to Highlight Critical Anatomy in Real Time

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Aims: The application of artificial intelligence (AI) technology in medicine is helping to move closer to optimal decision support in diagnostic imaging. Intraoperatively, the largest contributor to surgical complications is misidentification of anatomical landmarks. We aimed to develop an AI-based surgical vision system that highlights critical anatomy in real time.
Methods: Anatomical structures for AI recognition were the connective tissue fibers that define the optimal dissection plane in gastrointestinal surgery, the pancreas that should not be injured during gastric cancer surgery, and the hypogastric nerve that should not be injured during total mesorectal excision (TME). The algorithm was developed using deep learning based on still images extracted from more than 1,800 surgical videos. The AI was programmed to highlight the connective tissue fibers in turquoise, the pancreas in white, and the nerves in green. Using 20 randomly selected sample frames, we quantitatively evaluated model performance using evaluation metrics in machine learning (Recall, IoU, Dice) with manual annotation as ground truth. We also qualitatively evaluated the performance using sensitivity and misrecognition scores calculated from the surgeon's evaluation form (each on a 5-point scale, 0-4).
Results: The model produced high Recall scores (mean 0.606, maximum 0.861) for the connective-tissue fibers. Mean IoU and Dice scores reached 0.383 and 0.549, respectively, indicating acceptable spatial overlap of the objects. The sensitivity score was 3.52 (88.0%), and surgeons rated the sensitivity higher than the machine learning evaluation metrics. A strong correlation between this

sensitivity score and Recall (r = 0.733) indicated the reliability of the ground truth. The misrecognition score was very low (0.14), indicating an extremely low false-positive rate. Recall, IoU, and Dice for the pancreas reached 0.607, 0.461 and 0.610, respectively. Surgeons can sometimes find distinguishing the border of the pancreas from marginal adipose tissue difficult, but identification was largely clear with the AI, as was differentiation between the connective tissue fibers and nerves with similar properties in TME. Latency in recognizing these objects was less than 0.2 s on average.

Conclusions: AI can be trained to identify fine, difficult-to-discern, critical anatomical structures at a level convincing to expert surgeons. While surgeons see only the anatomy they can identify, AI displays the true anatomy and can help surgeons differentiate structures they otherwise might not see. This technology could assist surgeons in decision making by highlighting important anatomies in real time during gastrointestinal surgery, which could benefit patients by reducing surgical complications.



Figure 1. Highlighting connective tissue fibers (colored in turquoise) and nerves (colored in green) during TME by artificial intelligence

P087

Analysis of Surgeon Versus ChatGPT Recommendations on Bariatric Surgery Vignettes

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Introduction: The integration of artificial intelligence (AI) into healthcare prompts the need to measure its proficiency relative to human experts. This study evaluates the proficiency of ChatGPT, an OpenAI language model, in offering guidance concerning bariatric surgery, juxtaposed against bariatric surgeons. We hypothesize greater accuracy by bariatric surgeons as compared to ChatGPT.

Methods and Procedures: Five clinical scenarios representative of diverse bariatric surgery situations were given to board-accredited bariatric surgeons and ChatGPT. Both groups proposed medical or surgical management for the patients depicted in each scenario. The outcomes from both the surgeons and ChatGPT were examined and matched with the clinical benchmarks for bariatric surgery set by the American Society for Metabolic and Bariatric Surgery (ASMBS).

Results: There was a high degree of agreement between ChatGPT and physicians on the three simpler clinical scenarios. There was a positive correlation between physicians' and ChatGPT answers for not recommending surgery. In the two complex scenarios with multifaceted medical histories, surgeons exhibited a broader understanding and took into account distinct patient factors. Overall, ChatGPT's advice aligned with ASMBS guidelines 60% of the time, in contrast to attending bariatric surgeons, who consistently aligned with the guidelines 100% of the time.

Conclusions: ChatGPT had lower accuracy in the bariatric vignettes as compared to bariatric surgeons when compared against ASMBS guidelines. ChatGPT showcases potential in offering guidance on bariatric surgery, but it does not have the comprehensive and personalized perspective that doctors exhibit consistently. Enhancing AI's training on intricate patient situations will bolster its role in the medical field.

CLINICAL VIGNETTE	SURGEON RESPONSE	CHATGPT RESPONSE	ASMBS GUIDELINES
35 y/o female, no prev. surgical hx, BMI 30. Has tried dietary interventions and multiple medications with no sustained weight loss.	No Surgery	No Surgery	No Surgery
35 y/o male, complaints of fatigue and failed weight loss attempts. Has no past medical or surgical hx. BMI 45. Has tried dietary interventions and multiple medications with no sustained weight loss.	Sleeve Gastrectomy or Roux-en-Y Gastric Bypass	Sleeve Gastrectomy or Roux-en-Y Gastric Bypass	Sleeve Gastrectomy or Roux-en-Y Gastric Bypass
35 y/o female, BMI 37. Past medical hx includes obstructive sleep apnea. Has tried dietary interventions and multiple medications with no sustained weight loss.	Sleeve Gastrectomy or Roux-en-Y Gastric Bypass	Sleeve Gastrectomy or Roux-en-Y Gastric Bypass	Sleeve Gastrectomy or Roux-en-Y Gastric Bypass
35 y/o male presents with complaints of 6 months of epigastric pain. Pain is worse after meals. Past surgical history includes sleeve gastrectomy 5 years ago. BMI of 35.	Roux-en-Y Gastric Bypass	No Surgery	Roux-en-Y Gastric Bypass
35 y/o female presents with 6 month history of burning epigastric pain. Pain is worse after meals. Past medical hx includes type 2 diabetes mellitus. Patient has BMI of 37. Has failed to achieve sustained weight loss with dietary interventions and multiple medications.	Roux-en-Y Gastric Bypass	Sleeve Gastrectomy	Roux-en-Y Gastric Bypass

P088

Assessing Artificial Intelligence-Generated Medical Content on Appendicitis: A Novel Content and Quality Analysis

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Introduction: Generative artificial intelligence (AI) chatbots have recently proliferated throughout many aspects of healthcare. Existing online patient-oriented medical information has repeatedly been shown to be of variable quality readability for the public. We sought to evaluate the content of AI-generated medical information on appendicitis.

Methods: We created a novel score for AI-generated medical information based on existing validated tools such as the DISCERN Instrument. Our tool comprises 16 distinct criteria, each scored on a 5-point Likert scale with a total maximum score of 80. Criteria

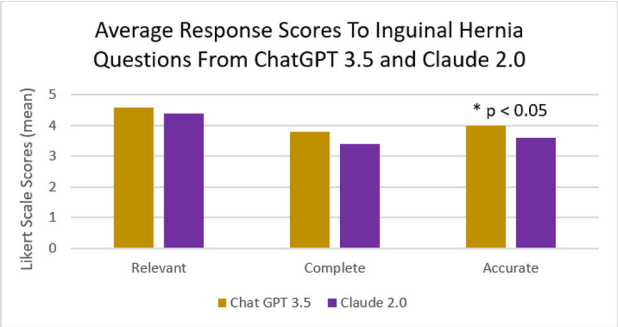
assessed included accuracy, comprehensiveness, risks, benefits, sources, areas of uncertainty, and tone. Readability was determined using the Flesch Reading Ease (FRE) and Flesch-Kincaid Grade Level (FKGL) tests.
Four widely used chatbots, ChatGPT-3.5 and ChatGPT-4 (OpenAI), Bard (Google), and Claude-2 (Anthropic), were prompted to generate content about appendicitis. Three investigators independently scored the generated texts blinded to the identity of the AI platforms. One-way ANOVA with Bonferroni correction was performed to evaluate differences in mean quality scores between chatbots.
Results: ChatGPT-3.5, ChatGPT-4, Bard, and Claude-2 achieved overall mean (SD) quality scores of 59.7 (0.58), 60.7 (3.21), 63 (2.00), and 50.3 (3.5), respectively. Inter-rater reliability was 0.64, 0.68, 0.66, and 0.61, respectively, all indicating substantial agreement among investigators. Claude-2 demonstrated a significantly lower mean quality score compared to ChatGPT-4 ($p = 0.001$), ChatGPT-3.5 ($p = 0.005$), and Bard ($p = 0.001$). There was no significant difference in mean quality scores between ChatGPT-3.5, ChatGPT-4, and Bard. Additionally, there was no significant difference between the paid subscription-based ChatGPT-4 and the freely available ChatGPT-3.5 ($p = 1.00$). When comparing specific criteria, Bard was the only platform that listed verifiable sources, while Claude-2 provided fabricated sources. ChatGPT-3.5 and GPT-4 did not provide any sources. None of the chatbots made any disclosures. However, all four chatbots discussed the risks of not treating appendicitis, provided accurate medical content regarding etiology, symptoms, and treatment with no major factual errors. All chatbots except for Claude-2 advised readers to consult a physician if experiencing symptoms. Regarding readability, FKGL and FRE scores of ChatGPT-3.5, ChatGPT-4, Bard, and Claude-2 were: 14.6 and 23.8, 11.9 and 33.9, 8.6 and 52.8, 11.0 and 36.6, respectively. All scores indicated difficulty readability.
Conclusion: AI-generated medical information on appendicitis scored favorably upon quality assessment, but most either fabricated sources or did not provide any. Additionally, overall readability far exceeded recommended levels. Generative AI platforms demonstrate measured potential for patient education and engagement about appendicitis.

P089

The Accuracy of Natural Language Processors for Patients Seeking Healthcare Information

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Background: This study aims to assess the accuracy of responses generated by Natural Language Processors (NLP) regarding queries around common surgical conditions. NLPs are artificial intelligence platforms that use computational linguistics and machine learning to analyze text and generate responses to questions. NLPs such as ChatGPT are now readily accessible, are quickly being integrated into our most widely used Internet search tools and will likely underpin the primary methods by which patients obtain healthcare information. The accuracy of NLP-generated responses to health information queries is unknown.
Methods: We queried two NLPs (ChatGPT 3.5 and Claude 2) for responses to a predetermined list of 17 questions about inguinal hernia surgery with topics including symptoms, diagnosis, surgical treatments, mesh safety, complications, and recovery. Responses were graded on a Likert scale (1 poor to 5 excellent) for relevance, completeness, and accuracy. Collective responses were compiled and scored collectively using the DISCERN criteria, a previously validated tool for evaluating patient information sources (scored from 16 to 80 points). NLP responses were compared to two gold-standards, patient education materials provided by SAGES and the American College of Surgeons (ACS). Evaluations were performed by two expert hernia surgeons (AW, RY).
Results: DISCERN scores (mean ± SD) were 56.5 ± 3.5 vs 53 ± 8.5 vs 55 ± 8.5 vs 63 ± 12.7 for information provided by ChatGPT, Claude, SAGES, and the ACS, respectively. Relevance, accuracy, and completeness of NLP responses are seen in the figure.



Discussion: NLPs provided succinct, readable responses to questions about inguinal hernia surgery. Collective responses from both NLPs provided answers similar in relevance to patient education materials produced by surgical societies. Currently, responses from ChatGPT were more accurate than Claude, and surgeons may consider endorsing its use with their patients to help them better understand their procedure.

P090

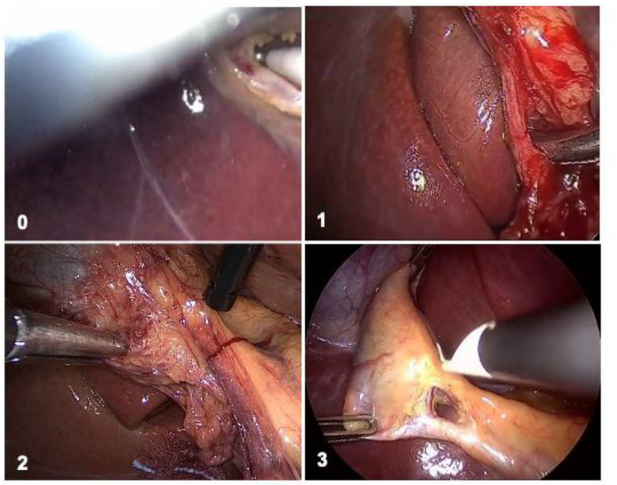
Artificial Intelligence for Surgical Coaching: Training and Testing of a Novel Computer Vision Algorithm for Assessing Adequacy of Retraction and Exposure During Laparoscopic Cholecystectomy

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Background: Establishing optimal exposure of dissection planes is a core behavior of every surgical procedure and a central theme for coaching safe surgical techniques. Artificial intelligence (AI) has recently been used to perform computer vision tasks on surgical videos (e.g. identification of anatomy, instruments, events) and could potentially be used to provide surgeons with real-time or postoperative feedback to improve operative performance. This study aims to develop and evaluate the performance of a novel AI algorithm that assesses adequacy of exposure and retraction of the hepatocystic triangle during laparoscopic cholecystectomy (LC).
Materials and Methods: LC videos were annotated by three high-volume surgeons for adequacy of retraction of the target hepatocystic triangle using an ordinal scale: 0 = target anatomy not in view, 1 = target anatomy in view but with inadequate retraction, 2 = target anatomy in view with adequate but suboptimal retraction, 3 = target anatomy in view with optimal retraction (Fig. 1). Adequate visualization of anatomical landmarks (inferior edge of gallbladder and the Line of Safety) were also each annotated as a binary classification. Data sampling involved extracting ten random sets of 5-s video clips

from each LC video. Each frame was annotated separately and AI algorithm performance was tested against surgeon annotation.
Results: A total of 27,028 frames (244 LC cases) were procured from 37 countries. Inter-annotator variability on a random sample of 3000 frames (20 videos) was 0.75 and 0.98 (Cohen's kappa) for adequacy of retraction and anatomic landmarks, respectively. Using a 70/15/15 training/testing/validation split, a deep neural network was trained using EfficientNet architecture. Compared to surgeon annotators, the AI model had an F1 score, precision, accuracy, sensitivity, specificity of 0.79, 0.86, 0.69, 0.72, 0.54, respectively when predicting adequacy of retraction, with a false discovery rate of 0.14. The model was able to identify adequate visualization of the inferior edge of the gallbladder and the Line of Safety with specificity and accuracy of 0.95 and 0.71, and 0.83 and 0.63, respectively. Lag time for model inference was 0.01 ms, compatible for real-time utilization.
Conclusion: AI can potentially be used to assess adequacy of retraction and exposure. Such algorithms can be used in real-time or in the postoperative setting for surgical coaching – including as part of a collective of other algorithms that perform various computer vision tasks (e.g. assessing go/no-go zones of dissection, critical view of safety). Future work should also explore whether this technology impacts surgical performance.

Figure 1: Ontology for Adequacy of Retraction



0: Target anatomy not in view
1: Target anatomy in view but with inadequate retraction
2: Target anatomy in view with suboptimal retraction
3: Target anatomy in view with optimal retraction

P093

Effects of Preoperative Fasting Duration on Postoperative Outcomes in Metabolic and Bariatric Surgery

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Introduction: The latest ASA guidelines recommend administering clear fluids up to 2 to 4 h pre-operatively with supporting evidence showing improved post-operative patient outcomes. The recently developed ERAS guidelines concur but propose reduced NPO time with clear liquids up to 2 h primarily for patient comfort and are limited by an overall low quality of evidence. Previous studies have shown decreased length of stay with shorter NPO duration in other surgeries but outcomes data in bariatric surgery are limited. With medications that delay gastric emptying, pushing for shorter NPO times can have risk as well.
Methods: We queried the electronic health records (EHR) system of Houston Methodist Hospital system for patient records. Patients with primary bariatric surgeries such as laparoscopic Roux-en-Y gastric bypass (RYGB) and laparoscopic gastric sleeve (GS) from June 2016 to June 2022 were included. We collected patients' demographics, inpatient data, and outcomes data from the local Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) database. Summary statistics were presented and tested with independent t-test and Chi-square test. We performed univariate analysis of surgical outcomes stratified by NPO less than or greater than 8 h with Chi-square test. Multivariate analysis with logistic regression was performed to evaluate the association between NPO time and surgical outcomes while adjusting for baseline characteristics. We also evaluated NPO status > 12 h and > 16 h.
Results: We examined data from a total of 1619 patients: 789 RYGB and 830 GS. Those with NPO < 8 h had similar outcomes to those > 8 h. These included length of stay (1.82 vs 1.83 days respectively) and readmissions (3.75% vs 5.19%). No differences were observed by univariate and multivariate analysis on SSI, transfusion, reoperation, intervention, or cardiopulmonary complications. In addition, no differences were seen at the 12-h and 16-h cutoffs for the groups in outcomes. There was also no difference when analyzed by procedure type.
Conclusion: In this bariatric cohort, prolonged preoperative fasting state of ≥ 8 h did not lead to higher length of stay or readmissions. Further research will analyze antiemetic and pain medication usage to see if a difference is detected. With bariatric patients potentially being on medications that can delay gastric emptying, we must be careful about pushing for shorter NPO times without more data showing any difference in outcomes in this patient population.

P094

Does Gastroesophageal Reflux Affect 30-Day Outcomes in Patients Undergoing Revisional Bariatric Surgery to Single Anastomosis Duodeno-Ileal Bypass (SADI)? An MBSAQIP Analysis of 933 patients

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Introduction: Revisional bariatric surgery is often performed for inadequate weight loss, weight recidivism, and gastroesophageal reflux (GERD), among other indications. Single anastomosis duodeno-ileal bypass (SADI) represents a promising but, to date, poorly understood revisional procedure in patients with pre-operative GERD. Thirty-day outcomes in patients with pre-existing GERD undergoing revision to SADI have not been previously characterized.
Methods and Procedures: The Metabolic and Bariatric Accreditation and Quality Improvement Program (MBSAQIP) registry was analyzed for patients who underwent revisional bariatric surgery to SADI between 2020 and 2021. Comprehensive cohort analysis followed by subgroup analysis based on the presence or absence of preoperative GERD was performed to determine if this had any significant impact on thirty-day outcomes. Statistical analysis included bivariate analysis and multivariable logistic regression modeling to identify independent predictors of 30-day morbidity. Statistical analysis was conducted via Stata 17.0.
Results: Revision to SADI was most frequently performed for weight recidivism in 444 (47.6%), 397 (40.6%) for inadequate weight loss,

42 (4.5%) for GERD, and 22 (2.3%) for persistent metabolic comorbidities. The most frequent index procedure was sleeve gastrectomy in 723 (78.5%) followed by adjustable gastric banding in 87 (9.3%), and roux-en-Y gastric bypass in 82 (8.8%). Of the included 933 patients, 342 (36.7%) had preoperative GERD. Anastomotic leak seen in 19 (2%) of all patients and was not associated with preoperative GERD (2.5% non-GERD cohort vs. 1.2% GERD cohort; p = 0.2). Bleeding occurred in 12 (1.3%) patients including 6 (1%) non-GERD cohort and 6 (1.8%) of the GERD cohort (p = 0.33). There was no difference in thirty-day readmission (5.6% vs 5.9%, p = 0.9) reintervention (2.4% vs 1.2%, p = 0.2), or reoperation (3.6% vs 2.05%; p = 0.19) rates. Multivariable regression analysis revealed that, among all-comers undergoing revision to SADI, a history of dyslipidemia was associated with a significantly elevated risk of serious complication (OR 2.2; 95% CI 1.04-4.56; p = 0.04) as was a history of myocardial infarction (OR 12.2; 95% CI 2.79–53.23; p = 0.001).

Conclusions: The presence of GERD in patients undergoing revisional bariatric surgery to SADI does not have any association with anastomotic leak, hemorrhage, thirty-day readmission, reintervention, or reoperation. The presence of dyslipidemia and prior myocardial infarction are independent predictors of post-operative thirty-day morbidity, regardless of the presence of preoperative GERD. Patients should be carefully selected for revisional bariatric surgery and optimized prior to undergoing any revisional procedure with a multidisciplinary approach.

P095

Should Gastric Specimen from Bariatric Laparoscopic Sleeve Gastrectomy Be Submitted for Histopathology Report?

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Introduction: In recent years sleeve gastrectomy as well as other gastric volume reduction procedure has been utilized more frequently for the purpose of weight-loss as well as managing or completely reversing morbidities associated with morbid obesity such as OSA, DM, and Metabolic Syndrome. Currently the most selected gastric volume reduction procedure is Laparoscopic Sleeve gastrectomy (LSG). With LSG being the most selected method due to its relatively low risk for peri-operative complications as well as better tolerance of post-operative Life-style modification for patients. It is also the only procedure to produce surgically resected specimen in laparoscopic gastric volume reduction procedures, this includes parts of the gastric fundus and body along the greater curvature. Frequently these specimens are submitted for histopathology report, either as a routine, often without specific indications.The author sort to explore the necessity for routine submission of the partial gastric specimen to pathologists.

Methods and Procedures: This study is a single center, single surgeon, observational study. With data collected from the electronic Healthcare system from Bhumibol Adulyadej Hospital, Royal Thai Air Force Medical Services, Bangkok, Thailand. Subjects are selected on the basis having undergone LSG with or without simultaneous laparoscopic cholecystectomy (LC) with Bariatric Intent with the presence of histopathology report of the Partial Gastric Specimen from August 2012 to April 2023. Information including: subjects' age, sex, BMI, and Pathological report including the presence of H. Pylori in the specimen were analyzed.

Results: In this study, 181 patients (130F/51M with a mean age of 37.6 ± 10.4 years and a body mass index [BMI] of 42.03 ± 7.48 kg/m^2) were included. With 163 (90.06%) underwent sole LSG and 18 (9.94%) underwent LSG with LC. Specimen pathological findings included: 62 (34.4%) mild Chronic Gastritis, 15 (8%) Moderate Chronic Gastritis, 67 (36%) Vascular congestion, 17 (9.1%) Lymphoid Hyperplasia, 1 (0.5%) GIST, 20 (11%) Presence of H.Pylori.

Conclusions: Based on this relatively small study it could be concluded that forgoing pathological analysis of the partial gastric specimen should not be discouraged. Since the histopathologic findings of these specimens are equivocal to the further treatment of the patient even in GIST, where a free (wide) margin complete resection is consider curative for non-metastatic tumor. However, the presence of H.Pylori may indicate the initiation of eradicating therapy.

P096

Trends and Comparative Analysis of Primary Bariatric Surgeries in Patients with Body Mass Index > 60 kg/m2 Using the 2015-2021 MBSAQIP Database

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Background: The most common primary bariatric surgeries performed in patients with BMI > 60 kg/m^2 or super super obese (SSO) are Sleeve Gastrectomy (SG), Roux-en-Y Gastric Bypass (RYGB), and Biliopancreatic Diversion with Duodenal Switch (BPD/DS). First, we aim to determine 30-day outcomes between primary SG, RYGB, and BPD/DS in SSO. Second, identify the odds between postoperative complications and each surgical approach.

Methods: Patients who underwent primary SG, RYGB, and BPD/DS in SSO were identified in the 2015-2021 MBSAQIP database. We compared preoperative characteristics and 30-day outcomes. In addition, a multi-logistic regression for overall complications, mortality, readmission, reoperation, and leak stratified by surgical procedure was performed.

Results: Over the last 7 years, trends of primary SG and BPD/DS in SSO have increased, contrarily to RYGB as shown in Fig. 1. The most common primary procedure was SG (n = 33,033), followed by RYGB (n = 13,776) and BPD/DS (n = 1662). Preoperative characteristics showed that SSO patients who underwent SG had similar rates of comorbidities as BPD/DS, but lower rates of diabetes, hypertension, hyperlipidemia, sleep apnea, and GERD than RYGB. Longer operative time (125 min and 161 min vs 78 min, p < 0.001) and hospital length of stay (2.12 days and 2.34 days vs 1.68 days, p < 0.001) were found in the RYGB and BPD/DS groups. In terms of 30-day outcomes, higher rates of mortality (0.3% and 0.5% vs 0.2%), readmission (6.4% and 6.6% vs 0.9%), reoperation (2.2% and 2.9% vs 0.9%), reintervention (2.3% and 2.4% vs 1.0%), medical complications (3.9% and 4.9% vs 2.4%) such as unplanned ICU admission and blood transfusions, surgical complications (2.8% and 3.3% vs 1.2%) such as bleeding and surgical site infection, and overall complications (5.8% and 6.7% vs 3.3%) were found in SSO who underwent RYGB and BPD/DS compared to SG.

A multi-logistic regression analysis was performed, compared to SG, RYGB, and BPD/DS demonstrated higher odds of overall complications (aOR 1.76; 2.13), mortality (aOR 1.73; 2.61), readmission (aOR 1.64; 1.72), and reoperation (aOR 2.33; 3.23), respectively. Unlike RYGB, BPD/DS had higher odds of leak (aOR 2.57).

Conclusion: Trends of primary SG in SSO have increased by over 7% since 2015 and showed the lowest rates of medical, surgical, and overall complications when compared to RYGB and BPD/DS. Therefore, primary SG appears to have the safest 30-day profile and

could also be used as a two-stage surgical management for other procedures such as SADI-S or BPD/DS.

Figure 1. Trends of primary bariatric procedures in patients with BMI ≥60 kg/m2 in the 2015-2021 MBSAQIP Database



P097

The Role of Social Media Support Groups in Improving Postoperative Outcomes in Bariatric Surgery

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Introduction: Sustained weight loss (WL) is the ultimate goal after bariatric surgery (BS) and identifying the optimal role of postoperative support groups (SG) is critical. This study aims to determine the role SGs on patient satisfaction as well as objective WL.

Methods and Procedures: We conducted a single-center study from 2015-2023, where BS postoperative SGs include 1) a closed Facebook (FB) bariatric page, 2) a traditional in-person/virtual (IP/V) meeting, or 3) combined IP/V and FB approach. We created a survey about patients' experience with their preferred SG. Six subjective data points were measured on a 5-point Likert scale (Table 1). Objective percent total weight loss (TWL) was calculated postoperatively and correlational analysis was performed. Chi-squared test and analysis-of-variance (ANOVA) were utilized.

Results: A total of 322 patients completed the survey. Of those, 227 (70%) participated in SGs, with most participants in the FB-only SG (n = 137, 60.4%), followed by combined IP/V and FB (n = 55, 24%). We found a positive correlation between the type of SG and reported patient's experience, most significant in the level of activity and degree of engagement (Table 1). No significant correlation between SGs and the amount of WL was noticed (p = 0.262, 0.337, 0.310, 0.119 at 6, 12, 18, and 24 months respectively)

Conclusions: Facebook is the most prominent platform for participation in SGs after BS. Participation in 3) combined IP/V and FB SGs provides the patient with greatest experience, especially with level of activity and degree of engagement. However, there is no significant impact on TWL in the short term. Enhancing patient wellness after BS using this approach should be a component of WL programs.

Table 1 Subjective Questions

	Correlation (r)	P-value
1. Level of activity within group	0.207**	0.002
2. Degree of engagement within group	0.334**	< .001
3. Increased amount of WL		
5. Increased motivation		
6. Decreased stress Level		
7. Increased level of Support		

P098

The Influence of Significant Risk Factors on Metabolic and Bariatric Surgery Outcomes: An MBSAQIP Analysis

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Introduction: In modern healthcare, identifying risk factors has great relevance for patients and health systems to assess mortality, morbidity, and costs associated with surgical interventions. Emerging literature emphasizes the critical role of detecting comorbidities perioperatively to predict postoperative morbidity and mortality. This study investigated the impact of factors present at the time of surgery on postoperative outcomes in the context of metabolic and bariatric surgery (MBS).

Methods: To examine the occurrence and significance of risk factors present at the time of surgery on postoperative results after MBS, a retrospective analysis was carried out using data from the MBSAQIP 2015-2018 participant usage file (PUF) database. Chi-square tests and logistic regression tests were utilized to identify potential risk factors associated with perioperative mortality and morbidity. Given the considerable sample size, a statistical significance threshold of $P < 0.001$ was adopted.

Results: The incidence of being on a ventilator for more than 48 h was found to be 0.001%, with an odds ratio (OR) for mortality of 138.2 (95% CI: 70.756 – 270.118). Pneumonia was observed in 0.01% of cases, showing an OR for mortality of 72.8 (95% CI: 35.292 – 150.168). Urinary tract infections were reported in 0.03% of cases, displaying an OR for mortality of 13.6 (95% CI: 5.042 – 36.502). Sepsis was found in 0.04% of cases, with an OR for mortality of 30.9

(95% CI: 16.405 – 58.307). Septic shock presented in only 0.02% of cases, with a remarkably high OR for mortality of 204.9 (95% CI: 140.398 – 299.130). Wound complications revealed a frequency of 0.02% for deep incisional surgical site infections (SSI) and 0.08% for organ space SSI, with corresponding OR for mortality of 13.3 (95% CI: 3.282 – 53.746) and 41.7 (95% CI: 28.398 – 61.314) respectively. These findings provide valuable insights into the prevalence of perioperative complications and their potential impact on postoperative outcomes following MBS.

Conclusion: The presence of risk factors at the time of surgery has a significant impact on postoperative 30-day morbidity and mortality in MBS. These comorbidities represent a relatively small proportion of the total MBS patient population, accounting for less than 0.1%. Despite a low prevalence, these findings highlight the influence comorbidities have on surgical outcomes and require careful consideration during the perioperative management. Awareness of these comorbidities and personalized interventions can improve overall outcomes and further reinforce the safety profile of MBS interventions.

Table 1. Risk factors present at the time of surgery and their effect on outcomes in metabolic and bariatric surgery.

Complication	frequency	Odds ratio for mortality	CI 95
On ventilator>48 hours	0.001 %	138.2	70.756 – 270.118
Pneumonia	0.01 %	72.8	35.292 – 150.168
Urinary Tract Infections	0.03 %	13.6	5.042 – 36.502
Sepsis	0.04 %	30.9	16.405 – 58.307
Septic Shock	0.02 %	204.9	140.398 – 299.130
Wound Occurrence			
Deep incisional SSI	0.02 %	13.3	3.282 – 53.746
Organ Space SSI	0.08 %	41.7	28.398 – 61.314

P100

Ruptured Appendicitis Causing Biliopancreatic Limb Obstruction

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Biliopancreatic limb obstruction is a known complication of gastric bypass surgery. It can be caused by internal hernias, an abdominal wall hernia, adhesions, volvulus, intussusception, and stricture. We present the first described case of ruptured appendicitis causing biliopancreatic limb obstruction in a patient with a large ventral hernia.

A 61-year-old male with a history of obesity (BMI 40.6), s/p open Roux-en-Y gastric bypass presented with a symptomatic 12 cm ventral hernia with loss of domain and symptoms of one week of sharp upper abdominal pain, nausea, and decreased oral intake. He was afebrile and hemodynamically stable with no leukocytosis. His abdomen was soft, distended, non tender with a large incarcerated ventral hernia. Computerized tomography scan of the abdomen and pelvis demonstrated a large ventral hernia with obstruction of the biliopancreatic limb proximal to the jejunojejunal anastomosis with a transition point at the level of the hernia, with distension of the remnant stomach, duodenum, and proximal jejunum. The patient urgently underwent open decompression of the remnant stomach with placement of a 22 Fr Malecot tube. Postoperatively, he tolerated a regular diet with bowel function. He had high gastrostomy tube outputs, 2.7- 4.9L, requiring fluid replacement. On hospital day eleven, the patient returned to the operating room for definitive repair of his incarcerated ventral hernia and small bowel obstruction. We proceeded with a diagnostic laparoscopy with enterolysis, which was converted to a midline laparotomy. While performing enterolysis, purulent material was noted near the cecum and a perforated appendix with a surrounding abscess cavity was identified. An appendectomy was performed with subsequent irrigation and drain placement. Next, the ventral hernia was primarily repaired. Bilateral subcutaneous flaps were raised and an anterior component separation with primary midline closure was performed. His postoperative period was unremarkable and he was discharged on postoperative day four.

In our patient with a non obstructing large ventral hernia, it is theorized that acute ruptured appendicitis in the hernia sac caused inflammation and compression leading to mechanical obstruction of the biliopancreatic limb. Due to the history of a gastric bypass, the patient's symptoms were masked and our thought process was skewed toward the etiology of the complication of afferent limb syndrome. This case stresses the importance of early operative intervention for afferent limb syndrome and the need for a high clinical suspicion of various etiologies of abdominal pathology in post bariatric surgery patients.

P101

Case Report of Mesenteric Abscess Following Laparoscopic Roux-en-Y Gastric Bypass in the Setting of a Ventriculoperitoneal Shunt

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Laparoscopic Roux-en-Y gastric bypass (LRYGB) is currently the second most common metabolic/bariatric surgery performed in the United States. Potential early postoperative complications include anastomotic leak, bleeding, internal hernia, pulmonary embolism, pneumonia, surgical site infection and organ space infection. We report a rare case of a mesenteric abscess after LRYGB in a patient with a history of hydrocephalus and a ventriculoperitoneal (VP) shunt, managed with surgical drainage, systemic antibiotics, and temporary exteriorization of the shunt.

A 38-year-old female with a history of VP shunt for hydrocephalus in infancy underwent LRYGB for morbid obesity (BMI 43.55 kg/m^2). Her postoperative course was uneventful, and she was discharged from the hospital on postoperative day #1. She reported feeling well at her first postoperative visit, with no signs or symptoms of infection. However, she sustained a syncope on postoperative day #15 and presented to the emergency department, where she was found to have leukocytosis to 15.6 thousand/μL, and underwent cross-sectional imaging which revealed a large mesenteric abscess. Broad-spectrum antibiotics were initiated, and she underwent operative drainage of the abscess located within the mesentery of the common channel (laparoscopic converted to open due to adhesions and inadequate visualization). An old blood clot was removed, but no succus or enterotomy were identified. A small bowel resection with primary anastomosis was performed due to trauma associated with the dissection. The VP shunt was visualized intraoperatively and after discussion with the neurosurgery team, exteriorized from the right upper quadrant. Cultures of the abscess grew *Enterococcus faecalis*, *Klebsiella oxytoca*, and *Citrobacter freundii* complex. She was closely monitored with serial shunt cultures revealing no growth, remained on IV antibiotics, and the VP shunt was re-internalized under laparoscopic visualization on postoperative day #12 after laparotomy (postoperative day #28 after LRYGB). IV antibiotics were continued for two additional days, and the patient was then discharged home.

The possible mechanisms of mesenteric abscess formation after LRYGB include infected hematoma, anastomotic leak, missed enterotomy, or deep space surgical site infection. The management of

these complications in the setting of an in situ VP shunt involves prompt diagnosis, adequate drainage, appropriate antibiotic therapy, and exteriorization of the VP shunt to prevent shunt infection and ventriculitis, followed by shunt re-internalization after clearance of the infection. Future research will be directed towards the optimal management of in situ VP shunts for patients undergoing metabolic/bariatric surgery.

P102

Preoperative Measure of Social Vulnerability is an Independent Predictor of Short Term Postoperative Compliance: Review of Patients Undergoing Sleeve Gastrectomy at a Bariatric Center Of Excellence

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Introduction: Despite research showing effective weight loss from bariatric surgery many patients fail to lose their excess body weight. Patients may fail to meet their goals for many reasons including inability to follow-up after surgery. We sought to understand the impact of patient's social vulnerability on their ability to follow-up following a sleeve gastrectomy.
Methods: An institutional bariatric database created from MBSAQIP reported metrics and retrospective chart review was used to identify ERABS patients undergoing elective minimally invasive sleeve gastrectomies from 2019-2020. Demographic data reviewed included age, gender and preoperative body mass index (BMI), and percent change in BMI at 6 and 12 months. Patient's addresses were used to identify census tracts and then correlated to their social vulnerability index. Patient's six month and one year follow-up were considered positive if they followed up $\pm$ 3 months of their original surgery date. Patients who followed up were compared to those who did not. A p-value less than 0.05 was considered significant.
Results: A total of 416 patients were identified who had undergone minimally invasive sleeve gastrectomy. Within that group, 305 (73.3%) of patients followed-up within 6 months and 201 (48.3%) followed up at 1 year. A total of 174 (41.7%) followed up at both 6 months and 1 year. The mean SVI for patients who followed up at both intervals is 0.70 compared to 0.74 for those who did not follow-up at one of the time point ($p = 0.04$). On multivariable analysis only housing and transportation theme of social vulnerability was significant for one year follow-up (OR 0.244, $p = 0.011$).
Conclusion: Social vulnerability plays a role in a patient's ability to follow-up after minimally invasive bariatric surgery. Addressing these social factors prior to surgery with a multidisciplinary team could effectively aid

P103

Double Trouble: A Rare Case of Two Simultaneous Internal Hernias after RYGB

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As the prevalence of obesity increases in the United States, the number of Roux-En-Y Gastric Bypass (RYGB) operations continues to mirror that increase. According to the American Society of Metabolic and Bariatric Surgery, the number of RYGB has been rising steadily between 2016-2021 (40,316 to 56,527). Internal herniation is a known complication of RYGB and may occur at three potential sites, but most commonly seen through a single defect. Postoperative weight loss of 90% or more of excess weight is associated with an increased likelihood of developing internal hernias. Current literature reveals an increased incidence of transmesenteric hernias parallel to the increase in the procedures entailing the construction of a Roux-en-Y loop.2 There is a scarcity of reports of two or more simultaneous hernias after RYGB.

We report the case of a 31-year-old male who underwent a Robot-Assisted Laparoscopic RYGB (LRYGB) and achieved a reduction of 98% of excess weight (BMI of 25.9). At 10 months postoperatively, he presented with perforated small bowel secondary to a complete obstruction due to internal herniation at the Petersen and mesenteric defects.

He presented to the emergency room with a two-day history of progressive abdominal pain, nausea, and vomiting. On physical examination, the patient's abdomen was not distended, soft, but with localized tenderness at the upper abdomen. An abdominal CT showed a "swirl sign", non-progression of contrast indicative of obstruction, and free fluid in the pelvis.3 In surgery, succus entericus was visualized on diagnostic laparoscopy which prompted the conversion to an exploratory laparotomy. A single small perforation was found at the Roux limb proximal to the jejunojejunal anastomosis. There was herniation of the small bowel at both the Petersen's and the mesomesenteric defects, which were reduced and closed.

The patient's history, physical examination, and imaging all play a role in the diagnosis of internal hernias. Laparoscopy continues to be the most highly specific tool in this scenario.2 A high index of suspicion is necessary, as a delay in this diagnosis can have catastrophic consequences including anastomotic breakdown, perforation, or nonviable bowel requiring significant resection.4

P104

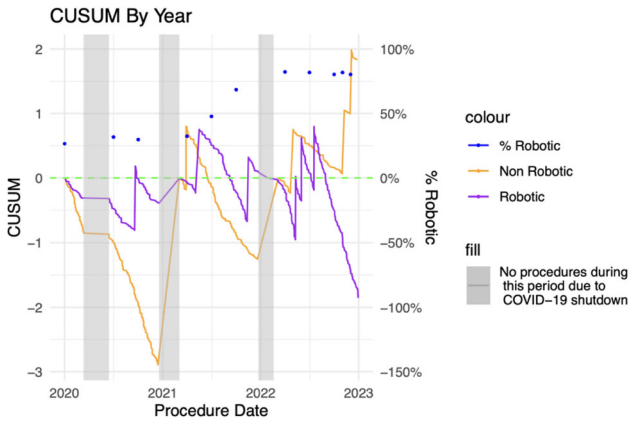
Losing the Edge: Does Adoption of Robotic Assisted Sleeve Gastrectomy Compromise Hemorrhage Risk in Traditional Laparoscopic Sleeve Gastrectomy?

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Background: Robotic assisted surgery (RAS) offers improved ergonomics and visualization and a shorter learning curve when compared to traditional laparoscopy, and has been widely adopted for many surgical procedures. However, the implications of large scale RAS adoption and transition from traditional laparoscopy in an established minimally invasive program are not known. This study investigates the relationship between RAS integration and the rate of postoperative hemorrhage, the most common serious adverse event, following each approach to longitudinal sleeve gastrectomy (LSG).
Methods: This is a retrospective study performed in a well established, MBSAQIP accredited, bariatric surgery program including five experienced surgeons. The incidence of hemorrhage (using the MBSAQIP registry definition) following primary LSG was studied from 2020 to 2022. During this time period, there were three state prescribed moratoriums on elective operations due to the COVID-19 pandemic. Laparoscopic LSG (L-LSG) and robotic assisted LSG (RA-LSG) groups were compared using t-tests and Fisher's exact tests as appropriate. Trends over time were analyzed with CUSUM, which is a standard method of tracking deviations in the outcome of a process.
Results: A total of 1022 patients underwent LSG during this period. Laparoscopic and robotic groups were similar in age, sex, and known risk factors for postoperative bleeding including BMI, hypertension and anticoagulant use. Overall, postoperative hemorrhage rate was 0.98% (n = 10). Lower BMI was found to be predictive of hemorrhage on univariate analysis ($p = 0.042$). Between 2020 and 2022, the

percentage of RA-LSG increased from 31 to 80%, as the RAS program grew. CUSUM analysis of postoperative hemorrhage rate demonstrated an advantage for L-LSG over RA-LSG during the early adoption period of RAS (2020). Hemorrhage rates in both groups were similar in 2021. However, as utilization of RAS peaked and then plateaued in 2022, hemorrhage rate increased in L-LSG while a decrease in hemorrhage was observed in RA-LSG (Fig. 1).

Conclusion: This analysis demonstrates an expected improvement in postoperative hemorrhage with increasing adoption of RA-LSG. Contrary to our expectations, as RA-LSG became the more frequently utilized approach, the risk of hemorrhage with L-LSG increased. This trend is observed despite all surgeons being well beyond their learning curve for L-LSG, suggesting a potential risk associated with the use of the traditional laparoscopic approach when it is supplanted by the robotic approach.



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Metabolic and Bariatric Surgery Is Safe and Feasible as a Redo Foregut Procedure: An MBSAQIP Study

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Introduction: Bariatric patients with complications from a primary operation or with weight recurrence often require a revisional procedure, or redo. A considerable number of bariatric patients have a history of non-bariatric foregut surgery such as hernia repair, esophageal surgery etc., increasing the complexity of planned bariatric surgery. Current literature on bariatric surgery for this highly specific patient group is limited. This study aimed to investigate the perioperative outcomes of metabolic and bariatric surgery as a redo/revisional foregut procedure.

Methods: To investigate bariatric and metabolic surgery outcomes in patients with history of foregut surgical procedures, a retrospective analysis was conducted using the participant usage file (PUF) database from the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) for the years 2015 to 2018. We assessed the frequency of perioperative outcomes to gain insights into the impact of prior foregut surgical history on bariatric and metabolic surgery outcomes.

Results: Out of the 760,076 patients included in the database, 119,667 patients (15.7%) had a history of prior metabolic/foregut surgery, emphasizing the prevalence of redo bariatric procedures. The 30-day mortality rate was 0.2%. The most common complication was "Re-admission (30-day)" with a frequency of 6.1%, followed by "Need for reoperation (30-day)" in 3.2% of cases. Life-threatening complications reported: "Acute Renal Failure" (0.12%), "Stroke" (0.02%), and "MI (Myocardial Infarction)" (0.04%). Several complications presented a frequency below 0.1% including "Coma" (0.005%), "Peripheral nerve injury" (0.005%), and "Incisional hernia" (0.1%); "Unplanned need for ICU" was required in 1.5% of cases, and "Need for CPR" was observed in 0.08% of patients. Circulatory system complications like "Deep vein thrombosis" and "Pulmonary Embolism" were identified in 0.2% of patients each. We found "Progressive renal insufficiency" in 0.1% of patients and "Prolonged discharge (drainage) (30-day)" in 0.8%. Lastly, "Need for Transfusion" was observed in 1.4% of cases, "Need for Re-Intubation" was reported in 0.3% of cases and "Wound Disruption" in 0.2% of cases.

Conclusion: This study demonstrates that metabolic and bariatric surgery as a redo/revisional foregut procedure is feasible and safe, with low and acceptable rates of mortality and morbidity. Despite the complex nature of obesity and the need for redo interventions, the study results provide valuable insights into the relatively low rates of adverse events following these surgeries. Understanding the perioperative outcomes and associated risk factors can help in optimizing patient care and enhancing surgical approaches for patients requiring redo bariatric procedures.

Table 1. Perioperative Outcomes in Redo-Metabolic and Bariatric Surgery

Complication	Frequency
30-day mortality	***0.2 %***
Unplanned need for ICU	1.5 %
Deep vein thrombosis	0.2 %
Acute Renal Failure	0.12 %
Need for CPR	0.08 %
Coma	0.005 %
Stroke	0.02 %
MI	0.04 %
Peripheral nerve injury	0.005 %
Progressive renal insufficiency	0.1 %
Pulmonary Embolism	0.2 %
Need for Transfusion	1.4 %
Need for Re-Intubation	0.3 %
Wound Disruption	0.2 %
Need for reoperation (30-day)	3.2 %
Re-admission (30-day)	6.1 %
Re-intervention (30-day)	2.9 %
Incisional hernia	0.1 %
Prolonged discharge (drainage) (30-day)	0.8 %

P106

Does Exercise Frequency Impact Reflux and Eating-Related Symptoms in Metabolic and Bariatric Surgery Patients? A Cross-Sectional Analysis at a Major Academic Center

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Introduction: Exercise is critical for success in patient's undergoing metabolic and bariatric surgery (MBS). However, there remains limited understanding in the impact of exercise frequency as it relates to clinically relevant endpoints with rigorous patient-reported outcome measures (PROMs). We evaluated patient-reported eating-experience with GERD-HRQL scores and the novel BODY-Q Eating Modules. We hypothesize that patients who exercise more frequently pre-operatively have improved eating-related symptoms (GERD-HRQL) and behavior (BODY-Q) scores post-operatively.

Methods and Procedures: All patients at a major academic institution undergoing evaluation for MBS were given electronic questionnaires at their preoperative surgical evaluation and at each postoperative follow-up. GERD-HRQL, a validated 15-question survey, was scored from 0 to 75, with higher scores reflecting more severe symptoms. BODY-Q scores (Table 1) evaluated three domains: eating behavior (ER Behavior), eating-related distress (ER Distress), and eating-related symptoms (ER Symptoms), ranging from 0 (poor health) to 100 (optimal health). Exercise frequency was determined by self-reported individual instances of exercise per week. Patients were categorized into two groups: low exercise (< 3 times/week) and high exercise (≥ 3 times/week). For each exercise group the average total score for each questionnaire was compared between the pre-operative baseline and post-operative time period using a student's unpaired t-test.

Results: A total of 305 exercise questionnaires were completed: 224 pre-operatively and 81 post-operatively. Survey compliance was 82%. The baseline demographics of pre-operative and post-operative groups did not differ significantly in age or gender, but the post-operative group had significantly lower BMI (41 vs. 46, $p < 0.001$). Patients who engaged in high exercise frequency both pre-operatively and post-operatively had a statistically significant improvement in their ER Behavior and ER Distress, while they had worsening in their ER symptoms (Table 3). There was no significant change in the low exercise group (Table 2).

Conclusions: Our results show that frequency of exercise has a statistically significant impact on improving eating related behavior and distress in patients who undergo bariatric surgery. Additional benefits may be garnered by patients who participate in high frequency exercise regimens. Exploring the impact of exercise frequency in these patients can help optimize patient success and improve outcomes in patients undergoing MBS.

Table 1 Body-Q Eating Related Behavior Survey Format

HOW ARE YOUR EATING HABITS?

Think about the FOOD you ate in the past week. How often did you:

	Never	Sometimes	Often	Always
1. Feel satisfied after eating?	1	2	3	4
2. Eat healthy food that your body needs?	1	2	3	4
3. Show self-control when you ate?	1	2	3	4
4. Feel in control of what you ate?	1	2	3	4
5. Chew food thoroughly before swallowing?	1	2	3	4
6. Eat the right amount of food?	1	2	3	4
7. Eat at the right speed (not too fast)?	1	2	3	4
8. Avoid unhealthy snack foods?	1	2	3	4
9. Stop eating before you felt full?	1	2	3	4

Table 2: Low Exercise Frequency Pre-Operatively and Post-Operatively

Questionnaire	Low Exercise Pre-Operatively (≥3 times/week)	Low Exercise Post-Operatively (≥3 times/week)	P-Value
GERD-HRQL	5.984	6.727	0.741
BODY-Q ER Symptoms	76.92	72.18	0.234
BODY-Q ER Behavior	53.73	56.64	0.513
BODY-Q ER Distress	77.51	78.27	0.901

Table 3: High Exercise Frequency Pre-Operatively and Post-Operative

Questionnaire	High Exercise Pre-Operatively (≥4 times/week)	High Exercise Post-Operatively (≥4 times/week)	P-Value
GERD-HRQL	4.652	5.941	0.293
BODY-Q ER Symptoms	80.30	75.06	0.016
BODY-Q ER Behavior	60.89	68.63	0.001
BODY-Q ER Distress	84.96	90.14	0.041

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Porto-Mesenteric Vein Thrombosis after Minimally Invasive Bariatric Surgery: A Rare Complication

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Introduction: Minimally Invasive Bariatric Surgery (MIBS) has long been established as the gold standard treatment for morbidly obese patients and their associated comorbidities. While it offers substantial benefits, it is not without risks. A rare and most likely under-reported complication is Porto-Mesenteric Vein Thrombosis (PMVT), which can prove to be life-threatening. Though many cases of PMVT following bariatric surgery have been published in scientific literature, its pathogenesis, presentation and management remain unclear. The primary objective of this study was to determine the incidence, risk factors and clinical presentation and to assess the outcomes of affected patients.

Material and Methods: We conducted a retrospective analysis of electronic health records of patients who had undergone MIBS spanning a 7-year period. Patients who subsequently developed PMVT, confirmed through radiological imaging, were included. Demographic information, pre-operative comorbidities, perioperative anticoagulation strategies and clinical outcomes were analyzed.
Results: Among 1809 MIBS patients, 14 (0.77%) were diagnosed with PMVT. Seven (50%) underwent laparoscopic surgery and 7 (50%) underwent robotic surgery. The mean time to diagnosis was 12.5 days post-surgery. All patients presented with abdominal pain. Risk factors associated with PMVT included a history of thromboembolic events and pre-existing pro-thrombotic conditions, such as Factor V Leiden and Thrombophilia. None of the pro-thrombotic conditions were diagnosed preoperatively. Preoperative anticoagulation therapy, using subcutaneous low molecular weight heparin, was administered to all patients. Three patients (21.4%) required endovascular thrombectomy. Figure 1 illustrates the clot burden on these patients. One patient (7%) died due to a calf DVT that caused a saddle pulmonary embolus.
Conclusion: Porto-Mesenteric Vein Thrombosis, though rare, remains a significant complication following minimally invasive bariatric surgery. PMVT should be considered after MIBS in patients with abdominal pain. While most patients respond well to pharmacological treatment and conservative management, a subset may require endovascular interventions and a more aggressive treatment plan. Further research is needed to identify pre-operative risk factors, refine preventive measures and standardize treatment modalities in this challenging patient population.

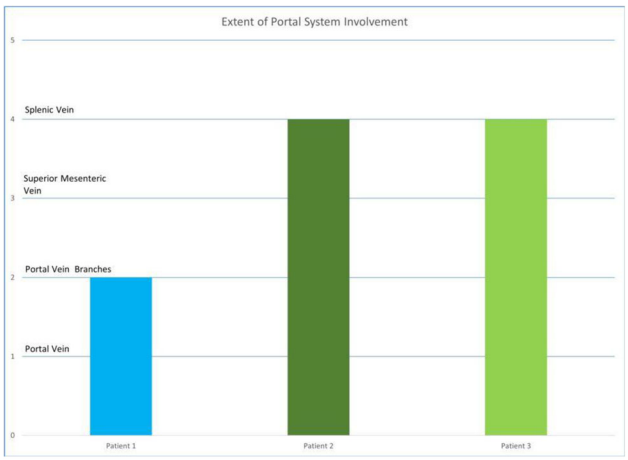


Figure 1

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Cholecystectomy Rate Following Bariatric Surgery Is Comparable to Those of the General Population and Is Unaffected by Ursadiol Utilization

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Background: Gallbladder disease is a well-known occurrence following bariatric surgery, with the prevalence of gallstones believed to be 25-30% [1]. Obesity and rapid weight loss have both been described as risk factors for gallstone formation. As a result, concomitant cholecystectomy used to be performed on all patients undergoing weight loss surgery [2]. Literature suggests that concurrent cholecystectomy led to longer operating times, longer hospital stays, and higher complication rates and is therefore less often performed today. Alternatively, some patients receive ursodiol post-operatively to help prevent the formation of gallstones, though compliance rates can be low due to cost, gastrointestinal side effects, and treatment course length. At our center we do not routinely prescribe ursodiol, and therefore wanted to compare the rates of cholecystectomy in our post-operative patients to other reported post operative data (7.8% rate) [3] and to the general population where it is believed that 10-15% of the population will be affected by gallstone disease [4].
Methods: We utilized an existing retrospective chart-review database of bariatric surgeries performed at a single institution between June 2020-May 2022. We excluded patients that had undergone a previous cholecystectomy, or concomitant cholecystectomy at the time of surgery. Data collected included bariatric surgery type, post-op cholecystectomy rate within the first 1-2 years following surgery, preoperative BMI, and % excess weight loss.
Results: We examined the data of 488 patients and excluded 126 patients who had a prior (120) or concomitant (6) cholecystectomy. Of the 362 remaining patients, 25 underwent cholecystectomy following weight loss surgery, resulting in a cholecystectomy rate of 6.9%. There was no significant difference in cholecystectomy rates based on type of surgery (Sleeve Gastrectomy or RNY Gastric Bypass, $p = 0.67$), preoperative BMI ($p = 0.09$), or the percent excess weight loss ($p = 0.18$).
Conclusion: We observed a 6.9% post op cholecystectomy rate within 1-2 years following bariatric surgery, which is comparable to the reported rate of 7.8% [3]. We do not believe that the use of ursodiol post operatively prevents increased rates of cholecystectomy, a hypothesis which our data would support. We also did not find surgery type, BMI, nor % excess weight loss to be predictive factors for post operative cholecystectomy.

P109

Extent of Hiatal Hernia Repair Mobilization with Concomitant Sleeve Gastrectomy does not Affect Postoperative Reflux Symptoms

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Background: Data supports concomitant repair of hiatal hernias found at the time of index bariatric surgery to prevent or mitigate development of postoperative reflux symptoms. Hiatal hernia repair (HHR) performed concurrently with vertical sleeve gastrectomy (VSG) has been shown to improve postoperative gastroesophageal reflux disease (GERD). While several studies examine the effect of the type of cruroplasty performed to the degree of postoperative reflux, data on the optimal extent of esophageal mobilization during repair is lacking. Mobilization techniques for hiatal hernia repair during vertical sleeve gastrectomy include partial (PM) or full (FM) mobilization of the esophagus. We hypothesize that patients who undergo FM will be less likely to develop postoperative reflux.
Methods: A single-institution retrospective review of all patients who underwent a VSG with a HHR between 2014 and 2021 was conducted. The primary outcome was postoperative reflux symptoms defined by diagnosis in the medical record, utilization of anti-reflux medications, and GERD health-related quality of life (GERD-HRQL) scores obtained via patient surveys.
Results: There were 190 patients included with 80 patients (42.1%) undergoing PM and 110 (57.9%) undergoing FM. Rates of

preoperative reflux were similar between the two groups (47.5% vs 51.8%, p = 0.5). During the GERD-HRQL survey, there were 114 patients (60%) contacted with a participation rate of 91.2% (104 patients). Rates of reported postoperative reflux were similar between the patients who underwent PM versus FM (70.7% vs 58.7% respectively, p = 0.1) as were average GERD-HRQL scores (7.3 vs 6.4 respectively, p = 0.3). A total of 5 patients underwent conversion to Roux-en-Y gastric bypass for persistent reflux, and this was not statistically significant between the PM versus FM groups (2.5% vs 2.7%, p = 0.9). Regardless of the extent of esophageal mobilization, most patients would choose vertical sleeve gastrectomy again despite postoperative reflux symptoms (73.2% vs 71.4%, p = 0.4). For those patients that would not pursue sleeve gastrectomy as a means for surgical weight loss, the majority indicated that this was due to weight loss recidivism rather than intolerable reflux symptoms.

Conclusion: Our study found that post-operative GERD was similar between patients who underwent a partial versus full esophageal mobilization during concurrent HHR with VSG. Interestingly, regardless of high self-reported reflux symptoms, most patients would still choose VSG for surgical weight loss.

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Bariatric Surgery Conversions After Sleeve Gastrectomy: Analysis of the Recent Trends and Outcomes Using the MBSAQIP database.

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Introduction: Bariatric conversion surgery has become more common. Using the most recent dataset from the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP). We sought to analyze the trends of conversion from a prior sleeve gastrectomy and related outcomes.

Methods: A retrospective analysis of the 2020-2021 MBSAQIP database was performed. Patients who underwent bariatric surgery conversions from sleeve gastrectomy to biliopancreatic diversion with duodenal switch (BPD-DS), Roux en Y gastric bypass (RYGB), Roux en Y distal gastric bypass (RYGB-d), single-anastomosis duodeno-ileal bypass sleeve (SADI-s), and one-anastomosis gastric bypass (OAGB) were included in the analysis. Descriptive analysis was performed, and 30 days outcomes were analyzed.

Results: A total of 18.179 conversions from sleeve gastrectomy were identified. Among those, 1.153 (6.3%) were BPD-DS, 15.425 (85%) were RYGB, 685 (3.7%) were RYGB-d, 723 (3.9%) were SADI-s, and 193 (1.1%) were OAGB. The most common indications were gastroesophageal reflux disease (GERD), inadequate weight loss or weight gain. Postoperatively, there were significant differences in rates of any minor complications (p = 0.012) with BPD-DS and SADI-s having the lowest percentage compared with RYGB, RYGB-d, OAGB (1.4-1.5% vs 2.5-2.8%), but no differences were found for any major complications (p = 0.41) among the groups. The percentage of readmissions was high in conversions to RYGB, RYGB-d, and OAGB (19-20%) compared with BPD-DS and SADI-s (14-15%) (p < 0.001).

Demographics and 30 Days Outcomes.

2020–2021	Overall	BPD-DS	RYGB-d	RYGB	SADI-s	OAGB	p-value
Total of Cases	18.179	1.153	685	15.425	723	193	
Age Mean/SD	45,67/10,43	44,72/10,09	45,7/10,37	45,8/10,47)	44,33/10,12	45,20/10,44	< 0.001
Female/Male	90/10%	83/17%	90/10%	91/9%	84/16%	90/10%	
BMI Mean/SD	40,35/8,13	46,38/8,63	39,98/8,11	39,69/7,83	45,08/7,84	40,56/8,78	< 0.001
Any Minor Complication	2,7%	1,5%	2,5%	2,8%	1,4%	2,6%	0.012
Any Major Complication	3,7%	3,4%	3,6%	3,8%	2,9%	5,7%	0.41
Any Readmission	19%	14%	20%	19%	15%	19%	< 0.001
Readmission	7,2%	5.4%	9,1%	7,4%	5,3%	6,2%	0.006
Emergency Visit	12%	8,3%	12%	13%	9%	14%	< 0.001
Reoperation	3%	2,6%	4,2%	3%	2,9%	3,6%	0.36

P111

Comparison of Gastric Emptying using Scintigraphy Between Laparoscopic Sleeve Gastrectomy and Mini Gastric Bypass

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Introduction: Bariatric Surgery has gained popularity in treatment of morbid obesity in the US and worldwide. Laparoscopic Sleeve Gastrectomy and Mini Gastric Bypass are very feasible surgical options with significant potential weight loss. The present study attempts to compare the gastric emptying time and gastric reflux using scintigraphy in both pre and post operative cases of LSG and MGB.

Materials and Methods:

Study Design: Prospective Observational Study

Place of Study: Tertiary Care Centre in association with Department of Nuclear Medicine.

Duration of Study: One year

Study Population: Obese patients attending the Metabolic Surgery Clinic at Tertiary Care Centre

Inclusion Criteria:

- BMI > 32.5 kg/m2
- Age between 18 and 65 yrs.

Exclusion Criteria:

- Non motivated individual and non-supportive family/social environment.
- Psychologically unstable patient.
- Cardiac and lung disease precluding general anaesthesia.
- Pregnancy.

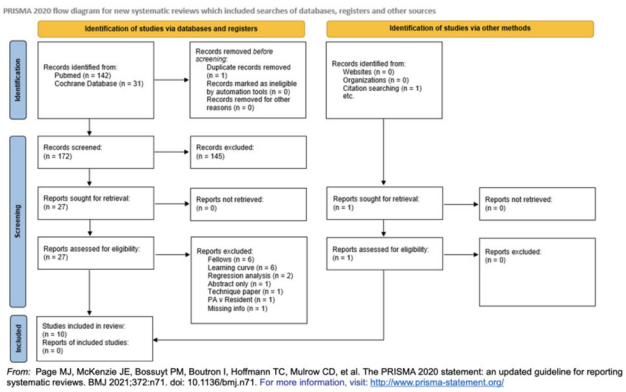
Primary Outcome: Gastric emptying using scintigraphy in LSG & MGB.
Secondary Outcome: Gastro-esophageal reflux using scintigraphy in LSG and MGB.
Methodology: All the patients included in the study were divided into two groups, one for LSG and other for MGB. After routine evaluation and work up, Gastric emptying scintigraphy(GES) and Gastric reflux scintigraphy was done 7-10 days pre-operatively to determine gastric emptying and gastric reflux in subjects of both groups. After the designated procedure, the patients were followed up for 3 months and then a repeat Gastric emptying scintigraphy and Gastric reflux scintigraphy was done. The collected data was then subject to statistical analysis.
Results and Conclusion: In our study the LSG group was found to have the mean GES T1/2 (Minutes) decreased from a maximum of 136.89 min at the pre-operative timepoint to a minimum of 42.78 at the post-Operative timepoint. This change was statistically significant. In MGB group, the mean GES T1/2 (Minutes) decreased from a maximum of 163.80 min at the pre-Operative timepoint to a minimum of 35.80 at the post-Operative timepoint. This change was not statistically significant. There was no significant difference in the trend of GES T1/2 (Minutes) over time between the two groups. In our study all the patients included in the study had no gastroesophageal reflux preoperatively. Postoperatively, no patient of LSG developed GER and 1 patient of MGB developed GER.

P112

Effect of Resident Involvement in Laparoscopic Roux-en-Y Gastric Bypass Surgery on Short Term Patient Outcomes: A Meta-Analysis and Systematic Review

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Introduction and Objective: Impact of resident involvement in laparoscopic Roux-en-Y gastric bypass surgery remains controversial. This study aims to systematically determine the effect of resident involvement on patient outcomes in laparoscopic Roux-en-Y gastric bypass surgery.
Methods: This paper followed the Preferred Reporting Items of Systematic Reviews and Meta-Analyses guidelines. Two independent reviewers searched PubMed, Embase, and Cochrane Library to find studies assessing the impact of resident involvement on patient outcomes. Fourteen patient variables were compared between cohorts to investigate participant similarity. Eight outcome variables potentially impacted by resident involvement were compared via meta-analysis. Categorical data from studies were pooled to report odds ratio (OR) and 95% confidence intervals (95% CIs). Continuous data were analyzed to yield standardized mean difference (SMD) and 95% CIs. Study quality was assessed using the Newcastle-Ottawa Scale for cohort analysis and given a quality label based on Agency for Healthcare Research and Quality standards.
Results: Ten studies were included in the meta-analysis, comprising a total of 178,973 patients. The resident-involved group had a lower number of patients with diabetes (odds ratio [OR], 1.28; [95% CI], [1.05, 1.55], 8 studies (178,322 patients), I2 = 96%) and history of myocardial infarction ([OR], 1.14; [95% CI], [1.01, 1.30], 3 studies (156,531 patients), I2 = 0%). Residents were also more involved in operations where patients had a Class 1 ([OR], 1.64; [95% CI], [1.05, 2.56], 4 studies (156,161 patients), I2 = 77%) or 2 American Society of Anesthesiologists scores ([OR], 1.24; [95% CI], [1.20, 1.27], 5 studies (157,461 patients), I2 = 0%). Post-operative outcomes with resident-involvement were found to be similar between groups. The resident-involved surgery group had similar rates of anastomotic leak/perforation, reoperation, urinary tract infection, pulmonary embolism, readmission, pneumonia, death, and operative time in minutes.
Conclusions: Resident involvement in laparoscopic Roux-en-Y gastric bypass surgery seems to have no negative effect on patient outcomes. However, resident involvement was associated in cases with less healthy patients according to ASA scores. This could lead to an overestimation of any potentially negative impact resident involvement might have. Data is limited due to the lack of high-quality, propensity-scored studies. With significant heterogeneity present in few select outcomes, further investigation is warranted to confirm and elucidate these findings.



Study	Primary Source	Year	Location	Resident (n)	No Resident (n)	Newcastle-Ottawa Score			NOS to AHRQ
						Selection	Comparability	Outcome	
Doyon et al.	PubMed	2016	USA	22189	21288	**	*	***	Fair quality
Goldberg et al.	PubMed	2019	USA	21257	90810	**	*	***	Fair quality
Hsu et al.	Goldberg et al.	2005	USA	158	84	**	*	***	Fair quality
Iordens et al.	PubMed	2012	Netherlands	83	326	**	*	***	Fair quality
Krell et al.	PubMed	2014	USA	7603	9456	**	*	***	Fair quality
Major et al.	PubMed	2017	Poland	81	84	**	*	***	Fair quality
Sebastián-Tomás et al.	PubMed	2021	Spain	67	141	**	*	***	Fair quality
Sommer et al.	PubMed	2011	Denmark	300	1000	**	*	***	Fair quality
van Rijswijk et al.	PubMed	2018	Netherlands	361	2690	**	*	***	Fair quality
Zambare et al.	PubMed	2021	USA	844	143	**	*	***	Fair quality

P113

Endoscopic Reversal of Roux-en-Y Gastric Bypass

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Background: Laparoscopic Roux-en-Y gastric bypass (LRYGB) is a safe and effective procedure for the treatment of morbid obesity and related metabolic comorbidities. However, in certain rare circumstances, gastric bypass reversal is required, most commonly for malnutrition, severe dumping syndrome, postprandial hypoglycemia, and excessive weight loss. Generally, reversal is accomplished surgically via a laparoscopic approach with creation of a gastro-gastric anastomosis between the gastric pouch and remnant stomach. Here we present an alternative, less invasive endoscopic approach to gastric bypass reversal.

Case: The patient is a 41-year-old female with a history of remote LRYGB who presented with recalcitrant marginal ulceration at her gastrojejunostomy, resulting in chronic abdominal pain and PO intolerance. She also had a complex abdominal surgical history including a recurrent ventral incisional hernia and mesh infection for which she had undergone mesh explantation. The decision was made to proceed with endoscopic bypass reversal. An initial endoscopy was performed, where moderate ulceration and stenosis of the gastrojejunostomy was encountered (Fig. 1). A 20 × 10 mm AXIOS stent was placed between the pouch and remnant stomach under endoscopic ultrasound (EUS) and fluoroscopic guidance. Repeat endoscopy approximately 1 month later demonstrated improved appearance of the ulceration and stenosis, and a second gastrogastric AXIOS stent was placed adjacent to the previously placed stent (Figs. 2, 3). A third repeat endoscopy approximately 1 month later was then performed, at which time the two pre-existing stents were removed, and the intervening septum was divided using a scissor-type knife and needle-type knife to create a single large gastrogastric fistula (Fig. 4).

Conclusion: Gastric bypass reversal can be safely and effectively accomplished endoscopically utilizing AXIOS stent technology.

Figure 1 Ulcerated and stenotic gastrojejunostomy anastomosis.

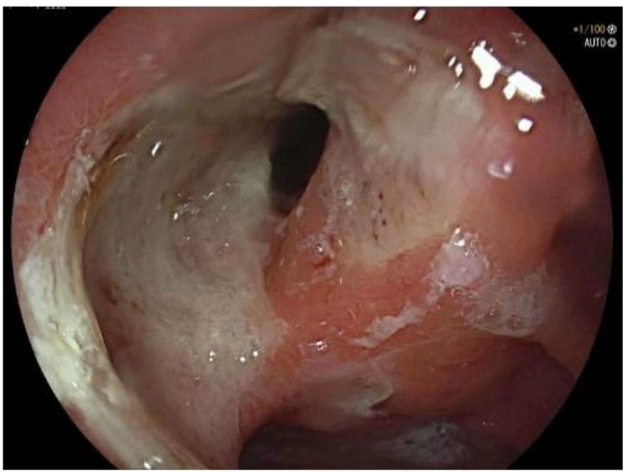


Figure 2 Dual gastro-gastric AXIOS stents viewed from gastric pouch.

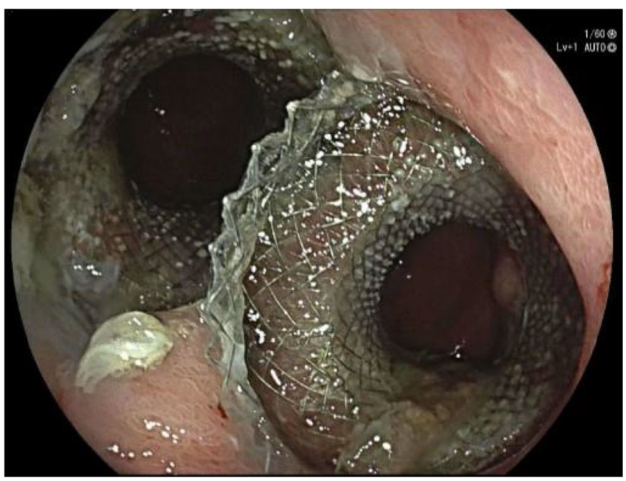
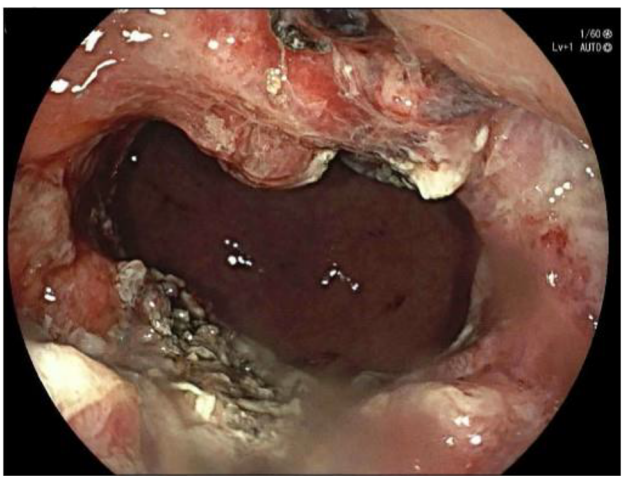


Figure 3 Dual gastro-gastric AXIOS stents on retroflexed view from remnant stomach



Figure 4 Gastrogastric fistula after removal of stents and division of septum.

Fig. 4. Gastrogastric fistula after removal of stents and division of septum.



P114

Does Robotic Bariatric Surgery Reduce the Requirement for a Surgical Assistant? An MBSAQIP Analysis

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Introduction: Laparoscopic Sleeve Gastrectomy (LSG) and Laparoscopic Roux-en-Y Gastric Bypass (LRYGB) constitute the most commonly performed bariatric metabolic surgery (BMS) procedures in the US. The number of robotic-assisted BMS cases remains low, primarily due to the increased cost and extended operative time associated with the robotic platform. Our primary objective was to determine if the robotic platform reduced the necessity for a surgical

first assistant (FA). Our secondary objective was to compare the level of surgical assistants with the robotic platform.

Methods: We conducted a retrospective analysis of the MBSAQIP Participant Use File cohort spanning from 2015 to 2019 to determine the prevalence of Attending Surgeon involvement in robotic-assisted, laparoscopic RYGB, and SG procedures, in comparison to non-physician surgical First Assistants. Cases involving medical trainees (residents and fellows) were excluded from the analysis. For each bariatric procedure, we established two distinct groups and employed propensity score matching to ensure patient comparability. A "good match" was defined when the standardized mean difference (SMD) was less than 0.10. All statistical analyses were two-sided, with a significance level set at $p < 0.05$.

Results: A total of 113,682 patients underwent LRYGB, with 12,480 undergoing robotic RYGB (RRYGB). After a 1:1 match, attending-level FAs were involved in 25.9% of LRYGB cases, midlevel FAs in 55.6%, and no assistants in 18.5%. In contrast, RRYGB cases utilized attending-level FAs in 13.7% of cases, midlevel FAs in 68.4%, and had no assistants in 17.9% of cases ($P < 0.0001$).

In LSG, attending-level FAs were present in 28.1% of cases, midlevel FAs in 51.6%, and no assistants in 20.3%. In comparison, robotic SG (RSG) cases had attending-level FAs in 16.1%, midlevel FAs in 55.6%, and no assistants in 28.3% of cases ($P < 0.0001$).

Conclusions: The robotic platform failed to reduce the need for an assistant in Roux-en-Y Gastric Bypass (RYGB) procedures but did lead to a decrease in the number of assistants required in sleeve gastrectomy (SG). Mid-level assistance was necessary for the majority of both robotic and laparoscopic bariatric metabolic cases. The robotic platform was associated with a 12% reduction in the requirement for attending-level assistance.

Table 1 RYGB Level of First Assistants

	Pre-Match		Post-Match		
Main Outcome	**Lap**	**Robot**	**Lap**	**Robot**	**p**
Assistant Levels					<.0001
Attending	29571 (26%)	1710 (13.7%)	3,232 (25.9%)	1,710 (13.7%)	
Mid-level	63729 (56.1%)	8536 (68.4%)	6,938 (55.6%)	8,536 (68.4%)	
None	20382 (17.9%)	2234 (17.9%)	2,310 (18.5%)	2,234 (17.9%)	

Table 2 SG Level of First Assistants

	Pre Match		Post Match		
Main Outcome	**Lap**	**Robot**	**Lap**	**Robot**	**p**
Assistant Levels					<0.0001
Attending	96,365 (29.2%)	5,302 (16.1%)	9,256 (28.1%)	5,302 (16.1%)	
Mid-level	167,488 (50.8%)	18,303 (55.6%)	16,979 (51.6%)	18,303 (55.6%)	
None	65,938 (20%)	9,296 (28.3%)	6,666 (20.3%)	9,296 (28.3%)	

P116

Sleeve Gastrectomy, Hiatal Hernia Repair, and Magnetic Sphincter Augmentation (LINX) as a Combined Primary Procedure for Obese Patients with Hiatal Hernia and Reflux

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Introduction: Obesity patients commonly have gastroesophageal reflux disease (GERD).

Sleeve gastrectomy is the most performed bariatric procedure, but GERD can worsen or develop de novo after vertical gastrectomy. While gastric bypass is one alternative for obesity and GERD, the procedure risks life-long complications not seen with sleeve gastrectomy, and the effectiveness of bypass treating reflux remains questionable. Magnetic sphincter augmentation (LINX) is an FDA-approved treatment for GERD in the post-sleeve gastrectomy patient who develops significant reflux. We present eight patients who presented with severe obesity, large hiatal hernia, and GERD requiring medication and who wished to have sleeve gastrectomy as their bariatric procedure. All eight patients were treated with laparoscopic repair of their hiatal hernia, LINX, and sleeve gastrectomy in one operative procedure.

Methods and Procedures: All patients underwent standard preoperative evaluation for bariatric surgery and were given informed consent regarding options for bariatric procedures. Multiple options were presented including laparoscopic gastric bypass as well as repair of hiatal hernia + sleeve gastrectomy + magnetic sphincter augmentation in one procedure. All patients had EGD, UGI, or manometry for evaluation of their GERD and hiatal hernia. No pH or impedance was required, and marshmallow-bagel testing was done if manometry was borderline or unavailable. The sequence of surgery was hiatal hernia repair, LINX device placement, and then sleeve gastrectomy. GERD-HRQL Quality of Life scoring data was collected.

Results: Eight patients were treated over a 14-month period. Seven were female. Average age, BMI, and weight were 49.9 years, 48 kg/m2, and 300.4 lbs. Average operative time was 173 min with all patients discharged home the following morning under 23-h observation guidelines.

No immediate complications occurred, and to date no surgical complications have developed. Weight loss has been consistent with our previously published data (X). GERD-HRQL scoring (total, heartburn, and regurgitation) preoperatively was 56.4, 34.1, and 22.3 and postoperatively 0.7, 0.7, and 0.

No patients are taking oral antireflux medication postoperatively for symptoms.

Conclusion: Combined hiatal hernia repair plus magnetic sphincter augmentation plus sleeve gastrectomy as a primary treatment of obese patients with hiatal hernia and GERD can be done with minimal morbidity and results in significant improvement in GERD-HRQL scores postoperatively.

(X) Sleeve Gastrectomy Performed with Single Staple Height and Bioabsorbable Reinforcement in a Single Surgeon > 2500 Consecutive Case Series: Is Smart Technology Necessary? George Woodman, MD and Guy Voeller, MD. Obesity Surgery: 32, 690-695 2022

P117

Revisional Bariatric Surgery Due to Weight Recidivism: An MBSAQIP Analysis of 30-day Complications for 19,291 Patients

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Introduction: Weight recidivism is one of the most common indications for revisional bariatric surgery, however the characteristics and outcomes of this population remains poorly understood.

Methods and Procedures: Data was extracted from the MBSAQIP registry for patients who underwent revisional bariatric surgery due to weight recidivism between 2020 and 2021. It captured those who experienced either weight gain or inadequate weight loss. Patients were then organized into Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG) cohorts, including revision and conversion cases. Statistical analysis included bivariate analysis and multivariable logistic regression modeling.

Results: Of 19,291 patients, 12,162 (63%) underwent RYGB and 7,129 (37%) underwent SG. The most common primary procedures for the conversion cases were adjustable gastric banding (8515 patients; 44%) and SG (5756 patients; 30%). Compared with the SG cohort, the RYGB patients were younger (47.8 ± 10.5 vs. 49.2 ± 10.5; $p < 0.0001$), had higher BMI (43.6 ± 7.4 kg/m2 vs. 43.2 ± 7.6 kg/m2; $p = 0.001$), were more often female (87.3% vs. 83.1%; $p < 0.0001$), and were less frequently smokers (4.7% vs. 5.81%; $p < 0.0001$). The RYGB cohort was more likely to have post-operative bleeds (1.69% vs. 0.80%; $p < 0.0001$) as well as higher rates of 30-day re-operation (2.66% vs. 1.49%; $p < 0.0001$), and re-intervention (1.83% vs. 1.29%; $p = 0.004$) and readmission rates (5.92% vs. 3.31%; $p < 0.0001$) in the first 30-days. RYGB patients had a near two-fold increased rate of serious complications (6.05% vs. 3.79%; $p < 0.0001$) when compared to SG. Multivariable regression analysis revealed that RYGB was amongst the single greatest modifiable independent predictor of serious complications after adjusting for comorbidities (OR 1.42, 1.2 – 1.65 95% CI, $p < 0.0001$).
Conclusions: Weight recidivism is currently the most common indication for revisional bariatric surgery in North America. While RYGB cases represent the majority of revisional procedures, they are associated with a substantial burden of 30-day morbidity. Further work is needed to develop strategies with which to improve the short-term safety profile of revisional cases as well as understanding their long-term metabolic benefit.

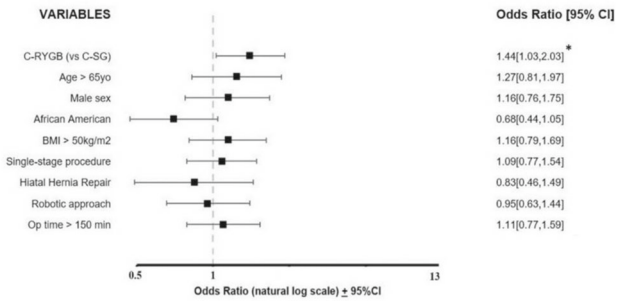
P118

Weight Loss Failure After Adjustable Gastric Band: Conversion to Sleeve Gastrectomy or Conversion to Roux-en-Y Gastric Bypass? Analysis Using the MBSAQIP Database

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Background: Adjustable Gastric Band (AGB) conversion represents 41.3% of all the conversion procedures performed during the 2020-2021 period in the MBSAQIP database. 65.3% of those AGB conversions were performed due to weight loss failure (WLF). First, we aim to determine 30-day outcomes between conversion from AGB to SG (C-SG) and to RYGB (C-RYGB). Second, identify the factors associated with overall complications after surgery.
Methods: The new variable, CONV_PREV_PROC in the 2020-2021 MBSAQIP database was analyzed. Patients who underwent C-SG and those who underwent C-RYGB due to WLF were identified. We compared preoperative characteristics and 30-day outcomes. In addition, a multi-logistic regression for overall complications was performed.
Results: The most common conversion procedure after an AGB placement was C-SG (n = 3496) followed by C-RYGB (n = 1885). Preoperative characteristics showed that patients who underwent C-RYGB had higher BMI and comorbidities such as diabetes mellitus, obstructive sleep apnea, and GERD. Additionally, the C-RYGB group showed a higher incidence of single-stage procedure, meanwhile, the C-SG group had higher rates of concomitant hiatal hernia repair. Longer operative time (160.29 ± 74 min vs 100.67 ± 51 min, $p < 0.001$) and hospital length of stay (1.72 ± 1 days vs 1.30 ± 1 days, $p < 0.001$) were found in patients who underwent C-RYGB. In terms of the 30-day outcomes, C-RYGB showed a higher percentage of overall complications (4.9% vs 2.4%, $p < 0.001$), surgical complications (2.6% vs 1.2%, $p < 0.001$) such as surgical site infection, and medical complications (3.1% vs 1.4%, $p < 0.001$) such as unplanned ICU admission and blood transfusions. Consequently, the C-RYGB group had increasing rates of reoperations (2.7% vs 1.3%, $p = 0.001$), readmissions (5.4% vs 2.4%, $p < 0.001$), and emergency visits (8.4% vs 4.4%, $p < 0.001$). Interestingly, both conversion procedures had similar leak and bleeding rates. In regards to weight loss, both procedures had comparable 30-day TBWL (5.82 ± 5.01 kg vs 5.54 ± 5.56 kg, $p = 0.313$)
A multilogistic regression analysis was performed, C-RYGB (OR 1.44, $p = 0.033$, CI 95% 1.03-2.03) was associated with higher overall complications. Conversely, single-stage procedure and concomitant HHR were not statistically significant (Fig. 1).
Conclusion: The incidence of AGB conversion remains high over the last years and we anticipate that the number of conversions will continue to increase. C-SG showed lower rates of overall complications compared to C-RYGB, however, bariatric-specific complications were comparable. Prospective studies are recommended to determine long-term outcomes.

Figure 1. Factors associated with 30-day Overall Complications after Adjustable Gastric Band conversion



*p value <0.05. C-RYGB: Conversion from AGB to SG, C-SG: Conversion from AGB to SG, BMI: Body Mass Index, LOS: Length of Stay

P119

Endoscopic Hill Grade Is not Predictive of New Post-Operative GERD Following Sleeve Gastrectomy with or Without Cruraplasty

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Background: Hiatal hernias continue to be a concomitant finding in the bariatric population. It is believed that clinically significant hiatal hernias predispose patients to gastroesophageal reflux disease (GERD). Research has shown that hiatal hernia repair during primary or revisional bariatric surgery is safe and reduces rates of post-operative GERD [1]. However, evidence has also found that preoperative endoscopic Hill grade 2-3 may not be representative of intraoperative findings of hiatal hernia [2]. We sought to determine if cruraplasty affected post-operative GERD rates in those patients with a Hill grade 2-3 flap valve diagnosed on preoperative endoscopy.
Methods: We conducted a retrospective chart review of all bariatric pre-operative endoscopy performed by one surgeon from June 2020—May 2022. We excluded patients that had undergone previous weight loss surgery or hiatal hernia repair, and those that did not follow up beyond 6 months. Data collected included endoscopic Hill grade, LA grade esophagitis, presence of pre- and post-operative GERD, surgery type, surgeon, and length of follow-up.
Results: We compiled 594 patients that underwent pre-operative endoscopy. After removing patients who did not undergo surgery or did not follow up for at least 6 months, we were left with 387 patients. Hill grade 2-3 valve was diagnosed in 135 (35%) patients. Of this group, if there was no cruraplasty performed at the time of surgery, there was a higher rate of new-onset GERD in patients who underwent sleeve gastrectomy when compared to gastric bypass (15 of 58

(26%) vs 0 of 17, p = .019). Furthermore, no significant difference in post-operative GERD was found in the sleeve gastrectomy cohort when cruraplasty was performed compared to when it was not (8 of 20 vs 15 of 58, p = .26). The percentage of post-operative GERD after sleeve without hernia repair was also no different when all Hill grades 1-4 were considered (42 of 160 (26%)).
Conclusions: Our data suggests that repair of an intra-operative hiatal hernia with pre-operative diagnosis of a Hill grade 2-3 flap valve did not improve post-operative rates of GERD after Sleeve Gastrectomy, and may be independent of Hill grade. As we expected, sleeve gastrectomy will carry a much higher rate of new post-operative GERD compared to gastric bypass. This data may impact preoperative surgical procedure choice decision counseling and surgeon intraoperative decision making to repair a hiatal hernia when faced with a minute crural dimple.

P120

The Effects of Pre-Operative Patient Education on Bariatric Outcomes

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Background: Obesity is associated with many comorbidities, including, but not limited to, cardiovascular disease, pre-diabetes and type 2 diabetes, osteoarthritis, polycystic ovarian syndrome (PCOS), infertility, sleep apnea, and insomnia. Mental and social health are also negatively affected. As of 2023, The Centers for Disease Control and Prevention (CDC) reports obesity in 42.4% of all US adults. Though bariatric surgery has proven itself to be safe and effective for sustained weight loss, complications can still arise. Some of these complications include infection, stomach obstruction, anastomotic leak, chronic nausea and vomiting, and weight gain or inability to lose weight. Some institutions have created pre-operative educational programs in efforts to decrease post-operative complications and maximize post-operative outcomes. This study aims to identify the effects of pre-operative patient education on bariatric outcomes.
Methods: A retrospective review analyzing post-operative outcomes was performed on patients who received either a sleeve gastrectomy or Roux-en-Y between 2019 and 2022 at a single institution. Prior to operation, patients completed the "Pre-Op Pathway", consisting of an initial appointment with the surgeon, visit at the two-month mark with the Advanced Practice Provider to assess progress and draw labs, and a Zoom class with a Registered Dietician (RD). All patients also had 3-6 months of individual visits with RDs based on insurance requirements and were required to be cleared by the RDs prior to the pre-op appointment. Additionally, patients were required to be cleared by a psychologist. Following completion of the Pre-Op Pathway, patients were given a 10-question quiz to assess their understanding of their surgery and post-operative restrictions and expectations. Quizzes were reviewed with patients in the office and were graded after the patient had left. Post-operative outcomes were examined by recording post-op HbA1c, BMI, total body weight, and complications.
Results: We intend to use descriptive data analytics in the coming months to determine whether there is a correlation between pre-operative quiz scores and bariatric outcomes, thus evaluating the effect of pre-operative education.
Conclusion: We propose that a good understanding of the procedure and its subsequent expectations will have a beneficial effect on post-operative outcomes. Specifically, we predict higher pre-op quiz scores to correlate with better post-op markers: lower HbA1c, BMI, total body weight, and fewer complications.

P121

A Comparative Analysis of Logistic Regression and Machine Learning Models for Predicting Surgical Site Infections in Bariatric Surgery Patients

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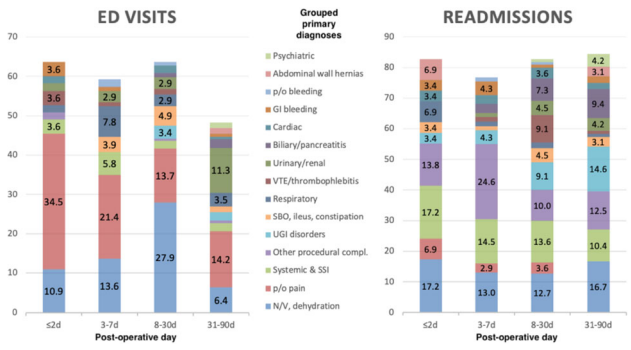
Introduction: Surgical site infections (SSI) remain a significant concern in bariatric surgery, impacting patient outcomes and healthcare costs. Identifying risk factors for SSI can improve significant morbidity and mortality. However, prior attempts predominantly relied on logistic regression (LR), which demonstrated limited accuracy and predominantly utilized intraoperative variables. We sought to use an emerging approach in predictive analytics, machine learning (ML), to create a model for SSI. Therefore, the objective of this study was to evaluate and compare SSI prediction models in bariatric surgery using logistic regression methods and ML.
Methods and Procedures: A cross-sectional study of the MBSAQIP database was conducted from 2015 to 2019. Patients undergoing sleeve gastrectomy (CPT code 43775) and Roux-en-Y gastric bypass (CPT codes 43644 for proximal gastric bypass with Roux-limb 150 cm or less and 43645 for distal gastric bypass with a Roux-limb of greater than 150 cm) were included. Patients undergoing revisional or emergent surgery as well as those younger than 18-years old were excluded. A binary-outcome SSI prediction model was generated using three different modeling methods: (1) main-effects only logistic regression, (2) a neural network with a single hidden layer, and (3) an XGBoost model with a max depth of 3. The same set of predictor variables and random split of the total data (50/50) were used to train and validate each model. Overall performance was compared based on the area under the receiver operating curve (AUC).
Results: A total of 750,417 patients were analyzed in this study, of which 0.4% experienced SSI. Of the total cohort, 79.6% were female with a mean age of 44.4 $\pm$ 11.9 years. The initial mean body mass index (BMI) was 45.2 $\pm$ 7.8 kg/m2. The most common comorbidities included hypertension 47.7%, diabetes 26.1%, hyperlipidemia 23.6%, tobacco used within 1 year 8.4%, previous percutaneous cardiac intervention 1.9%, history of myocardial infarction 1.2%, previous cardiac surgery 1.2%, and renal insufficiency 0.6%. The AUC for the three different SSI prediction models was: 0.719 for logistic regression, 0.725 for neural network and 0.718 for XGBoost. Although the AUC suggests a comparable discriminant function, the risk prediction histogram for the neural network displayed a more gradual shift.
Conclusion: The ML models demonstrated significant discriminant function in predicting SSI compared with LR. ML may be used to identify patients at increased risk and to target preventive interventions for SSI after bariatric surgery.

P122

90 Day Readmissions and Emergency Room Visits Following Bariatric Surgery

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Background: Hospital readmissions following bariatric surgery are well-recognized sources of morbidity and cost. Previous literature largely focuses on readmissions rather than Emergency Department visits (EDV). Furthermore, existing data primarily examines 30-day outcomes, rather than long-term outcomes. To overcome these deficiencies, we aimed to analyze all healthcare encounters (readmissions and EDV) following bariatric surgery patients up to the 90-day mark.
Methods: Adult patients undergoing bariatric surgery were identified using the Maryland State Inpatient and State Ambulatory Surgery and Services Databases between 2016-2017. Encounters were grouped by post-operative days (POD; < 2 days, 3-7 days, 8-30 days, and 31-90 days). Primary (admitting) diagnosis for each patient were collected and a regression model was used to determine predictors of EDV/readmissions.
Results: 7454 patients underwent bariatric surgery. Within 30 days post-operatively, 362 (3.8%) presented to the ED and 208 (2.2%) were re-admitted. Within 90 days post-operatively, 503 (5.3%) presented to the ED and 304 (3.2%) were re-admitted.
The most frequent reason for EDV during POD 0-2, 3-7, and 31-90 was post-operative pain (34.5%, 21.4%,14.2% respectively). During POD 8-30, PO intolerance and dehydration was the most common reason for EDV (27.9%). Most frequent reasons for re-admissions were PO intolerance and dehydration (17.2%, 13%, 12.7% and 16.7% on POD 0–2, 3–7, 8–30, and 31-90 respectively), followed by systemic and surgical site infections (17.2%, 14.5%, 13.6%, and 0% on POD 0–2, 3–7, 8–30, and 31-90 respectively.) Procedural complications (24.6%) were the most frequent cause of readmissions during POD 3-7.
Patients with 90-day EDV/readmissions were less likely to be white (54.9% vs 48.5%), less likely to have private insurance (77.4% vs 63.1%), and less likely to be married (50.6% vs 46.1%) ($p < 0.0001$).
Conclusions: A substantial fraction of bariatric patients have unplanned post-operative healthcare encounters. Potentially preventable causes, such as pain or poor oral intake, constitute a large proportion of such encounters. Socioeconomic and racial disparities likely pay important role and could be addressed by patient education, setting realistic expectations, and easier access to healthcare facilities. Multimodal pain regimens and closes nutritional monitoring may be helpful in decreasing unplanned encounters.



P123

Intraperitoneal Instillation of Local Anesthetic Does Not Provide Additional Analgesia When Combined with Transversus Abdominis Plane (TAP) Block

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Introduction: Intraperitoneal instillation of local anesthetic agents (IPLA) has been shown to decrease postoperative pain after laparoscopic surgery. It can be used in conjunction with other intraoperative adjuncts for pain control such as TAP block and incisional local anesthesia. This retrospective study compared post-operative pain scores and opioid analgesic requirements in patients undergoing minimally invasive bariatric surgery receiving IPLA in addition to TAP block versus TAP block alone.
Methods: Descriptive statistics (mean ± standard deviation, or median [25th, 75th percentiles] for continuous variables; frequencies and percentages for categorical variables) were calculated for TAP block with IPLA vs. TAP block alone. The two groups were compared using the chi-square test or Fisher's exact test for categorical variables, two sample t-test for normally distributed continuous data, or the Mann-Whitney test for skewed continuous data. Results were considered statistically significant at $p < 0.05$.
Results: Two hundred and thirty five patients underwent primary (non-revisional) bariatric procedures in 2021. 173 (73.6%) patients received TAP blocks only, while 62 (26.4%) patients received TAP blocks and intraperitoneal instillation (IPLA) of local anesthetics. There was no difference in mean age (44.08 ± 13.01 vs. 43.27 ± 12.91, P = 0.60723), mean BMI (45.24 ± 7.24 vs. 45.69 ± 8.87, P = 0.87028), or pre-operative opioid use (3.5% vs. 4.8%, P = 0.7017) when comparing the TAP to TAP + IPLA group. There was no difference in the median average pain score during the hospital stay (3.6[2.3-4.9] vs. 3.4[2.3-4.5], P = 0.8139), median opioid requirements in IV morphine equivalents (mg) at 6 h (5[3-7] vs. 5[2-8], P = 0.8832), 12 h (4[2-6] vs. 4[2-6], P = 0.2148), and 24 h (4[0-6] vs. 4[2-7], P = 0.5498), when comparing the TAP to TAP + IPLA group. There were no differences in outcomes between the two groups.
Conclusion: Intraperitoneal instillation of local anesthetics confer no additional analgesic benefits and does not lead to decreased postoperative opioid requirements when combined with TAP blocks in patients undergoing primary bariatric surgical procedures.

P125

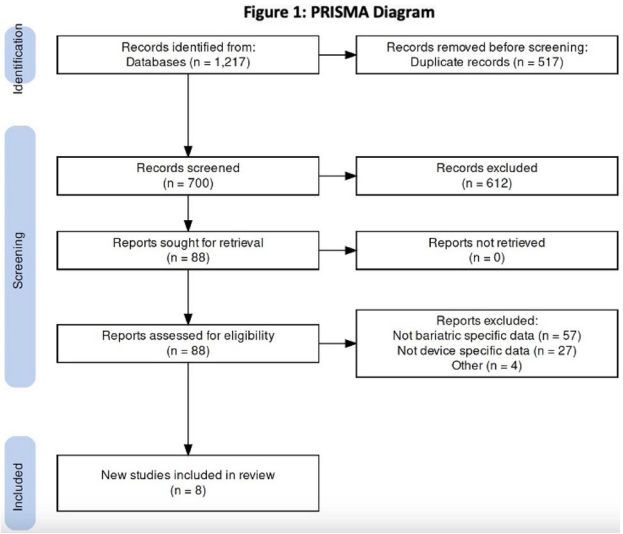
Endoscopic Closure Techniques of Bariatric Surgery Complications: A Meta-Analysis

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Introduction: A systematic review and meta-analysis was performed to compare the efficacy of endoscopic clips versus endoscopic suturing to treat bowel defects following bariatric surgery. These complications, while rare, are potentially fatal due to risk of peritonitis and sepsis. Anastomotic leaks and gastro-gastric fistulae following Roux-En-Y gastric bypass (RYGB) as well as staple line

leaks after sleeve gastrectomy, have historically been treated multimodally with surgical drainage, aggressive antibiotic therapy, and more recently, endoscopically. Endoscopic clipping using over-the-scope clips, as well as endoscopic suturing are two of the most common devices used to achieve full thickness closure.

Methods and Procedures: A systematic literature search was performed in PubMed to identify articles on the use of endoscopic clipping or suturing for the treatment of leaks and fistulae following bariatric surgery. Studies focusing on stents, and those that incorporated multiple closure techniques simultaneously, were excluded. Literature review and meta-analysis was performed with the PRISMA guidelines, as seen in Fig. 1.



Results: Five studies with 61 patients that underwent OTSC closure were included. The pooled proportion of successful closure across the studies was 81.091% (95% CI 67.344 to 91.744). The successful closure rates were homogenous (I2 = 39%, p = 0.15). Three studies with 92 patients that underwent endoscopic suturing were included. The weighted pooled proportion of successful closure across the studies was shown to be 22.386% (95% CI 14.617 to 31.268). The successful closure rates were homogenous (I2 = 0%, p = 0.44). Only three of the studies, totalling 34 patients, examining OTSC deployment reported data for reintervention rate. The weighted pooled proportion of reintervention across the studies was 35% (95% CI 11.69 to 64.72). We noticed statistically significant heterogeneity (I2 = 68%, p = 0.04). Only one of the studies, with 20 patients examining endoscopic suturing, reported their rate of repeat intervention: 60%. Of the 61 included patients that underwent OTSC closure, 41 were closures of fistulae, and 20 were closures of leaks. Of the 92 patients evaluated that underwent endoscopic suturing, 72 were closures of fistulae and 20 were closures of leaks.

Conclusions: Pooled data showed that OTSC were much more likely to successfully close bariatric defects when compared to endoscopic suturing and should therefore be considered first. Larger studies comparing different closure devices specifically for bariatric leaks should be carried out to better understand the ideal endoscopic approach to these rare complications.

P126

Adequate Caloric Intake Associated with Increased Weight Loss Post-Bariatric Surgery

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Introduction: Bariatric surgery is one of the most effective and enduring treatments for obesity. Professional organizations which developed guidelines for clinical care in bariatric surgery have also developed dietary recommendations. These nutrition guidelines for the pre- and post-operative bariatric patient include parameters for diet progression? Despite stringent literature review, there exists no evidence-based consensus on recommended energy intake following bariatric surgery? We investigated the degree of caloric restriction required to provide optimal outcomes after sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RYGB).

Methods and Procedures: A retrospective cohort analysis was performed of patients who had undergone bariatric surgery and had at least three high-quality, post-operative nutrition visits between January 1, 2002 and December 31, 2022. Data including demographic and surgical history, surgical complications, and post-operative nutritional data were gathered from each visit. Subjects were stratified into three groups categorized by inadequate, adequate, or excessive caloric intake as determined by a registered bariatric dietician's recommended individualized parameters specific to their post-operative dietary progression and changing metabolic rate at the time of each visit. A linear mixed effects model was used to assess the association between calorie intake level and post-operative weight loss while controlling for initial weight, accounting for the patient-level variability.

Results: A total of 96 patients were included in the study; 88 (91.7%) patients were female and 8 (8.33%) were male. 27 (28.1%) underwent SG, 64 (66.7%) underwent RYGB, and 5 (5.21%) had conversion of SG to RYGB. The mean pre-surgical BMI was 45.2 kg/m^2. Following linear mixed effects modeling, the results indicate that adequate caloric intake is significantly associated with improved post-operative weight loss ($p < 0.001$) compared to inadequate or excessive intake. With adequate caloric intake post-bariatric surgery, the expected mean weight was decreased by 20 pounds compared to patients with inadequate caloric intake.

Conclusions: Adequate caloric intake correlates with increased weight loss for both SG and RYGB by approximately 20 pounds when compared to inadequate caloric intake. Further studies are required to account for confounding variables and to better understand complication rates within each caloric group.

Table 1 Linear mixed effects model with post-surgery weight as the outcome

Caloric Intake Level	Beta	95% Confidence Interval	p-value
Inadequate	–	–	
Adequate	− 20	− 25, − 15	**< 0.001**
Excessive	− 13	− 29, 3.7	0.13

P127

The Effect of the Coronavirus Pandemic on Bariatric Surgery Complications

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Introduction: Due to the Covid-19 pandemic, bariatric surgeries were postponed increasing inpatient capacity, as well as many restrictions. The restrictions were accompanied by a decline in patient visits to the Emergency Departments. The diminished visits to emergency services have led to excessive morbidity and mortality in many medical fields. These conditions may have caused a decrease in postoperative monitoring of bariatric patients, along with a late and more complicated onset of complications. Thus, we aimed at evaluating the differences in the post-surgery bariatric complications in the period of the COVID-19 pandemic compared with a similar period before.
Methods: This was retrospective cohort study, comparing the patients who were admitted to the Clalit HMO Hospitals, Israel due to bariatric surgery complications. We compared the first three months of 2020 (January till March, before the first wave of COVID-19 in Israel) to the corresponding months in 2021). The data for our research will be collected from hospital medical records of the attending physician, and ED records of our HMO. Collection of relevant data included variables, such as age during surgery, BMI and weight prior to surgery, smoking status, etc.
Statistical Analysis: Data analysis was performed using SPSS 26.0 (SPSS, Chicago, IL) software. The data was analyzed using descriptive and analytical statistics: independent samples t-test (for variables like age compared in the different times evaluated), one-way ANOVA, and Scheffe comparisons. Differences were considered statistically significant at $p < 0.05$.
Results: 411 subjects were included, of which 231 patients arrived at the ED in 2019 (56.1%) compared to 181 subjects in 2020. There were 244 women (59.2%). The average age upon arrival to the ED was 55.2 ($\pm$ 17). The average duration of hospitalization was 4.9 days ($\pm$ 15). There was no difference between the years in baseline demographic variables, as well as in background morbidity. No difference was found in the rate of early discharge, the diagnosis during hospitalization, or the main complaint, neither in days of hospitalization. This similarity between time periods were also seen in regression models.
Conclusions: Although during the COVID epidemic there was a change in ED arrival and hospitalization in many diseases, when looking at bariatric emergencies no such trend was seen in our study. This calls for further evaluation, as well as coming up with a coping strategy for the near future if another corona surge, or other pandemics might arise.

P128

Effect of Postoperative Hypertension on Postoperative Bleeding in Primary Bariatric Surgery Patients

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Introduction: Postoperative hemorrhage is a rare but significant complication of bariatric surgery occurring in 1-6% of cases. Studies have found that increasing intraoperative systolic blood pressure (SBP) or mean arterial pressure (MAP) to check for intraoperative bleeding may decrease the risk of postoperative hemorrhage. Postoperative hypertension may cause increased bleeding in cardiovascular surgery but its role in bariatric surgery is not clear. Our study aims to evaluate any correlation between high blood pressure and risk of postoperative bleeding.
Methods: We queried the electronic health records (EHR) system from June 2016 to June 2022 at Houston Methodist Hospital for primary bariatric surgeries, such as laparoscopic Roux-en-Y gastric bypass (RYGB) and laparoscopic gastric sleeve (GS). Patient demographics and outcomes data were recorded from the local Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) database. Data processing and statistical analyses were performed with Python 3.8 and Stata 16 with independent t-test and Chi-square test. Pearson correlation was calculated between 24-h postoperative SBP and change of postoperative hemoglobin at different time points. We also performed univariate analysis of surgical outcomes stratified by blood pressure. All reported p-values are two-sided with $< .05$ considered statistically significant.
Results: We analyzed data from 1619 primary bariatric surgeries; 789 were RYGB and 830 were GS. Elevated SBP, diastolic blood pressure, or MAP and persistently elevated SBP for 60 min at 160, 170, 180, 190, and 200 mmHg did not result in statistically significant decrease in hemoglobin level. In addition, elevated blood pressure at these levels did not result in higher transfusions or reoperations. There were no differences in these outcomes when analyzed by procedure, RYGB versus GS. Patients with readmissions had more persistently elevated SBP greater than 160 mmHg (1.95% vs 1.47%, $p = 0.033$). Patients who had a postoperative intervention as defined by the MBSAQIP were less likely to have an elevated SBP > 190 mmHg (0.19% vs 0%, $p < 0.001$). Clinical relevance of this is unclear.
Conclusion: In this study of primary bariatric procedures, postoperative elevated blood pressure was not associated with an increase in transfusions or significant hemoglobin drops over 72 h. This may mitigate some fears of postoperative hypertension leading to staple line bleeding. Persistently elevated BP should still be treated as there could be other adverse effects. Further analysis into other outcome associations with elevated BP should continue to be performed including its potential role in early versus delayed bleeding.

P129

Comparative Analysis of Postoperative Outcomes of Revision or Conversion Metabolic and Bariatric Surgery After Primary Sleeve Gastrectomy: An Analysis of the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program Database

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Introduction: A growing subset of patients who have undergone primary sleeve gastrectomy (SG) requires revision or conversion metabolic and bariatric surgery (MBS). There are several revision or conversion MBS procedures performed in practice, yet comparative analyses of short-term safety are limited. Recently, the MBSAQIP Participant User Data File (PUF) updated several variables related to revision or conversion MBS, enabling analyses of short-term postoperative outcomes.
Methods and Procedures: We conducted a retrospective comparative analysis of postoperative outcomes of revision or conversion MBS following primary SG using the 2020-2021 MBSAQIP PUF.

Our primary outcome was 30-day incidence of major complications. Secondary outcomes included operative time, length of hospital stay, 30-day change in body mass index (BMI), mortality, readmission, reoperation, and anastomotic or staple line leak. The exposure variable was the type of MBS procedure: Roux-en-Y gastric bypass (RYGB), revision SG (re-SG), biliopancreatic diversion with duodenal switch (BPD/DS), single-anastomosis duodeno-ileal bypass (SADI), and one-anastomosis gastric bypass (OAGB). We performed multivariable regression analyses to determine the relationship between our outcomes of interest and the type of MBS procedure after adjusting for patient- and procedure-level covariates.

Results: Among 20,050 revision/conversion MBS procedures, the most common procedure performed was RYGB (80.3%). Using the RYGB group as the reference, we did not find differences in the odds of major complications, readmission, or reoperation within 30 days across the other MBS procedures. Mortality was rare across all groups at less than 0.1%. Interestingly, re-SG and SADI were associated with higher odds of developing anastomotic or staple line leak compared to RYGB, OR 2.67 (95%-CI 1.57-4.55) and OR 3.05 (95%-CI 1.53-6.07) respectively. At 30 days, BPD/DS was associated with a smaller change in BMI after surgery (mean difference 0.15 kg/m2 (95%-CI 0.02-0.28)) compared to RYGB. Hospital stay was shorter in re-SG (mean difference -0.42 days (95%-CI -0.52– -0.31 days)) and longer in the BPD/DS group (mean difference 0.13 days (95%-CI 0.01–0.25 days)) and OAGB group (mean difference 0.49 days (95%-CI 0.22-0.76 days). Compared to RYGB, operative time was significantly shorter in re-SG (mean difference of -51.4 min (95%-CI -55.0– -47.8 min)).

Conclusion: In this study, we did not find differences in the odds of postoperative major complications based on the type of revision or conversion MBS procedure following primary SG. Interestingly, re-SG and SADI were associated with higher odds of anastomotic or staple line leak compared to RYGB.

P130

Impact of Sleeve Gastrectomy on Postoperative Constipation: A Self-Reported Questionnaire-Based Study from a Bariatric Center of Excellence

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Introduction: Bariatric surgery has a significant impact on dietary intake, metabolism and bowel function, little research exists regarding incidence and treatment of postoperative constipation in bariatric surgery patients. Constipation, especially in the immediate postoperative period can affect postoperative healing, comfort, respiratory and circulatory function, and quality of life. Factors associated with postoperative constipation in bariatric patients are dehydration, low fiber intake, decreased activity, and postoperative use of narcotic pain medications. Patients often complain of constipation during their early and immediate postoperative visits.

Methods: Retrospective review of prospectively collected self-reported survey questionnaire filled out by patients undergoing sleeve gastrectomy at our institution between May 2022 and March 2023 at 4-time intervals viz. preop, 1 week postop, 1 month postop and 3-month postop visits. The data was analyzed to understand the incidence of postoperative constipation at various time intervals and the postop visit at which the number of bowel movements postop matched that of preop. No change in our current bowel regimen instructions was given during the time the survey was undertaken. The survey administered was modeled based of Rome criteria for functional constipation.

Results: A total of 327 patients undergoing sleeve gastrectomy were administered the survey, and 82 patients (25%) completed the survey at all 4 time points. One hundred and seventy patients completed the survey one week postop followed by 158 and 104 patients at 1 month and 3 months respectively. The incidence of preoperative constipation was 9% (15/164 pts) with a significant increase in incidence to 27% (47/177 pts) at 1 week postop, further continuing to increase to 31% (49/158 pts) at 1 month and remaining high at 23% (24/104 pts) at 3 months postop. In terms of looking at the time taken to return to preoperative state of number of bowel movements in the 82 patients who completed all time intervals, majority (71%) did not return to preoperative status, 16% reported no change in number of bowel movements, 4% reported return at 1 month postop and 9% reported return at 3 months postoperatively and majority.

Conclusions: The incidence of postoperative constipation following sleeve gastrectomy remains elevated at almost one in every 4 at 3 months postoperatively thus identifying the burden of this problem in this patient population. Only 1/3rd of them actually return to having the same number of bowel movements postoperatively as that of preop at this time interval.

P131

Evaluating a Novel Pre-operative Bariatric GERD Algorithm

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Introduction: Sleeve gastrectomy remains the most common bariatric procedure performed in the United States. However, patients are at increased risk of developing or exacerbating gastric reflux postoperatively compared with gastric bypass. Currently, there is no standardized pre-operative workup to determine which patients are appropriate candidates for sleeve gastrectomy versus bypass. We created an algorithm and analyzed the results of the various gastrointestinal studies patients received along with their GERD Impact Scale (GIS) to assess their utility in this process.

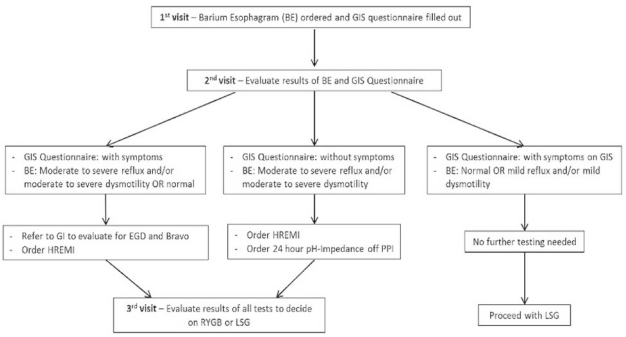
Methods: 208 patients who underwent bariatric surgery at Temple University Hospital between 2013 and 2023 were identified. The algorithm for determining testing and recommending which bariatric surgery procedure can be found in the figure.

The GIS score and upper GI fluoroscopy (UGI) results (presence of reflux, dysmotility, and hiatal hernia) of patients were compared to EGD (presence of esophagitis, hiatal hernia, Barrett's esophagus, and eosinophilic esophagitis), manometry (presence of dysmotility, hiatal hernia), and pH impedance (DeMeester score and acid percent time). Analysis was done through either logistic regression or correlation depending on the variables.

Results: 208 patients (20 males and 188 females) were included in the analysis. There were 25 (12%) Caucasian, 94 (45%) African American, and 89 (43%) Hispanic patients. The average age at time of surgery was 44.2 years. Higher GIS scores were significantly associated with hiatal hernias (OR 1.07, $p = 0.04$) and a marginally significant probability of dysmotility (OR 1.07, $p = 0.057$) on manometry. Patients exhibiting reflux or hiatal hernia on UGI had hiatal hernias detected on EGD ($p = 0.05$) or manometry ($p < 0.01$) respectively. The other comparisons were not significant.

Conclusion: The pre-operative workup for reflux for sleeve gastrectomy is varied among practices. Subjective symptomology (GIS score), manometry. pH impedance, and EGD have all been used to quantify reflux prior to surgery. Our data suggests that GIS score is related to hiatal hernias and dysmotility. Hiatal hernia on upper GI correlated with manometric hiatal hernia. Reflux seen on UGI is

positively correlated with hiatal hernias. No other positive correlations could be made between other tests. Further studies are needed to identify the ideal pre-operative reflux workup.



P132

Variation of Laparoscopic Roux-en-Y Gastric Bypass Techniques and Dumping Syndrome assessment: a Survey of 90 Bariatric Surgeons and Endoscopists

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Background: Laparoscopic Roux-en-Y Gastric Bypass (RYGB) is the second most frequently performed bariatric procedure worldwide and one of its most frequent long-term complications is Dumping Syndrome (DS). Despite a dedicated consensus on the diagnosis and management of DS, published in 2020, great variability exists among physicians.
Methods: An anonymous 24-question survey was distributed by email and website (Websurg, IRCAD France) to all the subscribers bariatric surgeons and endoscopists from August to September 2023.
Results: A total of 90 subjects (85 surgeons, and 5 endoscopists) responded. Among surgeons, 46.1% perform at least 50 procedures per year and 61.2% of them routinely perform RYGB. A wide variability was found in the main technical aspects of the surgical procedure: the volume of the gastric pouch, the length of the jejunal loop and the Roux limb. A multidisciplinary team preoperative evaluation and follow-up were reported by 89% and 84% of the responders, respectively. The frequency of DS after RYGB was reported as $< 20\%$ in 70%, $< 40\%$ in 24.4% and $> 40\%$ in 5.5% of cases. Only 15.6% of the responders routinely use mOGTT to confirm the diagnosis of DS, as recommended by guidelines, while 32.2% never used this diagnostic test. The limited use of the mOGTT could be related to low patient compliance, which in 65.5% of cases was evaluated $< 50\%$. The most frequent first-line DS treatment was diet alone or in combination with drugs (mainly acarbose). Second-line treatment was endoscopic revision while surgical revision represented the third-line treatment, frequently performed after two failed attempts of endoscopic revision. Six types of surgical procedures were reported with pouch revision (37.1%), distal RYGB (28.4%), and Biliopancreatic diversion/Duodenal switch (11.1%) being the most frequent. Treatment efficacy was evaluated by DS questionnaires in 68.9% of cases, whereas by mOGTT only in 14.4%.
Conclusions: There are wide variations in the diagnosis and management of DS after LRYGB. Further consensus and guidelines are warranted to standardize patients' diagnostic and therapeutic algorithm.

P133

Use Of Glucagon-like-peptide-1 (GLP1) Agonists for Augmented Weight Loss After Bariatric Surgery

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Morbid Obesity is a public health concern effectively treated by bariatric surgery (BS). African American (AA) patients, especially females, are more likely to be afflicted with morbid obesity. (MO: 16% in AA females which is twice the rate seen in white or Hispanic females of 8%). Meta-analyses and systematic reviews have shown that AA patients experience on average 8-10% less weight loss than white patients after BS. Initial weight loss has an impact on long-term success, continued resolution of comorbid conditions, and the need for revisional surgery. We sought to determine if this disparity could be mitigated with pharmacologic adjuncts, specifically GLP-1 agonists. This pilot study aims to investigate the effect of GLP1 agonist use on weight loss in conjunction with initial BS.

We performed a retrospective cohort study in an urban teaching hospital on diabetic patients undergoing BS. The first group (drug group) underwent BS and were taking a GLP1 agonist (either semaglutide or dulaglutide) throughout their postoperative course, the second group (control group) underwent the same procedure but did not take a GLP1 agonist. Groups were matched by age, sex, weight, BMI, and comorbidities. We compared the total body weight loss (TBWL) and the excess body weight loss (EBWL) at one, three, six, and 12 months postoperatively.

Thirty-two patients were included in this study, with sixteen in each group. Patients in both groups were African American or Hispanic. One year postoperatively, patients in the drug group showed a greater degree of TBWL (26.7% vs. 22.2%, $p = 0.05$) and EBWL as a percentage (68.1% vs. 50.3%, $p = 0.045$). There were no glycemic or GI-related complications observed during the study period in the drug group. The control group contained 68.75% AA patients while the drug group contained 81.25% AA patients.

In this pilot study at a single institution, we found that patients on GLP1 agonists post-BS experienced greater weight loss at all time points up to one year when matching for age, weight, BMI, and comorbidities. Limitations of this study include a small sample size at a single institution. We hypothesize that GLP1 agonists may be used to improve weight loss in AA patients after BS which have been shown to experience less EBWL relative to white patients.

P134

Efficacy of Perioperative Aprepitant Compared to Haloperidol as Part of a Multimodal Enhanced Recovery After Bariatric Surgery (ERABS) Protocol for Postoperative Nausea/Vomiting (PONV) Prophylaxis

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Introduction: The evolution of Enhanced Recovery After Bariatric Surgery (ERABS) protocols has led to improved patient outcomes and decreased perioperative complications; however, this comes at a cost. Total intravenous anesthesia (TIVA) can often be more than double the cost of balanced anesthesia with volatile anesthetics; in communities with a need for bariatric surgery but decreased resources, the development of cost effective treatment strategies without sacrificing patient outcomes is necessary.
Methods: An institutional bariatric database created from MBSAQIP reported metrics and retrospective chart review was used to identify ERABS patients undergoing elective minimally invasive bariatric procedures from 2017-2023. Demographic data reviewed included age, gender and preoperative body mass index (BMI). Primary outcomes included patient reported episodes of postoperative nausea/vomiting (PONV), total doses of Ondansetron administered, need for a rescue antiemetic, complication rate and length of stay (hours). A p-value less than 0.05 was considered significant and data sets analyzed using the Mann-Whitney test.
Results: A total of 105 patients were found to have received either Aprepitant (n = 51) or Haloperidol (n = 54) in the perioperative period. Patients receiving Aprepitant were less likely to experience POV (1.79% vs 12.96%, p = 0.02) however, there was no significant difference in incidence of PON, overall antiemetic requirement or need for rescue medication. Length of stay (LOS) and complication rate were also not significantly different between the two groups.
Conclusion: Administration of Aprepitant or Haloperidol as part of a multimodal PONV prophylaxis regimen leads to comparable reductions in incidence of PON and overall antiemetic requirement. Use of Aprepitant significantly reduces POV; however, there was no significant difference in hospital LOS or complication rate.
Table 1 Aprepitant and Haloperidol achieve comparable efficacy in improving postoperative ERABS outcomes however, Aprepitant demonstrates superior antiemetic effect

	Aprepitant (n = 51)	Haloperidol (n = 54)	p-value
Average LOS (hours)	30.50	29.77	0.81
Incidence of PON	26.79% (n = 15)	37.04% (n = 20)	0.25
Incidence of POV	**1.79%** (n = 1)	**12.96%** (n = 9)	**0.02**
Required > 2 doses of Ondansetron	39.22% (n = 20)	37.04% (n = 20)	0.47
Required Rescue Antiemetic	17.65% (n = 9)	31.37% (n = 16)	0.09
Complication Rate	3.92% (n = 2)	5.56% (n = 3)	0.30

P135

Long-term Outcomes of Bariatric Surgery—A 10 Years Average Follow-up at a Single Center

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Background: Bariatric surgery has been established as the most effective treatment for morbid obesity and its associated comorbidities. Furthermore, it has demonstrated enduring efficacy over an extended period. However, long-term follow-up studies have cast doubt on its effectiveness compared to the initial years post-surgery. This study aimed to present our findings regarding the sustained weight loss achieved through laparoscopic sleeve gastrectomy (SG) and Roux en Y gastric bypass (RYGB) over an extended duration.
Patients and Methods: We conducted a retrospective analysis of patient data for individuals who underwent SG and RYGB at our institution between 2008 and 2014 (with a follow-up of more than 8 years). Data was extracted from electronic medical records, encompassing both in-person and telephone encounters. We collected and analyzed demographic information, pre-operative medical conditions, and weight loss parameters. Patients with incomplete long-term follow-up data were excluded from the study.
Results: A total of 433 patients underwent either SG or RYGB during the 7-year period. Out of these, long-term data was available for 103 patients (23.7%), with 77 (74.7%) being female. SG was performed on 83 patients, while RYGB was performed on 20 patients. The mean age, initial weight, and body mass index (BMI) of the patients were 40.0 ± 13.5 years, 117.7 ± 16.7 kg, and 42.6 ± 5.1 kg/m^2, respectively. Following a mean follow-up of 10.7 ± 1.4 years, the patients' nadir weight, long-term follow-up weight, percent total weight loss (%TWL), percent excess BMI loss (%EBMI), and percent excess weight loss (%EWL) were 73.0 ± 13.4 kg, 86.9 ± 19.2 kg, $26.1 \pm 12.2\%$, $63.4 \pm 31.0\%$, and $64.4 \pm 30.0\%$, respectively. Younger age, higher pre-operative weight, higher BMI, and the primary operation were significant factors associated with greater long-term weight loss.
Conclusions: Despite ongoing debates about the long-term efficacy of bariatric surgery, our study has demonstrated that although there is some weight regain from the nadir to the final follow-up, the weight loss achieved during the first decadeafter bariatric surgery remains considerable and sustainable.

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Predictors of Anemia Recovery in Patients with Pre-existing Anemia Undergoing Bariatric-Metabolic Surgery

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Background: While predictors of postoperative anemia have been well studied, predictors of recovering from anemia in individuals with pre-existing anemia at the time of bariatric-metabolic surgery remain underexplored.
Objectives: The current study in individuals with pre-existing anemia examined the incidence of, and protective factors associated with, anemia recovery up to five years after bariatric-metabolic surgery.

Methods: A retrospective analysis of data from the Ontario Bariatric Registry was conducted. The primary outcome was recovery from preoperative anemia at any follow-up time from six months to five years post-surgery.
Results: A total of 1871 patients with preoperative anemia were identified. Of these, 1311 (70.1%) recovered from anemia within five years of surgery.
Table 1 Postoperative Odds of Recovering from Anemia

	Odds Ratio (95% CI)	p-Value
Females	1.53 (1.11–2.11)	0.01
Age (Years) (Base < 35)		0.04
35–44	1.02 (0.75–1.39)	0.91
45–54	1.52 (1.07–2.15)	0.02
55–64	1.53 (0.99–2.37)	0.06
65 +	1.18 (0.52–2.68)	0.70
Weight Loss (Kg/m^2) (Base = Lost ≥ 0 and < 10)		0.01
Lost ≥ 10 & < 20	1.30 (1.01–1.68)	0.04
Lost ≥ 20 & < 30	2.95 (1.53–5.71)	0.00
Lost 30 +	2.70 (0.26–27.78)	0.41
Baseline Hemoglobin (g/L) (Base = 0–10—Normal)		< 0.001
11–20—Normal	0.51 (0.38–0.68)	< 0.001
21–30—Normal	0.61 (0.37–1.00)	0.05
31–40—Normal	0.40 (0.18–0.88)	0.02
41 +—Normal	0.26 (0.06–1.15)	0.08

Conclusion: The majority of patients with pre-existing anemia that underwent bariatric-metabolic surgery recovered. Recovery from anemia is influenced by age, sex, weight loss, and preoperative baseline hemoglobin.

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Portomesenteric Vein Thrombosis in Laparoscopic Gastric Bypass: Case Report in High Volume Bariatric Center

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Introduction: Portomesenteric vein thrombosis(PMVT) is a rare complication of bariatric surgery, with an incidence stated anywhere from 0.3 to 1%, most commonly associated with sleeve gastrectomy. In a large volume bariatric practice, we present a case report of a PMVT after a primary laparoscopic gastric bypass in order to add to the growing literature on this life-threatening complication of bariatric surgery.
Clinical Case: This is a 48 year old female, non smoker, with a BMI of 42, gastro-esophageal reflux disease, obstructive sleep apnea, iron deficiency, Vitamin B12 and D deficiency, and osteoarthritis, who underwent a routine primary laparoscopic gastric bypass. Pertinent history included concurrent oral contraception use, no family or personal history of clotting disorders, and no complications after her previous tubal ligation and breast reduction surgery. Post-operatively, she had an unremarkable course, being able to tolerate her liquid diet, ambulating without issues, and met discharge criteria on postoperative day 2. On postoperative day 7, she returned to the emergency department, presenting with right sided abdominal pain, with no other associated symptoms, and was having regular bowel movements. On her clinical evaluation, she was found to have no biochemical abnormalities outside a slightly above normal liver function tests and leukocytosis. On cross sectional imaging, she was found to have a superior mesenteric vein thrombosis that extended to the portal confluence and peripheral intrahepatic in the 8th segment of the liver, and additionally mild amount of edema in the small bowel mesentery without thickening or dilation. Given her clinical stable presentation, she was managed conservatively with anticoagulation and bowel rest. Hematologic work-up relieved an isolated elevated ANA titer, but no other identifiable cause other than recent surgery. She was managed with oral anticoagulation post-discharge for six months, and recent imaging confirms persistent chronic PMVT without bowel changes. She continues to be managed on oral anticoagulants and is awaiting repeat imaging for further management.
Conclusion: Little is known about the risk factors or pathophysiology of PMVT in the perioperative bariatric patient. This case illustrates the need for further studies in determining which bariatric patients are at risk for PMVT and how to prevent this life threatening complication.

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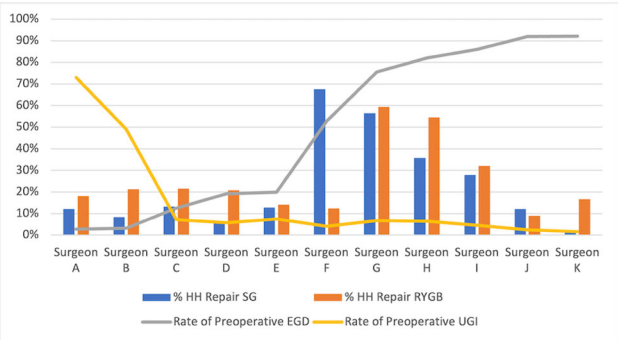
Surgeon Variability in Approach to Hiatal Hernia Repair During Bariatric Surgery

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Introduction: Hiatal hernia (HH) is estimated to affect between 20-50% of patients undergoing bariatric surgery. However, there is no consensus regarding the use of preoperative screening studies or methods for intraoperative assessment of HH. The aim of this study was to evaluate variation in surgeon assessment and repair of HH during bariatric surgery across four hospitals within a healthcare system.
Methods: A retrospective cohort analysis was conducted using data from the Metabolic and Bariatric Surgery Accreditation Quality Improvement Program (MBSAQIP) and institutional medical records. All adult patients who underwent primary sleeve gastrectomy (SG) or Roux-en-Y gastric bypass (RYGB) were included. Preoperative assessment of HH was defined as either EGD or upper GI/esophagram (UGI) within one year of surgery. Surgeons were evaluated individually and by hospital. Categorical variables were assessed using Chi-Square analysis.
Results: From 2018-2023, 3,487 bariatric surgeries were performed across 4 hospitals and 11 surgeons (2,481 SG and 1,006 RYGB). HH were concurrently repaired during 824 (24%) operations. The rate of HH repair (HHR) in SG was 25% and 22% in RYGB. Preoperatively, 41% of patients underwent EGD and 23% had an UGI. HH was diagnosed in 22% of preoperative EGDs. The rate of HHR in patients with a preoperatively diagnosed HH was 62%, compared with 25% in those without preoperative diagnosis ($p < 0.001$). HHR rate was 33% in patients with preoperative EGD and 17% in those who did not have a preoperative EGD ($p < 0.001$). The rate of preoperative EGD utilization by surgeon varied significantly from 3—92% ($p < 0.001$).

The figure illustrates surgeon variation in rate of HHR (range 8 – 57%; $p < 0.001$). Even among patients with a preoperatively diagnosed HH, the repair rate ranged 20—91% ($p < 0.001$) between individual surgeons. Between hospitals there were significant differences in the type of preoperative imaging obtained and the rate of HHR. One hospital had very low utilization of preoperative EGD (3%) but obtained UGI 60% of the time. The rate of HHR for that hospital was significantly lower compared to other hospitals which had higher rates of preoperative EGD ($p < 0.001$).

Conclusion: Within a healthcare system there is significant heterogeneity in the approach to assessment and repair of HH during bariatric surgery. Variability in performance of concurrent HHR is mediated by multiple factors, including utilization of preoperative studies, individual surgeon differences, and differences between hospitals. Further study is needed to understand how these variations in practice affect long-term patient outcomes.



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Preservation of the Gastrophrenic Ligament Allows for Antireflux Surgery in Medically Refractory Gerd Following Sleeve Gastrectomy

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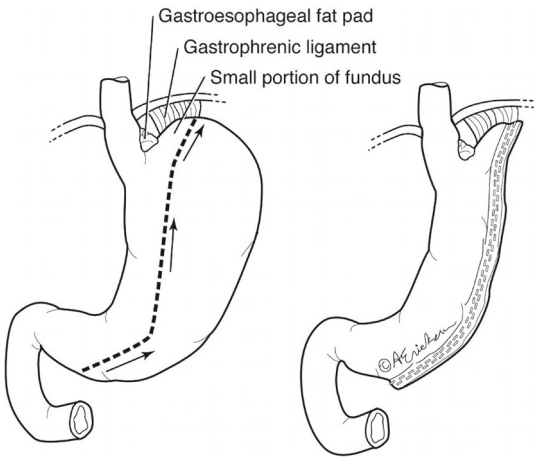
Introduction: Despite the enormous popularity of sleeve gastrectomy in recent years, a growing body of literature estimates that as high as 50 percent of patients will develop de novo gastroesophageal reflux disease (GERD) following sleeve gastrectomy or experience a worsening of GERD symptoms. Due to the anatomic alterations performed during a sleeve gastrectomy, typical surgical options for managing medically refractory GERD are unavailable, which results in approximately 7-8% of post-sleeve gastrectomy patients undergoing conversion to Roux-en-Y gastric bypass due to GERD symptoms. We describe a technique of performing laparoscopic sleeve gastrectomy with preservation of the gastrophrenic ligament, the associated gastroesophageal fat pad, and a small portion of gastric fundus intended to reduce subsequent development of GERD and allow for anti-reflux surgery rather than conversion to bypass if surgical management is necessary, without a difference in excess bodyweight loss or other complications or outcomes.

Methods and Procedures: All adult patients who underwent sleeve gastrectomy performed using this technique between January 1, 2012 and July 1, 2020 by a single surgeon at an academic medical center were evaluated via electronic medical records and MBSAQIP 3 year follow-up data. Weight loss, GERD, and reoperation rates were evaluated.

Results: 582 patients underwent sleeve gastrectomy. These patients demonstrated a decrease in BMI of 9.3 at 3 year follow-up, which is exactly equivalent to published national MBSAQIP data. 16.7% of patients experienced GERD symptoms requiring medication at 3 years, well below the 32.9% reported in the MBSAQIP database, and 1.8% of these patients underwent conversion to Roux-en-Y gastric bypass, aligned with the national rate of 1.9%.

Conclusion(s): Laparoscopic sleeve gastrectomy is the most commonly performed weight loss surgery in the United States with over 150,000 performed annually, but surgical management of post-operative GERD is limited by the traditional sleeve gastrectomy technique. Our technique of performing this surgery without disruption the gastrophrenic ligament or the gastroesophageal fat pad, and with preservation of a small portion of proximal fundus, provides similar weight loss outcomes to the conventional method without increased complications such as GERD or increased conversion to Roux-en-Y gastric bypass and preserves options for future antireflux surgery in cases of GERD refractory to medical management.

Technique:



Pre-op:



Post-op:



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An "Into the Fire" Hands-On Simulation Course for Endoscopic Sleeve Gastroplasty Increases Knowledge, Technical Skills, and Confidence

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Background: The Endoscopic Sleeve Gastroplasty (ESG) is an incisionless weight loss procedure that restricts the gastric lumen with endoscopically placed sutures. Randomized trials demonstrate safety, feasibility, and excellent outcomes. A standardized training program is needed to safely and effectively allow endoscopists to adopt the procedure.
Objective: We hypothesize that an "into the fire" simulation approach is effective at teaching the technical skills needed to perform ESG and increase confidence in the surgical endoscopist.
Methods: Data was collected during a two-day hands-on simulation course including a written knowledge-based exam, a confidence survey, and a skills assessment given before and after the course. The simulation model included a porcine stomach, the Overstitch™ suturing system (Apollo Endosurgery, Dallas, Tx) with both dual and single lumen gastroscopes, a helix device, and 2-0 permanent suture. The course begins with a hands-on pre-test during which the learners attempted an ESG without prior training and without mentorship. The learners then proceeded to the classroom for lecture and discussions focusing on the technical aspects of the procedure. This was followed by hands-on practice with skilled faculty mentorship and post-test assessment. A validated tool for ESG was used to assess the technical skills of the learners. Quality was assessed by comparing the percent change in pre- and post-test scores using the paired t-test.
Results: Six experienced faculty trained 26 learners over two days. 16 of the participants were surgeons, 9 were gastroenterologists, 1 did not respond. There were 20 attending physicians, 3 fellows, and 3 residents. There was significant difference between pre- and post-testing in the written knowledge focused assessment with an 18% improvement (Pre:11.9 $\pm$ 1.9, Post:13.7 $\pm$ 1.3; $p < 001$). There was a significant difference between hands-on pre-and post-testing assessment with a 43% improvement (Pre:27.6 $\pm$ 5.7, Post:38.6 $\pm$ 2.1; $p < 0.001$). Confidence scores also significantly increased (Pre:15.7 $\pm$ 8.1, Post:31.6 $\pm$ 3.1; $p < 0.001$). Learners evaluated the course highly; 96.4% believed their learning goals had been reached. The participants believed that the hands-on portion helped them improve their technique. (5.0 $\pm$ 0.02) The overall rating for the course out of 5 was a mean of 5.0 $\pm$ 0.0.
Conclusion: Endoscopists were able to show increased competency and confidence in completing an ESG after completion of an "into the fire" hands on simulation course. We recommend this method be strongly considered when training endoscopists to address a growing worldwide obesity epidemic.

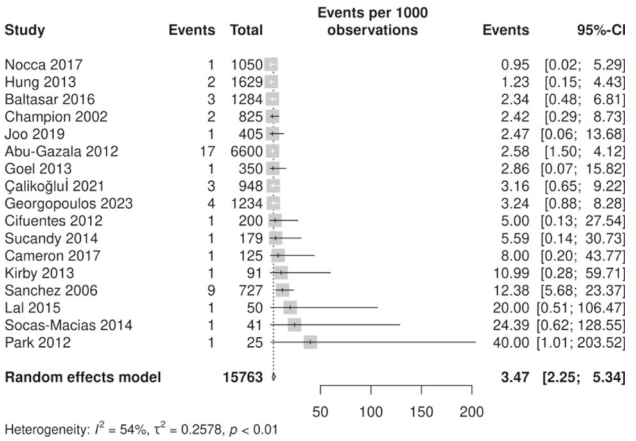
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Complications of Intraluminal Tubes in Bariatric Surgery: Systematic Review and Meta-analysis

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Introduction: Various tubes are routinely inserted into the alimentary tract during bariatric surgery, but these devices can cause harm if they are incorrectly used. Stapling, suturing, transection, and gastrointestinal perforation are all recognized risks of intraluminal tube use. We aimed to synthesize the previously published experiences of tube complications to better understand the risks and consequences and also propose our own recommendations for improving safety and eliminating harm.
Methods: We performed a systematic review of intraluminal tube complications in bariatric surgery by searching 3 electronic databases (PubMed, Web of Science and Embase) for previously published abstracts, case reports, case series, cohort studies, surveys and reviews. We recorded information on the type of operation, type of tube, whether the complication was identified intraoperatively, and the Clavien-Dindo classification of complication. Using data from surveys, case series and cohort studies, we performed a meta-analysis of the proportion experiencing an intraoperative complication from intraluminal tubes in bariatric surgery to estimate its incidence. Based on our own experience and previous authors' suggestions for reducing complications, we propose a perioperative safety checklist to be used during bariatric operations requiring intraluminal tubes.
Results: After screening 1090 reports, we identified 55 unique articles describing 93 cases of intraluminal tube complications. The most common type of reported complication was tube stapling (57%), followed by gastrointestinal perforation (24%). Tube complications were identified intraoperatively in 72% of cases. 58% of cases did not require reintervention, but 9.1% underwent postoperative endoscopy, 17% underwent reoperation, and 6.1% ultimately died. After pooling the data from 15,763 patients across 17 studies, the estimated incidence of an intraluminal tube complication during bariatric surgery was 3.47 events per 1000 cases (95% CI: 2.25 to 5.34). Our proposed perioperative tube safety checklist includes a preoperative briefing with the anesthesia team regarding tube insertion and removal, using a single intraluminal tube (for both gastric decompression and sleeve sizing), considering the use of a lighted calibration tube, and only introducing the tube under direct laparoscopic visualization.

Conclusion: Intraoperative complications from intraluminal tubes during bariatric surgery uncommonly occur but are a preventable source of morbidity and mortality. Surgical teams should be familiar with their use, be able to identify complications intraoperatively, and employ safety checks in order to prevent these devices from harming patients.



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Safety and Predictors of Same-Day Discharge after Primary and Revisional Laparoscopic Roux-en-Y Gastric Bypass: Analysis of the MBSAQIP Database

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Introduction: Continued improvements in bariatric surgery outcomes surgery have led to the development of policy initiatives that explore shifting bariatric surgery towards outpatient procedures. The safety of same-day discharge (SDD) after primary laparoscopic Roux-en-Y gastric bypass (LRYGB) has been previously documented, however, whether it is safe for patients undergoing a revisional LRYGB remains uncertain. Our study aimed to investigate the safety and predictive factors of same-day discharge in patients undergoing revisional LRYGB as it compares with primary RYGB.
Methods and Procedures: We identified adult patients who underwent primary and revisional LRYGB from 2020-2021 in the Metabolic and Bariatric Surgery Accreditation Quality Improvement Program (MBSAQIP) database. Patients discharged on the same day were compared with inpatients for primary and revisional LRYGB. Outcomes included complications, mortality, readmissions, and reoperations within 30 days of surgery. Differences were evaluated with univariable and multivariable analyses. Complications were categorized as minor (Clavien-Dindo: 1 & 2) and major (Clavien-Dindo: 3 & 4). Predictors for same-day discharge were assessed using a multivariable logistic regression model adjusting for patient demographics, comorbidities, and operative time.
Results: Same day discharge rate was similar after primary LRYGB (1,981 of 84,543; 2.3%) and revisional LRYGB (453 of 19,931; 2.3%). Multivariable analysis indicated that patients discharged on the same day following primary LRYGB had fewer major complications (aOR = 0.49, 95%CI: 0.36-0.66, p < 0.001), reoperations (aOR = 0.63, 95%CI: 0.41-0.97, p = 0.034), readmissions (aOR = 0.67, 95%CI: 0.51-0.86, p = 0.002), but higher minor complications (aOR = 1.17, 95%CI: 1.04-1.33, p = 0.011). SDD for revisional LRGYB was associated with lower odds of major complications (aOR = 0.50, 95%CI: 0.29-0.85, p = 0.01), and readmissions (aOR = 0.60, 95%CI: 0.37-0.96, p = 0.034). In both cohorts, patients with the American Society of Anesthesiologists (ASA) Classification III and ASA Classification IV & V were less likely to be discharged on the same day compared to ASA I & II.
Conclusion: While same-day discharge appears safe in this study, it is only applicable to 2.3% of LRYGB procedures. This suggests it is only feasible for a highly selected population as the norm remains to be inpatient admission. Our results dispute the current efforts of policymakers to turn bariatric surgery into outpatient procedures.

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Going Narcotic Free: Peri-operative Pain Management After Robot-Assisted Versus Laparoscopic Bariatric Surgery

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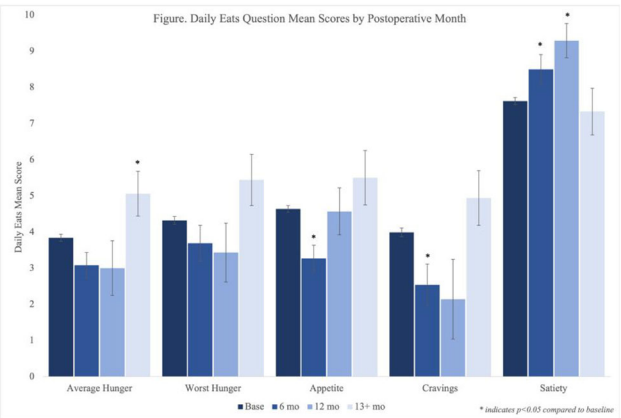
Introduction: Inpatient opioid utilization in patients undergoing surgery has received increased attention, as the opioid epidemic is among the most concerning public health crises in history. Many protocols for pain management include non-opioid analgesics, but occasional opioid treatment may be needed. Minimally invasive surgery leads to improved recovery profiles and decreased opioid requirements in the perioperative period.1 This study explores differences in rescue opioid use in patients undergoing robotic versus laparoscopic bariatric surgery within the first 48 h of the surgery and risk factors associated with increased narcotic requirements.
Method: This study is a retrospective chart review of minimally invasive bariatric surgeries from March 2021 to December 2022. The patients were divided into 2 groups: robotic surgery and laparoscopic surgery. Opioid use was expressed as morphine milligram equivalents (MME) per CDC guidelines for computation.2 The BSTOP protocol was implemented for all patients.
Results: The final analytic sample consisted of 443 patients who underwent bariatric procedures. Patients ranged in age from 18 to 76 (M = 42.11) and the majority of patients were women (n = 376, 85.26%). 57 patients (12.93%) had a history of bariatric surgery, and 116 patients (26.30%) underwent a concomitant procedure (e.g., hiatal hernia repair). The sample included 213 laparoscopic procedures (48.30%) and 228 robotic procedures (51.70%). Among laparoscopic procedures, the majority were Laparoscopic Sleeve Gastrectomy (LSG) (n = 184, 86.38%) and Laparoscopic Gastric Bypass (LGB) (n = 12, 5.63%). Among robotic procedures, the majority were Robotic Sleeve Gastrectomy (RSG) (n = 163, 71.49% and Robotic Gastric Bypass (RGB) (n = 60, 26.32%). The average BMI was 43.30. Patients undergoing laparoscopic and robotic procedures did not differ in BMI, nor in age. There were no significant differences in opioid use between laparoscopic and robotic procedures in unadjusted analyses nor when controlling for psychiatric and surgical history. There was, however, significantly lower opioid use among patients with a history of bariatric surgery (p = .035). There were no significant differences in opioid use between sleeve and bypass procedures.
Conclusion: Consistent with evidence suggesting that robotic and laparoscopic surgery do not differ in postoperative narcotic usage, we found no difference between robotic and laparoscopic procedures in opioid use during encounters for bariatric surgery. However, patients with a history of prior bariatric surgery had significantly lower opioid use. This may be attributed to benefits from prior education regarding appropriate pain management.

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How Does Sleeve Gastrectomy Impact Patient Satiety? A Cross-Sectional Analysis at a Major Academic Center

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Introduction: Satiety is a primary driver of eating behavior. Assessment of patient-reported satiety following sleeve gastrectomy (SG) is lacking. We therefore sought to evaluate hunger, appetite, cravings, and satiation pre- and post- SG via the Daily Eats questionnaire. Validated in a population with obesity, this questionnaire consists of 5 questions, scaled 0 to 10 to assess feelings after eating.
Methods and Procedures: All patients at a major academic institution undergoing evaluation for metabolic and bariatric surgery (MBS) were given the Daily Eats electronic questionnaire at their preoperative surgical evaluation and at each postoperative follow-up. Cross-sectional data, including demographics and Daily Eats responses, were obtained for four time-points of interest: preoperatively, post-operative after sleeve gastrectomy (SG) months 0-6, postoperative months 7-12, and postoperative months 13 + . Average score for each individual question was compared between each post-operative time point and the preoperative baseline.
Results: Overall, 569 Daily Eats questionnaires were completed; 518 preoperatively and 51 postoperatively after SG. Survey compliance was 82%. The baseline demographics of preoperative and postoperative groups did not differ significantly in age or gender, but the postoperative group had significantly lower BMI (41 vs. 46, $p < 0.001$) at mean postoperative follow-up of 19 months. At 6 months postoperatively, there was a significant improvement in appetite, unhealthy cravings, and satiety (Fig. 1). From 7-12 months postoperatively, there remained a significant improvement in satiety compared to preoperative values (9.29 SD 1.25 versus 7.62 SD 2.24, $p = 0.05$). However, at over 1-year post-SG, measures of eating habits and behaviors had returned to baseline values. Furthermore, average hunger was significantly greater than the baseline cohort (5.06 SD 2.62 versus 3.84 SD 2.16, $p = 0.02$).
Conclusions: There is a notable improvement in appetite, unhealthy cravings, and satiety immediately postoperatively following SG; however, these improvements are transient. After 1 year, improvements in eating behaviors disappear average hunger is higher than that reported prior to undergoing SG and satiety is substantially reduced. MBS programs should prioritize interventions during this critical period to maintain postoperative weight loss after SG.



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Enhanced Risk Stratification for Gastrointestinal Leaks After Bariatric Surgery: A Comparative Analysis of Predictive Models

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Introduction: Gastrointestinal leaks (GL) remain a critical concern in bariatric surgery, occurring in up to 8% of patients. Recognizing key risk factors for GL following to bariatric surgery holds substantial potential for mitigating significant morbidity and mortality rates. Machine learning (ML) has demonstrated promise in prognosticating postoperative outcomes through the discernment of non-linear patterns within large datasets. However, data on GL and ML remains limited. As such, the objective of this study was to evaluate and compare GL prediction models in bariatric surgery using logistic regression (LR) methods and ML.
Methods and Procedures: An observational study utilizing the MBSAQIP database was conducted from 2015 to 2019. Patients undergoing sleeve gastrectomy (SG) (CPT code 43775) and Roux-en-Y gastric bypass (RYGB) (CPT codes 43644 and 43645) were included. Patients undergoing revisional or emergency surgery and those younger than 18-years old were excluded. A binary outcome prediction model for GL was developed employing three distinct modeling techniques: (1) LR with main-effects only, (2) a neural network (NN) featuring a single hidden layer, and (3) an XGBoost model with a maximum depth of 3. The identical set of predictor variables and a randomized 50/50 split of the complete dataset were used for both training and validation of each model. Comparative evaluation of overall model performance was completed based on the area under the receiver operating curve (AUC).
Results: This study included a total of 755,506 patients, with a GL rate of 0.5% (n = 3,767). Out of the entire group, 79.6% were female, with a mean age of 44.4 years (± 11.9 years). The initial mean body mass index (BMI) was 45.3 kg/m^2 (± 7.8). The most prevalent comorbidities were hypertension (47.7%), diabetes (26.2%), hyperlipidemia (23.6%), recent tobacco use within one year (8.4%), prior percutaneous cardiac intervention (1.9%), history of myocardial infarction (1.2%), previous cardiac surgery (1.1%), and renal insufficiency (0.6%). The AUC for the three different GL prediction models was: 0.723 for LR, 0.723 for NN and 0.717 for XGBoost. A sub-analysis by surgical procedure indicated that the AUC values were as follows: SG: 0.638 for LR, 0.626 for NN and 0.619 for XGBoost. RYGB: 0.625 for LR, 0.618 for NN and 0.618 for XGBoost.
Conclusion: The ML models demonstrated noteworthy discrimination in predicting GL compared to LR. However, when stratifying by technique, the AUCs dropped, likely due to a lower number of GL events per procedure.

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Evaluating National Trends in Bleeding Associated with Bariatric Surgery over Seven Years

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Introduction: Post-operative bleeding is a known complication after bariatric surgery. We sought to evaluate the national trends in the rates of bleeding and factors associated with bleeding using the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) database from 2015-2021. Additionally, we performed a matched propensity analysis to examine the impact of a bleeding complication on other outcomes.

Methods: The MBSAQIP database was queried from 2015-2021 to identify bleeding, defined as transfusion of ≥ 1 unit of blood post-operatively, or readmission, reoperation or intervention for bleeding. Multivariable regression analysis of preoperative demographics and comorbidities associated with post-operative bleeding for all bariatric surgeries. Multivariable logistic regression was also performed on sleeve gastrectomy (SG) subset from 2015-2019 to evaluate the association of bleeding with staple line reinforcement/oversewing. Patients who had bleeding post-op underwent 1:1 propensity matching with those who did not have bleeding using pre-operative demographics and comorbidities. Peri-operative outcomes were compared in these matched cohorts (n = 8478).

Results: Rates of post-operative bleeding decreased overall from 1.01% in 2015 to 0.69% in 2021, 0.71% (2015) to 0.53% (2021) for SG, and 1.78% (2015) to 1.08% (2021) for Roux-en-Y gastric bypass (RYGB). RYGB (OR 2.08, $p < 0.01$) had higher risk of bleeding compared to SG. Longer operative times (> 360 min, OR 2.46, $p < 0.01$) and open surgical approach (OR 2.33, $p < 0.01$) were highly associated with bleeding, as were co-morbidities including therapeutic anticoagulation (OR 2.49, $p < 0.01$), renal insufficiency (OR 1.61, $p < 0.01$), dialysis (OR 1.39, $p < 0.01$), and history of MI (OR 1.26, $p < 0.01$). Pre-operative demographics associated with increased bleeding risk include older age, male gender (OR 1.10, $p < 0.01$), Asian (OR 1.47, $p < 0.01$) and African American (OR 1.06, $p = 0.04$) race. Staple line reinforcement (OR 0.76, $p < 0.01$) and oversewing (OR 0.79, $p < 0.01$) were protective against bleeding after SG. In the propensity matched analysis of patients with and without bleeding complications, bleeding was associated with 18 times higher risk of major complications (42.57% vs 2.33%, $p < 0.01$) and 8 times higher risk of death (1.06% vs 0.13%, $p < 0.01$).

Conclusions: The risk of bleeding after bariatric surgery has decreased in the past 7 years, with an overall rate of < 1% and a higher risk after RYGB compared to SG. Patients suffering a bleeding complication have a markedly higher risk of major complication and death. Therefore, identifying methods to reduce post-operative bleeding should be a priority and may improve overall outcomes of bariatric surgery.

P148

Revising the Sleeve: Unraveling Sleeve Morphology

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Introduction: Sleeve morphology and its relation with revision surgery remains poorly defined. Our aim was to explore the changes in sleeve morphology immediately postoperatively to those requiring revision later.

Methods: We performed a retrospective review of all patients who underwent SG (n = 822) at a single academic institution from 2015 to 2019. We identified 34 patients that underwent a procedure for gastroesophageal reflux disease (GERD) during the 2 year follow up period. Data regarding procedures, contrast studies and demographics were collected.

Results: Thirty four patients were identified. At index procedure, only 9 had concomitant hiatal hernia repair. Nineteen had preoperative GERD with 15 patients on daily PPI. Postoperatively, 11 patients had de novo GERD, 8 patients had worsening GERD, 3 patients had persistent GERD, 4 patients had improved GERD while 4 patients had resolution of GERD. The POD1 UGI sleeve morphology were: 6 (17.6%) dumbbell, 23 (67.6%) lower pouch, 5 (14.7%) tubular while none had the upper pouch. Revision procedures were: hiatal hernia repair (6 patients), Heller myotomy with Roux-en-Y gastric bypass (RYGB) (1 patient), Heller myotomy alone (1 patient), RYGB combined with hiatal hernia repair (13 patients), RYGB (2 patients), and hiatal hernia repair with magnetic sphincter augmentation (2 patients). Only 25 had an UGI pre-revision. Sleeve morphology distribution was dumbbell in 15 (60%) patients, lower pouch in 8 (32%) patients, tubular in 2 (8%) patients and upper pouch in 0 patients. Of the 23 patients who had the lower pouch morphology on POD1 UGI, only 15 (65.2%) had UGI pre- revision and 7 of them (46.7%) retained the lower pouch while 8 (53.3%) changed to a dumbbell. All six patients who had the dumbbell morphology retained it pre-revision (mean pre-revision BMI: 39.6, mean weight loss: 10.6). Seven patients had the lower pouch morphology on POD1 UGI and sustained it pre-revision (mean pre-revision BMI: 41.5, mean weight loss: 8.2). Eight patients (mean pre-revision BMI = 31, weight loss: 9.5) had the lower pouch sleeve morphology on POD1 UGI that transformed into the dumbbell morphology pre-revision. BMI>35 were found in 7 of these patients pre-operatively while 2 of them retained it pre-revision.

Conclusion: The lower pouch sleeve morphology was predominant although a little over half transformed to dumbbell. It appears that even if we attain the desired sleeve morphology, some will change their shape while others will not. Determining which sleeves will change shape will help decrease revisions in the future.

P150

Indications for Conversion or Revision of Sleeve Gastrectomy: An Analysis of the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program database

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Introduction: A growing number of patients who have undergone primary sleeve gastrectomy (SG) require revision or conversion metabolic and bariatric surgery (MBS) due to indications including gastroesophageal reflux disease (GERD), inadequate weight loss (IWL) or weight gain (WG), and obstructive symptoms. There are several revision or conversion MBS procedures that are performed in practice, including Roux-en-Y gastric bypass (RYGB), revision SG (re-SG), biliopancreatic diversion with duodenal switch (BPD/DS), single-anastomosis duodeno-ileal bypass (SADI), and one-anastomosis gastric bypass (OAGB), although the specific procedures performed for each indication have not been well described. Recently, the MBSAQIP Participant User Data File (PUF) updated several variables related to revision or conversion MBS, enabling detailed descriptive analyses.
Methods and Procedures: We conducted a cross-sectional study of adult patients who underwent revision or conversion MBS following primary SG using the 2020-2021 MBSAQIP database. We described indications for conversion or revision, patient characteristics for each indication, and frequency of different revision or conversion MBS procedures performed for each indication.
Results: We identified 19,715 patients who underwent one of five revision/conversion MBS procedures (RYGB, re-SG, BPD/DS, SADI, or OAGB) following primary SG. The two most common surgical indications were GERD (n = 9449, 47.9%) and IWL/WG (n = 8640, 43.8%). The IWL/WG group had a higher average BMI compared to the GERD group (mean 43.5 kg/m2 (SD 7.6) v. mean 37.8 kg/m2 (SD 7.3)) and a lower proportion of women (86.6% v. 92.8%). Patients undergoing surgery for IWL/WG also had a greater burden of comorbidities compared to those for GERD, including a higher proportion of diabetes (13.5% v. 9.3%), obstructive sleep apnea (27.3% v. 20.2%), hypertension (36.6% v. 31.7%), and ASA class III/IV (79.6% v. 67.7%). RYGB was the most common procedure (n = 16110, 81.7%) across all indications. The vast majority of patients with GERD underwent RYGB (n = 9034, 95.6%); interestingly, however, re-SG was second most common in these patients (n = 239, 2.5%). For IWL/WG, RYGB was again most frequent (n = 5756, 66.6%), though there were significant proportions of patients who underwent other procedures, including re-SG (n = 1138, 13.2%), BPD/DS (n = 1008, 11.7%), SADI (n = 647, 7.5%), and OAGB (n = 91, 1.1%).
Conclusion: IWL/WG and GERD were the two most common indications for revision or conversion MBS following primary SG. RYGB was the most common procedure performed across all indications, although re-SG, BPD/DS, and SADI were also frequently performed for WG/IWL.

P151

Single-Institution Experience Using Sleeve Gastrectomy Bridging LVAD to Transplant

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Background: BMI > 35 kg/m^2 is a relative contraindication to heart transplantation. The role of bariatric surgery in morbidly obese patients with left ventricular assist devices (LVAD) is not well studied. This single-institution retrospective case-control study aimed to evaluate these patients whom underwent laparoscopic sleeve gastrectomy (LSG) compared to medical management of morbid obesity.
Methods: LVAD patients with BMI > 35 kg/m^2 between 1/2016 – 12/2021 were identified and grouped by medical (LVAD-Only) vs surgical management (LVAD w/ LSG). Data analysis included demographics, weight changes, transplant listing status, reason for listing denial, post-op complications, and mortality.
Results: Twenty-two patients who underwent LVAD placement with BMI > 35 kg/m^2 were identified: 11 underwent LSG and 11 did not. The group demographics only differed significantly in regards to DMII diagnoses in LVAD-Only.
With LSG, twice as many patients were successfully listed and a significant more remain actively listed compared to the LVAD-Only group (see Table 3). Thus far two LVAD-LSG patients have been successfully transplanted.

There were two LSG post-op complications – both anemia requiring transfusion. Bleeding in these patients likely secondary to full anticoagulation. Protocol was adjusted, and there have been no further post-op transfusion needs. In the LSG group there were two deaths, both greater than 3 years post-op. One related to disease progression and the other substance abuse.

In the LVAD-Only group there was no significant change in weight during the course of the study. LSG however had successful weight loss, showing a mean BMI reduction of -8.55, significantly more than the LVAD-Only group.
Conclusion: Using our LVAD-LSG protocol, laparoscopic sleeve gastrectomy appears to be a safe and effective option for weight loss in patients with LVAD bridging to transplant. LSG also significantly improves the ability to be listed for a heart transplant.

	LVAD Only	LVAD w/ LSG	P-Value
Race	CC 4 (36.36%), AA 7 (63.64%)	CC 4 (36.4%), AA 7 (63.6%)	1
DMII	5 (45.45%)	0	0.0155
HTN	6 (54.5%)	8 (72.7%)	0.3753
BMI @ LVAD	35.87	37.03	0.5085
Average BMI Reduction	-1.24	-8.55	0.0209
Weight @ LVAD	105.39 kg	107.34 kg	0.8036
Listed	4 (36.3%)	8 (72.7%)	0.0876
Transplanted	1 (9.1%)	2 (18.2%)	0.5344
Listing Denial: BMI	6 (54.5%)	2 (18.2%)	0.0762
Listing Denial: Dz Progression	4 (36.3%)	1 (9.1%)	0.1269
Listing Denial: Other	1 (9.1%)	2 (18.2%)	0.5344
Active Waitlist	0 (0%)	4 (36.4%)	0.0207
Deceased	4 (36.36%	2 (18%)	0.3384

Table 1. Demographics and statistics related to transplant, listing status.

P152

Retrograde Intussusception of Jejunojejunostomy 24 years After a Roux en Y Gastric Bypass

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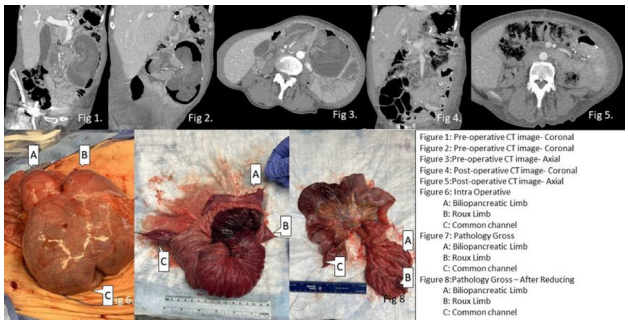
Introduction: Retrograde intussusception is a rare diagnosis. Our case looks into the presentation of this rare entity. We present a case of a 47 year old lady who present to the ED with severe abdominal pain after 24 years of having a Roux en Y Gastric Bypass. She was found to have bowel obstruction at the Jejuno-jejunostomy. It was found to be a retrograde intussception with necrosis and needed resection. She had an uneventful recovery.

Case Report: 47 year old female with previous history of Roux en Y Gastric Bypass over 20 years ago who presented with acute onset abdominal pain and obstipation for approximately 24 h. Patient is an active smoker with concurrent heroin and cocaine use. On exam, vitals were 128/73 mm Hg a, 98 pulse/min and 37.1° Celsius. Her abdomen was soft with localized tenderness in the epigastrium. CT scan of the abdomen was worrisome for intussusception or internal hernia at the previous site of the Jejunojejunal anastomosis. Her WBC was 8.28 K/uL and Lactic Acid was 2.8 mmol/L. Patient proceed to the operating room for exploration.

Diagnostic laparoscopy initially performed showed an intussusception of the Jejuno-jejunal anastomosis approximately 15 cm from the ligament of Treitz. Laparoscopic reduction was unsuccessful and with such close to the ligament of Treitz, a laparotomy was performed in attempt to reduce the intussusception. We resected the intussuscepted segment with the whole Jejuno-jejunal anastomosis and performed a primary two sequential side-to-side anastomosis 20 cm apart. Pathological analysis showed ischemic bowel disease with hemorrhagic necrosis in the mid-section of common channel that had intussuscepted. A 75 cm was resected. There were also some benign enlarged LN with sinus histiocytosis.

She had an uneventful recovery. She was readmitted for psychiatric illness but her abdomen had fully recovered.

Conclusion: Retrograde intussusception is a very rare diagnosis but not an uncommon entity in the bariatric population. Clinical suspicion needs to be very high to be able to appropriately manage so that we can salvage bowel.



P153

The Protective Impact of Concomitant Gastritis when Undergoing Laparoscopic Sleeve Gastrectomy on the Perioperative Course

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Introduction: The safety and efficacy of bariatric surgeries for patients with morbid obesity are well described. In recent years, tailored medicine has shifted the spotlight towards better identifying the benefits of those procedures and those with a higher risk for complications and long-term failure. We sought to better understand the impact of gastritis on short-and long-term results.

Material and Methods: Data on all patients who underwent Laparoscopic Sleeve Gastrectomy (LSG) in our university-affiliated Medici Center were included in a prospectively maintained database under IRB approval. A dedicated bariatric surgeon's team operated on all patients, using a similar operative technique.

Results: Between 2009 and 2022, we collected data on 805 patients who underwent LSG at our department and their pathological reports. We identified 377 patients with gastritis and 428 patients with normal pathology. Age, operative BMI and comorbidities, employment status, marital status, and smoking status were all similar for both groups. Patients in the gastritis group had higher rates of Helicobacter Pylori in the operative specimens (%, 15 vs. 0.5, $p < 0.01$).

In terms of long-term weight loss, the 1 to 5 years Excess Weight Loss was similar for both groups (81 vs 81, 81 vs 80, 73 vs 76, 72 vs 65 respectively, $p > 0.05$) so were the comorbidities remission rates.

When looking at the perioperative period, we can see that patients without gastritis suffered from significantly higher rates of major perioperative morbidity in terms of Clavien Dindo of III\IV (%, 1.6 vs 4.9, $p = 0.01$) and from higher rates of post-operative leaks (%, 0.8 vs 2.6, $p = 0.05$).

Conclusion: The long-term is similar when comparing patients with and without gastritis undergoing LSG, interestingly, gastritis seems to have a protective effect in the perioperative period, as those without gastritis have a threefold risk of perioperative major morbidities and leakage.

P154

Does Ethnicity Affect the Outcomes of Sleeve Gastrectomy for Weight Loss when Comparing Jewish vs. Arabs? An Israeli Prospectively Maintained Database Results

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Introduction: Ethnic diversity affects clinical outcomes for many patients, among them patients with morbid obesity undergoing bariatric surgeries. Morbid obesity prevalence is higher in Israeli-Arabs compared to Israeli-Jews, partially due to lower socioeconomic status coupled with lower education levels.

Material and Methods: Data on all patients who underwent Laparoscopic Sleeve Gastrectomy (LSG) in our University-affiliated single centers were included in a prospectively maintained database under IRB approval. A dedicated bariatric surgeon's team operates with all patients, using similar operative techniques.

Results: Between 2009 and 2022, 892 patients underwent LSG at our department, 262 Israeli-Arabs and 630 Israeli-Jews. Most of the

Israeli-Jews had tertiary education, compared to less than a third of the Israeli-Arabs (%, 30 vs 52, p = 0.00). The Israeli-Arab group was significantly younger (years, 35 vs 45 p = 0.00), with feminine dominancy (female gender %, 82 vs 67, p = 0.00), healthier in terms of Diabetes mellitus (%, 20 ns 28, p = 0.010), Hypertension (%, 21 vs 32, p = 0.00), and Dyslipidemia (%, 27 vs 39 p = 0.00). The operative BMI was higher for the Israeli-Arab group (mean, 45 vs. 43, p = 0.00) as well as the Excess Body Weight (mean, KG, 54 vs. 49, p = 0.00). The perioperative period was similar in terms of 30-day complication rates, leak rates, re-operation, and re-admission rates. The long-term results show similarity in terms of 2 years % Excess weight Loss (EWL) (%, 78 vs 80, p = 0.24) and 5 years %EWL (%, 65 vs 70, p = 0.41). The impact on co-morbidities was similarly high; Diabetes mellitus remission (%, 64 vs. 67, p = 0.81), Hypertension remission (%, 65 vs. 65, p = 0.91), Dyslipidemia remission (%, 52 vs. 56, p = 0.93).

Conclusions: Israeli demography leads to significant differences between the two groups, nevertheless, those noteworthy and important differences between the groups did not translate to a more complicated perioperative course, nor poorer long-term results. Both groups gain equally and significantly from this operation.

P155

Type-2 Diabetes Remission and Glycemic Control after SADI-S and BPD-DS: A Multi-center Comparative Analysis

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Introduction: Metabolic and bariatric surgery (MBS) has been demonstrated to be an excellent therapeutic option for the management of type-2 diabetes mellitus (T2DM). Novel procedures such as the biliopancreatic diversion with duodenal switch (BPD-DS) and single anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S) have shown excellent weight loss results and obesity-related medical conditions resolution rates. However, there is a scarcity of reports describing and comparing mid-term T2DM remission and glycemic control outcomes between these two procedures.

Methods: We performed a multicenter retrospective review of patients with T2DM who underwent BPD-DS or SADI-S between 2008-2023. Patient demographics, clinical and metabolic T2DM parameters were collected at 6, 12, and 24 months after MBS. T2DM remission was defined as HbA1c < 6.5% and off anti-diabetes medications. Our cohort was separated into two groups based on the initial procedure. A chi-square test for categorical variables and a two-sample t-test for continuous variables were used.

Results: A total of 97 patients were included from two separate institutions with 49 (50.5%) patients who underwent SADI-S [71.4% female; mean age 46.6 ± 8.2; mean BMI 53.4 ± 9.7; common channel length 250 cm] and 48 (49.5%) patients who had BPD-DS [60.4% female; mean age 49.6 ± 10.6; mean BMI 58.5 ± 9.6; common channel length range (100-150 cm); Roux limb length range (125-150 cm)]. Baseline T2DM metabolic parameters such as HbA1c level (p = 0.226), number of medications (p = 0.345), fasting blood glucose (FBG) (p = 0.076), and insulin use (p = 0.768) were similar between the two groups. Patients who underwent SADI-S had a higher change in FBG from baseline at 24 months follow-up (p = 0.035). Also, decrease in insulin use was statistically higher after SADI-S at 12 and 24 months (Table 1). Despite BPD-DS having a significantly lower HbA1c level at 6 months (p = 0.004), both procedures demonstrated a similar mean HbA1c level after 24 months of follow-up (p = 0.518) (Fig. 1A). Likewise, T2DM remission rates were higher after BPD-DS at the 6 months period (71.4% vs 44.1%; p = 0.016), however these rates became comparable at 24 months (72.0% vs 81.3%; p = 0.712) (Fig. 1B). Lastly, weight loss outcomes were comparable between the two procedures at 6, 12 and 24 months.

Conclusion: In our cohort, both SADI-S and BPD-DS were associated with high mid-term T2DM remission rates and improvement in glycemic control parameters. Further long-term studies are required to evaluate and compare the trends in T2DM remission rates after these procedures.

	SADI-S	BPD-DS	*p-value*
Change in number of medications, n (SD)			
6 months	-0.69	-1.07	0.760
12 months	-1.05	-1.18	0.540
24 months	-1.12	-1.17	0.849
Change in fasting blood glucose, mg/dL (SD)			
6 months	-38.2	-30.4	0.524
12 months	-48.2	-40.8	0.510
24 months	-61.8	-34.3	**0.035**
Insulin use, (%)			
Baseline	42.9	45.8	0.768
6 months	14.3	22.9	0.330
12 months	6.1	12.5	**0.035**
24 months	4.1	12.5	**<0.001**

Table 1. Changes in glycemic control parameters after SADI-S and BPD-DS

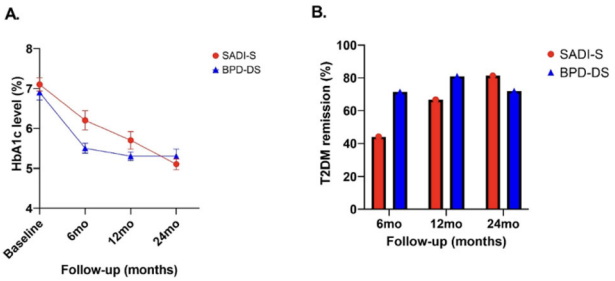


Figure 1. (A) HbA1c follow-up and (B) T2DM remission rates after SADI-S and BPD-DS

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Safety and Efficacy of Geriatric Bariatric Surgery

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Introduction: Obesity affects around 40% of adults ages 60 years and older in the United States. Geriatric obesity is associated with many comorbidities, polypharmacy, decreased functional capacity and quality of life, institutionalization, and death. Bariatric surgery can effectively treat obesity and reduce its associated morbidity and mortality. There is increased utilization in those ages 35-54, but it has been performed in those as old as 80 years old. The purpose of this study is to evaluate the safety and efficacy of bariatric surgery among geriatric patients.

Methods: A retrospective review was performed of geriatric patients (> 65 years old) who underwent sleeve gastrectomy (SG) or Roux-en-Y gastric bypass (RYGB) between 2019 and 2022 at a single institution. Data collected included demographics, pre-operative and post-operative total body weight and BMI, percent excess body weight loss (%EBWL), comorbidities, and perioperative complications. Descriptive analytics was performed.

Results: 11 patients aged 65 or older who underwent SG or RYGB were identified. 7 patients (63.6%) received SG and 4 patients

(36.4%) received RYGB. The age range was 65-78 with a mean of 67.5. 10 (90.9%) were female and 1 (9.1%) was male. Comorbidities pre-operatively included hypertension (90.9%), obstructive sleep apnea (72.7%), diabetes mellitus (54.5%), hyperlipidemia (45.5%), congestive heart failure (27.3%), coronary artery disease (9.1%), history of cerebral vascular accident (9.1%), COPD (9.1%), and chronic kidney disease (9.1%). Of those with diabetes mellitus, the mean pre-operative Hgb A1c was 8.2%. The mean %EBWL at twelve months was 26.1% with a range from 13.1% to 50.5%. The mean %EBWL at three years was 41.3% with a range from -4.8% to 142.5%. Two patients did not follow up at 3 years. Hypertension resolved in one patient and 46% of patients had improvement of their hypertension. Diabetes mellitus resolved in one patient and 100% of patients had improvement. Post-operative Hgb A1c of those with diabetes was 6.5%. There were no perioperative complications.

Conclusion: Even though obesity affects the geriatric population with a similar prevalence to that of younger adults, bariatric surgery is less commonly performed in this population. Possible explanations include disinterest in surgery later in life, lack of support, or concern for increased risk of surgery due to advanced chronic comorbidities and physiologic changes. Our results show that bariatric surgery is safe and effective with improvement in weight loss and comorbidities such as hypertension and diabetes in the geriatric population when appropriate medical risk stratification and optimization are performed.

P157

Factor VIII: A Potential Risk Factor for Venous Thrombosis After Bariatric Surgery?

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Introduction: Venous thromboembolism (VTE) is one of the serious complications after bariatric surgery. Risk assessment models have been created to calculate postoperative VTE risk and guide the use of extended thromboprophylaxis after discharge. These are yet to be unified in terms of risk factors, timing, agent or duration of thromboprophylaxis. Outside the current VTE risk predictor models, we aimed to examine the role of elevated coagulation factor VIII as a potential risk factor to determine VTE risk and thromboprophylaxis use.

Methodology: A retrospective review was conducted of all patients who underwent primary laparoscopic sleeve gastrectomy or laparoscopic Roux-en-Y gastric bypass from June 2020 to May 2023 in Cleveland Clinic hospitals in Ohio. Patients who had a measured preoperative factor VIII level were included in the study. We excluded all patients who were on chronic anticoagulation preoperatively. Factor VIII level $>$ = 174% was considered elevated.

Results: Final analysis was done on 1,413 patients with available preoperative factor VIII level; postdischarge extended thromboprophylaxis was prescribed for 615 patients (43.5%). Based on the Cleveland Clinic VTE risk calculator, 384 (27%) patients had an elevated risk for postdischarge VTE. In total, 564 patients (40%) had elevated factor VIII levels. In the multivariate regression model, with every 1 unit increase in BMI, the factor VIII level increased by 1.4% (95% CI 1.1 – 1.8), P-value < 0.001. Of the 564 patients with elevated factor VIII, postdischarge extended thromboprophylaxis was prescribed for 413 patients (73%). In the 30-day postoperative period, thrombotic events occurred in 6 patients (0.4%) with a median of 16.5 days post-surgery. 3 out of these 6 patients had normal preoperative factor VIII levels. 3 out of these 6 patients had an elevated factor VIII level; 2 of them were discharged on extended thromboprophylaxis.

Conclusions(s): Forty percent of patients with obesity undergoing bariatric surgery have an elevated factor VIII. In the current practice, the overall rate of thrombotic events post bariatric surgery is low. Findings of this study does not support the role of factor VIII as a major risk factor in predicting thrombotic events in patients undergoing bariatric surgery.

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Bariatric Surgery: Improving Access Without Compromising Outcomes

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Background: Bariatric surgery has been proven to reduce mortality from obesity related disease, yet less than 1% of eligible patients undergo surgery. Bariatric surgery preoperative workup mandates many multidisciplinary visits demanding patient's sacrifice in time and travel.

At our institution, due to the COVID pandemic, our entire bariatric clinic transitioned to telemedicine both for pre- and post-operative care. The objective of this study is to determine how this shift impacted access as well as outcomes.

Methods: Our study population comprised of patients 18 years and older who underwent gastric bypass or sleeve gastrectomy at a single US academic hospital between 2018-2022. We analyzed the impact of telemedicine on age, race/ethnicity, gender, insurance type, days from consultation to surgery, length of hospital stay, surgical procedures, BMI, and complications. Statistical analyses were conducted using $\chi 2$ tests for categorical variables and t-test for continuous variables as well as logistic regression. Statistical significance was set at $p \leq 0.05$, and analyses were conducted using Stata-18 software.

Results: A total of 794 patients were included: 566 (71.3%) received in-person care while 228 (28.7%) received telemedicine consultations. There was no significant difference between race, ethnicity or gender. There was a significant disparity in the insurance status of patients between the in-person and telemedicine groups ($p = 0.02$). The average duration from the initial consultation to surgery was significantly longer ($p < 0.001$) for in-person (551.1 days, SD:702.9, 95% CI: 493.1-609.1) compared to telemedicine (375.8 days, SD:423.8, 95% CI: 320.5-431.1). The mean preoperative BMI was higher for the in-person cohort versus telemedicine (45.5; SD:8.0 vs. 43.9; SD:6.7; $p < 0.001$) but there was no statistically significant difference in percent weight loss at 12 months.

The average length of stay was significantly longer ($p < 0.001$) in the in-person group compared to the telemedicine (1.9 days; SD: 0.74, 95% CI:1.9-2.0) vs. (1.2 days; SD: 0.67, 95% CI:1.1-1.3). For 30-day readmission rates, we observed 2.5% for in-person visits versus 0.8% for telemedicine ($p = 0.14$) and for 30-day emergency department (ED) visit rates, we found 12.8% for in-person and 10.9% for telemedicine ($p = 0.45$).

Conclusion: Despite being the best treatment for morbid obesity, bariatric surgery remains underutilized. Improving access to care is critical. When comparing telemedicine to an in-person model, we found shorter time to surgery, shorter length of stay and non-inferiority in outcomes with no difference in weight loss, 30-day readmissions nor ED visits. Telemedicine may be a useful way to improve access for patients seeking bariatric surgery.

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Outcomes of Same Day Discharge in Bariatric Surgery

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Background: Restrictions during the COVID-19 pandemic influenced a shift to same-day discharge in bariatric surgery versus the prior standard practice of overnight admission. Studies thus far comparing outcomes have drawn conflicting conclusions in terms of morbidity and mortality as it relates to the day of discharge.
Objectives: This study aims to compare thirty-day outcomes for same-day discharge versus overnight admission after bariatric surgery.
Methods: Subjects included patients who underwent primary laparoscopic or robotic-assisted sleeve gastrectomy or Roux-En-Y gastric bypass at a single center. The inpatient group included patients who underwent surgery from July 2019 up to March 2023 and were discharged postoperative day one. The outpatient group included patients from July 2020 to September 2023 who underwent surgery with same-day discharge. Primary outcomes included the number of emergency room visits, reoperations, IV fluid treatments, readmissions, and mortalities within 30 days. Several secondary outcomes were analyzed to assess morbidity such as skin and soft tissue infection, pulmonary embolism, and acute kidney injury.
Results: 1,225 patients met the inclusion criteria. In the sleeve group, 852 subjects were outpatient, and 227 were inpatient. In the gastric bypass group, 70 subjects were outpatient, and 40 were inpatient. The mean age was 44.63 (17.38-85.31) years, and the mean preoperative BMI was 46.07 $\pm$ 8.14 kg/m2. The outpatient group had a lower BMI and had less comorbidities. The inpatient and outpatient groups for both surgery types differed significantly for age, BMI, and presence of several comorbidities preoperatively, including diabetes mellitus, COPD, OSA, history of pulmonary embolism or thromboembolism, hypertension, hyperlipidemia, and dialysis requirement. The inpatient and outpatient groups for each surgery type did not differ significantly for reoperations, outpatient IV fluid treatments, or mortality within 30 days. The inpatient gastric sleeve group demonstrated a significantly higher percentage of readmission than the outpatient group (4.6% vs. 2.1%; $p = 0.02882$). The inpatient gastric bypass group showed a significantly greater number of ER visits (21.7% vs. 10%; $p = 0.0108$). The adverse events incidence regarding the secondary outcomes was not statistically different.
Conclusion: Same-day discharge after bariatric surgery is a safe and reasonable compared to overnight admission based on the thirty day outcome measures investigated in this study. Further studies are warranted to compare if this holds consistent for patients with greater comorbidities.

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Bariatric Surgery Impact on Weight Loss and Comorbidities in PCOS Patients

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Introduction: In this study we aim to explore the role of bariatric surgery on weight loss and several commodities in polycystic ovary syndrome (PCOS) patients that include: diabetes, GERD, sleep apnea, hypertension, and hyperlipidemia.
PCOS is an endocrine disorder that leads to fluid filled cyst formation in the ovaries. It affects child-bearing females and a common cause of infertility. PCOS leads to hormonal imbalance on several levels including androgens, insulin, cortisol…etc. causing many comorbidities. Obesity among other factors can aggravate and lead to the development of PCOS by influencing the hypothalamic- pituitary-ovarian (HPO) axis.
Methods: We performed a retrospective study of 221 patients who underwent bariatric surgery. 205 patients did not have PCOS while 16 patients had PCOS. Patients were surveyed at three intervals regarding their weight loss and comorbidities: pre-operation, post-operation at 6 months, and post-operation at 1 year. Average weight loss in kilograms, average weight loss percentages were calculated for both groups. Agresti-Caffo based 95% Confidence intervals was used to measure the significance of difference in proportions between non-PCOS and PCOS patients who responded "yes" to the following comorbidities: diabetes, GERD, sleep apnea, hypertension and number of hypertensive medications, and hyperlipidemia.
Results: Weight loss average over the period of the three intervals was similar between Non-PCOS and PCOS patients, and there was no significant difference in proportions of weight loss averages. The average weight loss increased post operation and was highest at 1 year follow-up with 24% for non-PCOS patients and 26% for PCOS patients.
For comorbidities and based on 95% confidence intervals, there was no true difference in the proportion of Non-PCOS and PCOS patients who reported comorbidities at pre-operation, post-operation at 6 months, and post-operation at 1 year.
Conclusion: Bariatric surgery had a similar positive impact on average weight loss in Non-PCOS and PCOS patients with increasing average weight loss over time. Additionally, there was no significant difference in reporting comorbidities in both groups. Despite the endocrine nature of their disease, this study shows promising results of bariatric surgery for PCOS patients. The limitations of this study include a small sample size of PCOS patients in which many were lost to follow up. Further studies are needed to establish the role of bariatric surgery on comorbidity resolution as weight loss can have a role in re-establishing hormonal balance which could potentially alleviate PCOS symptoms.

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Comparing Outcomes After Sleeve Gastrectomy Utilizing an Anatomical Based Approach. Does the Stapling Technique Matter?

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Introduction: The sleeve gastrectomy remains the most common bariatric procedure performed for weight loss. However, the surgical technique remains highly variable. An anatomical approach to the stapling whereby the stapler is placed 4 to 6 cm from the pylorus, 3 cm from the incisura, and 1 cm from the angle has been described with the Standard Clamp device and the Titan SGS stapler, a novel single-fire 230 mm stapler, to improve reproducibility of sleeve size and shape. The Standard Clamp is placed across the stomach at the described anatomical landmarks and a standard multi-fire stapler is placed parallel to the clamp to divide the stomach. The single fire 230 mm stapler utilizes a closed staple height of 1.2 to 2.2 mm along the jaw to account for variations in gastric thickness from the fundus to the antrum.
The purpose of this study is to compare whether the single continuous staple line with closed staple heights to account for the variability in gastric tissue thickness had a significant difference on outcomes.
Methods: At our institution between 12/2019 and 7/31/2023, a total of 107 patients underwent sleeve gastrectomy utilizing the Standard

clamp device and multi-fire stapler. The staple loads used were of uniform staple height with reinforcement. A total of 166 patients underwent sleeve gastrectomy with the Titan SGS single fire 230 mm stapler. The outcomes analyzed included operative time, length of stay, post-operative nausea, rate of leak, bleeding complications, incisional hernia rate, de novo GERD, and excess weight loss at 12 months.

Results: Data showed no difference in length of stay, postoperative nausea, rate of leak, bleeding complications, incisional hernia, de novo GERD, or weight loss. Preliminary data in this small sample suggests there is a decrease in operative time with the use of the single fire stapler and decreased rates of de novo GERD with an anatomical approach to the stapling technique versus the published average ranges of de novo GERD with a free hand staple technique.

Conclusions: Outcomes after sleeve gastrectomy utilizing anatomical stapling approach may improve rates of postoperative GERD and the Titan SGS single fire 230 mm stapler improves operative times.

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Preoperative Gastroesophageal Reflux Disease and Concomitant Hiatal Hernia Repair Are Associated with Increased Postoperative Infusion Therapy

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Background: Dehydration is a well-known potential complication after metabolic and bariatric surgery. We examined risk factors for patients who required multiple postoperative outpatient infusions after laparoscopic sleeve gastrectomy (LSG) and Roux-en-Y gastric bypass (RYGB).

Methods: We queried primary LSG and RYGB in the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program Database (MBSAQIP-PUF) from 2017-2021. Patients were grouped by number of 30-day infusions (0, 1, 2-3, 4 +). Preoperative comorbidities and operative characteristics were analyzed with univariate modeling, and logistic regression was used to identify patient characteristics associated with increased treatment (relative risk ratio [95% confidence interval]).

Results: Of 992,627 patients, 32,113 had one infusion, 7,116 had two to three infusions, and 1,271 had four or more infusion. Patients who received multiple treatments tended to be younger (0: 44.5 years, 1: 42 years, 2-3: 41.5 years, 4 + : 41.9 years), were more likely to be female (0: 80.6%, 1: 89.5%, 2-3: 91.2%, 4 + : 91.2%), and less likely to identify as Hispanic (0: 15.5%, 1: 12.1%, 2-3: 10.4%, 4 + : 9.8%). They were more likely to have preoperative gastroesophageal reflux disease (0: 31.2%, 1: 38%, 2-3: 41.4%, 4 + : 43%) and concomitant hiatal hernia repair (0: 19%, 1: 20.6%, 2-3: 22.2%, 4 + : 26.3%). These factors were associated with a significantly increased risk for multiple postoperative infusions (GERD: 2-3: 1.6[1.5-1.6], 4 + : 1.6[1.4-1.8], hiatal hernia repair: 2-3: 1.2[1.1-1.6], 4 + : 1.5[1.3-1.7]).

Conclusions: Maintaining hydration is essential after bariatric and metabolic surgery. Patients with preoperative GERD and concomitant hiatal hernia repair are at higher risk for requiring postoperative hydration therapy and may benefit from additional preoperative education or perioperative optimization prior to discharge.

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Analyzing Stapler Kinematics to Predict Per Os (PO) Intolerance After Robotic Sleeve Gastrectomies

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Introduction: Multiple studies have shown that the shape of the stomach in sleeve gastrectomies can affect patient outcomes, but limited research has defined the best way to achieve the optimal sleeve shape. Robotic surgery allows for the collection of precise kinematic and event data including the angles at which a stapler is fired. We hypothesize that the angles at which a stapler is fired determine the sleeve shape and can influence post-operative outcomes including per os (PO) intolerance.

Methods: The Intuitive da Vinci Surgical system and data Recorder were used to record 110 sleeve gastrectomies from 2 surgeons in our tertiary hospital center from March 2022 to April 2023. The sleeves were tailored over a 40 Fr Bougie and stapling was started at 6 cm from the pylorus from the midline port, placed 22 cm caudal to the xyphoid process. Two different objective performance indicators (OPIs), pitch (vertical angulation) and yaw (lateral angulation), were analyzed from the robotic stapler during the first stapler fire (Fig. 1). Patients who presented with severe PO intolerance, determined by vomiting more than once daily in the first 6 months after the procedure, underwent esophagastroduodenoscopy (EGD) ± dilation. Independent samples t-tests were performed between the two groups for each outcome and the two OPIs.

Results: Nine patients were found to have severe PO intolerance and underwent post operative EGD with 6 undergoing dilations with achalasia balloon (30-40 mm). Pitch and yaw were analyzed from these two groups (Fig. 2) and the mean pitch of the first stapler fire for patients with severe PO intolerance was 45.3 ± 9.5 degrees compared to 30.1 ± 16.1 degrees for those without PO intolerance (p = .006) (Fig. 3). The mean pitch of the first stapler fire for patients who underwent dilation was 45.7 ± 10.4 degrees compared to 30.5 ± 16.2 degrees for those who did not undergo dilation (p = .024) (Fig. 4). Yaw was not significantly different between the groups for either post operative outcome.

Conclusion: Our findings demonstrate that, with the aforementioned port configuration, having a more pronounced vertical angle with the first staple fire may result in sleeve spiraling and more PO intolerance amongst patients and so maintaining a straighter vertical angle may be preferable by lifting the stomach off the retroperitoneum. This study is the first step in identifying ideal stapler angles to prevent post-operative complications and could have significant impact on patient's well-being after sleeve gastrectomy.



Figure 1 Stapler Angular motion of the wrist defined as pitch and yaw.

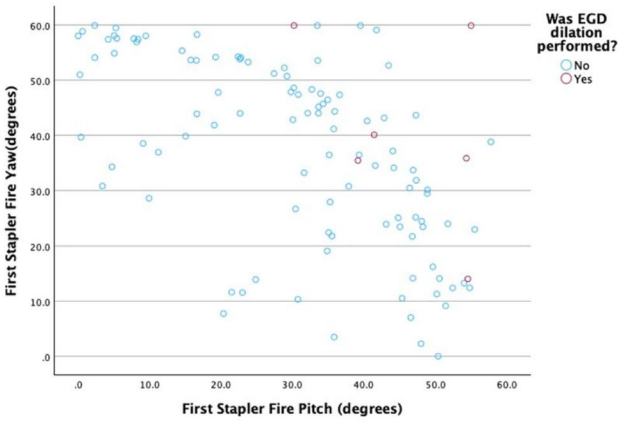


Figure 2 Angular Motion of First stapler fire for 110 cases

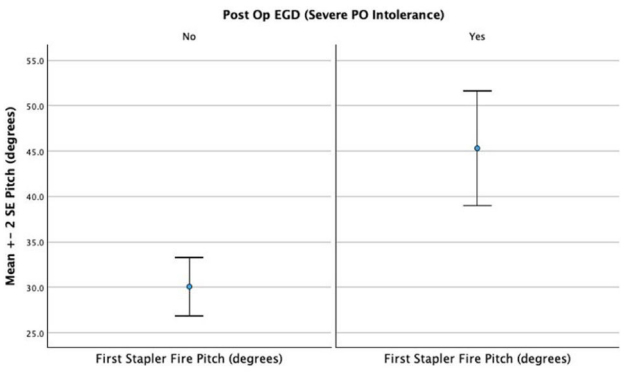


Figure 3

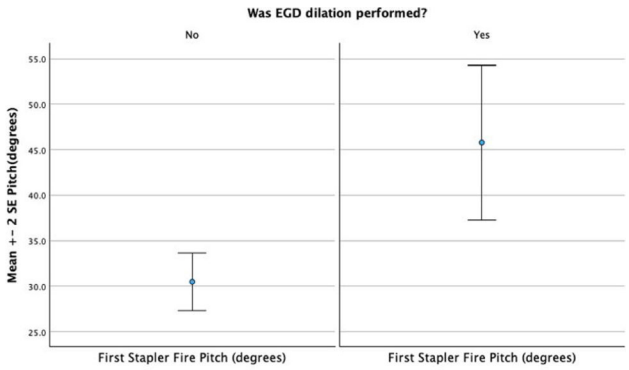


Figure 4

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Battle of the Procedures: Laparoscopic Sleeve Gastrectomy (LSG) Vs Banded Laparoscopic Sleeve Gastrectomy (B-LSG). A Systematic Review

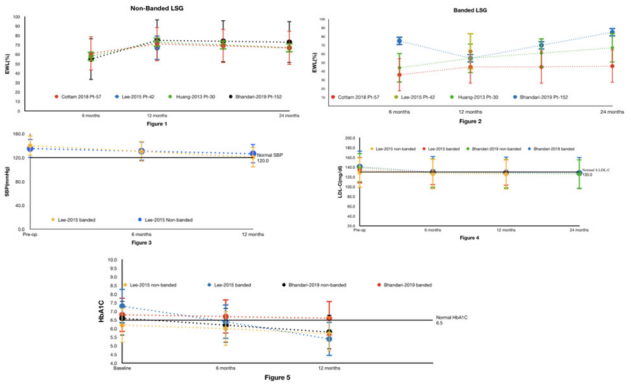
Purvil Joshi[1]; Hem Prajapati[1]; Melani E Lewis[2]; Christopher A Ibikunle[3]; Ahad Khan[3]; Jenny Huang[3]; [1]Medical College Baroda, Vadodara, Gujarat, India; [2]Bristol Medical School, University of Bristol, Bristol, United Kingdom; [3]Department of General Surgery, IBI Healthcare, Loganville

Introduction: How do the short and long-term weight loss outcomes of the Laparoscopic Sleeve Gastrectomy (LSG) compare to the Banded Laparoscopic Gastric Banding with Sleeve Gastrectomy (B-LSG), and how do they differ in the remission of obesity-related co-morbidities? Obesity is increasing in prevalence yearly and has become a significant growing concern worldwide (1). In the USA, adults and children have obesity rates of approximately 34% and 15% consecutively (1, 2). Consequently, the risk of developing co-morbidities such as type 2 diabetes and hypertension has become increasingly prevalent within the general population—more commonly seen in individuals with morbid obesity (1). Though there are multiple treatment options, there is good evidence that the evolving sub-speciality of bariatric surgery has the most effective methods for inducing significant weight loss and the reversal of obesity-related co-morbidities (1, 3). This review will focus on the laparoscopic approaches to Sleeve Gastrectomy (LSG) and Banded Sleeve Gastrectomy (B-LSG).

Methods: A systematic literature search was conducted using PubMed, Scopus and Google Scholars electronic databases. A comprehensive list of the outcomes of bariatric surgical procedures was extracted, focussing on articles published between 2000 and 2023. These studies were categorized into two groups: Banded LSG and Non-banded LSG. The outcomes of both groups were further classified into Excess Weight Loss (EWL%) and Resolution of Co-morbidities at 2-year Follow-up. Following the PRISMA guidelines, out of 61 articles found on data collection, full-text analysis was conducted on four publications, including both banded and non-banded LSG cases.

Results: A sub-group analysis of each group subjected to a follow-up years after participants' procedures show that Non-banded LSG has

slower Excess Weight Loss (EWL%) than Banded LSG. However, 24 months post-surgical procedure at the follow-up, the EWL% of both groups becomes almost identical (see Figs. 1, 2), and the reduction of co-morbidity markers for hypertension, high cholesterol and type 2 diabetes is virtually indistinguishable (see Figs. 3, 4 and 5).
Conclusion: The Non-banded LSG, though initially showing slower weight loss results than the Banded LSG, exhibits just as effective by the 2-year mark and the Comorbidities resolution was almost similar to each other.



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Roux-en-Y Gastric Bypass in the Setting of Incidentally Identified Malrotation

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Background: Incidental findings during bariatric surgery can create unexpected difficulty during the procedure. Intestinal malrotation is a congenital abnormality that arises if there is failure of the midgut to rotate 270 degrees counterclockwise and fix to the retroperitoneum during embryologic development. Prevalence of intestinal malrotation in bariatric surgery is calculated to be 0.025%, and a gap exists in our knowledge and literature regarding how to manage this congenital condition if incidentally identified at bariatric surgery. The objective of this study is to review a case series of incidental malrotation during bariatric surgery at a single academic institution. Furthermore, this series aims clarify associated preoperative clinical features, operative techniques, and postoperative clinical outcomes and complications.
Case Presentation: Six patients (4 female and 2 male) were incidentally diagnosed with malrotation while undergoing minimally invasive Roux-en-Y gastric bypass (RYGB). The mean age at the time of bariatric surgery was 43.7 years (range, 30 to 62 years). Mean body mass index (BMI) was 44.90 (range, 35.26 to 49.98). Two patients had prior abdominal surgery. None had presurgical cross-sectional imaging at our institution. Average mean operative time was 282.5 min (range, 174 to 419 min) and mean post-operative length of stay was 3.2 days (range, 2 to 5 days). Four of the patients had uneventful postoperative courses and two patients underwent exploratory laparotomy for concerns of small bowel obstruction and edema of the Roux limb.
Conclusion: While technically difficult, the authors demonstrated feasibility in completing a minimally invasive RYGB. However, the risks of complications can be higher, especially in patients with partial malrotation. Based off the cases, the authors describe an approach to RYGB for patients with incidentally identified malrotation. The approach includes considering whether to proceed with surgery, identifying the duodeno-jejunal junction or ligament of Treitz by running the bowel retrograde from the ileocecal junction, and assessing the ability of the biliopancreatic limb and the Roux limb to reach the stomach without mesenteric twists and with a pseudo-Peterson's to close. Additionally, the series highlights a need for transparency with the patient, increased vigilance of post operative small bowel complications, and consideration of the long-term effects on screening colonoscopy.

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The Effects of Marijuana on Post-Bariatric Surgery Patients

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Introduction: Marijuana decriminalization has prompted discussions surrounding its effect on bariatric surgery patients. As an appetite stimulant, marijuana may play a role in weight loss success post-operatively. Our objective was to compare weight loss trajectory and complications of post-operative bariatric patients in marijuana and non-marijuana users.
Methods: A prospective, single-institution analysis of patients who underwent bariatric surgery (Roux-En-Y Gastric Bypass, Sleeve Gastrectomy, and Gastric Band) from 05/01/2022-08/31/2023. Patients were surveyed at their first post-operative visit to evaluate their use of marijuana (defined as active use or use within one year of surgery) and consumption habits. Weight outcomes and complications were tracked at one-, three-, and six-month post-operative intervals. Patient characteristics and weight parameters were analyzed using descriptive, univariate, and multivariable linear regression statistics.
Results: There were 145 patients included. Twenty-nine(20%) patients endorsed marijuana use. Sixteen(11%) patients underwent gastric bypass, 127(88%) underwent sleeve gastrectomy, and 2(1%) underwent gastric band. The median age (40) was not different between marijuana and non-marijuana users. Median preoperative body mass index (BMI) was similar between marijuana and non-marijuana users (44.5[IQR:39.4-46.9] *vs* 43.4[IQR39.3-48.3], p = 0.735). There were no differences in median BMI decrease between the groups at 1 month (2.7[IQR:2-3.4] *vs* 2.8[IQR:2.3-3.7], p = 0.281), 3 months (6.6[IQR:4.7-8.8] *vs* 5.6[IQR:4.6-7.5], p = 0.204), and 6 months (8.3[IQR:6.3-11.7] *vs* 8.8[IQR6.6-10.5], p = 0.845). Complications within six months of surgery were similar (20% *vs* 9.5%, p = 0.093). When adjusting for age, gender, and surgery type, there were no differences in preoperative BMI or percent change in BMI at 1, 3, or 6 months in marijuana vs non marijuana users (Table).
Conclusion: There were no differences in weight loss or complications among marijuana and non-marijuana users. This suggests that marijuana use should not be a contradiction to bariatric surgery. Ongoing use of marijuana in the perioperative period for the treatment of sleep and anxiety may help with quality-of-life outcomes. Further long-term outcomes studies in this patient population are warranted.

Multivariable linear regression for percent difference (95% confidence interval) in BMI

	Preoperative BMI	BMI change at 1 month	BMI change at 3 months	BMI change at 6 months
Age	-0.08(-0.2–0.03)	-0.02(-0.04–0.003)	-0.03(-0.1–0.05)	-0.07(-0.1–0.01)
Female	1.5(-1.6–4.5)	-0.7(-0.2–0.3)	**-2.4(-4.4- -0.4)**	0.2(-1.8–2.2)
Sleeve Gastrectomy	-2(-5.4–1.4)	**-1.3(-1.3- -0.02)**	0.3(-2.1–2.7)	-0.9(-3.1–1.2)
Marijuana Use	0.04(-2.8–2.9)	-0.4(-0.9–0.1)	2(-0.1–4.1)	-0.5(-2.4–1.5)

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Do We Choose Different Weight Loss Procedures in Adolescents versus Adults? National Database Analysis

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Background: Weight loss surgery is increasingly prevalent in pediatric populations with the recent updated pediatric obesity management guidelines. We hypothesize that although the ASMBS has similar surgical recommendations for adult and pediatric bariatric populations, the choice of primary surgery may be skewed in the pediatric population.

Methods: The MBSAQIP reviewed from 2015-2020, for patients under < 18 (Peds) and those 19-30 yo (Adult). Data collected regarding demographics, BMI, procedure type and comorbidities including diabetes, OSA, Gerd, hyperlipidemia, and hypertension requiring multiple medications were analyzed. Only primary sleeves and gastric bypasses (GBP) were included. Data analyzed using Chi square through STATA was used to compare the different variables by the adult and pediatric age groups. P values were < .05.

Results: The peds group had 1895 pts (74% female vs 26% male, mean age was 17) versus 93,111 Adults (86.5% female vs 13.5% male, mean age was 26.0) in the same time period. 84.8% Peds (1606/1895) underwent a sleeve gastrectomy versus 75.7% Adults (70,478/93,111). 15.3% Peds (289/1895) had RGB vs 24.3% Adults (22,633/93,111). Comorbidities including hypertension, diabetes, OSA and hyperlipemia were observed. One notable finding was hypertension requiring > 3 medications was greater in the pediatric group (28.2% versus 16.8% Adult). Mean BMIs were similar in both groups peds vs adult (47 vs 41). If a peds patient was < 14 yo, 91.5% had a sleeve. Those 17-18 yo had a decrease incidence of a sleeve to 83%. As the adults aged, there was a trend toward more bypasses.

Conclusion: Pediatric patients are more likely to get a sleeve gastrectomy than young adults, especially if under the age of 14 yo. Hypertension that is difficult to control is greater in the pediatric population. As adults' approach 30 there is a higher percentage that get a gastric bypass. Patients 17-18 yo more closely follow the trends seen in adults.

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Revisional Bariatric Surgery, an East Asian Experience: Revision of Roux en Y Gastric Bypass to Sleeve Gastrectomy plus Laparoscopic Proximal Jejunal Bypass (LPJBSG)

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Introduction: Revisional Bariatric Surgery has grown in numbers as a significant number of patients experience weight regain and relapse of metabolic syndrome (type 2 diabetes and hypertension) following primary bariatric surgical procedures (Sleeve gastrectomy or Roux en Y Gastric Bypass). Revisional Bariatric Surgery is challenging as it requires shared decision making, necessity of carrying out a safe surgical procedure, with a smooth postoperative course which meets the goals of loss of expected weight loss and remission of metabolic syndrome without the sequalae of postoperative syndromes and nutritional disorders.

Laparoscopic Proximal Jejunal Bypass with Sleeve Gastrectomy (LRJBSG) is a primary and revisional surgical procedure which meets the above criteria and has been successfully performed at our center since 2017.

We present our experience of revision of Roux en Y Gastric Bypass to LPJBSG.

Methods and Procedures: Six patients who had experienced either significant weight regain (upto BMI: 45 kg/m2) or relapse of Type 2 Diabetes following Roux en Y Gastric Bypass as a primary bariatric surgical procedure, were operated for LPJBSG. All patients were carefully worked up and optimally prepared for the revisional procedure. Our technique is first,to take down the roux en y gastric bypass, restoring the gastric continuity, and performing a standard sleeve gastrectomy. Second, the previous Jejunal jejunal anastomosis is taken down and a new jejunal jejunal anastomosis is constructed such that there is total alimentary limb length of 300 cm and the rest is turned into a blind limb.

Results and Follow up: All the patients had a smooth postoperative course and were managed on the surgical floor on a standard postoperative protocol: allowed sips of water on the first postop to a liquid diet on discharge. Analgesic requirements were moderate and all had an early ambulation. All patients were followed up in the Clinic and all of the patients met the expected weight loss criteria.

Conclusion: LPJBSG is a safe bariatric surgical procedure for treatment of weight regain following RYGB.

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Metabolic and Bariatric Surgery in Adolescents: A Single Center's Seven-Year Update

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Introduction: Metabolic and bariatric surgery (MBS) is gaining traction as a treatment option for adolescents with severe obesity. Since our weight center last published results, trends have shown increasingly diverse patient populations and a predominance of laparoscopic sleeve gastrectomy (LSG) over roux-en-Y gastric bypass (RYGB). We sought to assess recent outcomes including complications and weight loss among our center's adolescent MBS patients. Additionally, identifying factors that predict optimal post-operative outcomes following MBS will aid patient selection, counseling, and

care pathway improvement. We hypothesized that pre-operative factors or early post-operative weight loss may be associated with long-term weight loss.
Methods and Procedures: This is a retrospective cohort analysis of patients under 21 years of age with severe obesity who underwent MBS at a single institution in the northeast USA between January 2014 and December 2020. Data on patient demographics, comorbidities, body mass index (BMI), and percent of total body weight loss (%WL), as well as subsequent complications including reoperations, were collected via chart review and summarized. We used multiple regression to assess for associations between sex, age, pre-operative BMI, number of comorbidities, duration in the weight loss program, %WL at 6 months, and most recent %WL among patients with at least one year of follow up.
Results: There were 80 patients including 74% females; 54% were White, 24% were Hispanic, and 15% were non-Hispanic Black. The median age at surgery was 18.2 years, and the youngest patient was 13.6 years. Pre-operatively, median BMI was 50.2, and 74% of patients had at least one diagnosed comorbidity. The majority (80%) of patients underwent LSG. Three-fourths of patients had follow-up data beyond 1 year, and 50% beyond 3 years. Regarding complications, there were no mortalities. One patient underwent a conversion from LSG to RYGB and then a diagnostic laparoscopy, and 9 patients (11%) developed biliary disease requiring laparoscopic cholecystectomies. Regarding outcomes, the mean %WL was 26.7% for patients with latest follow up between 1 and 3 years, and 23.3% for those with follow up beyond 3 years. Regression showed no significant associations between any of the variables of interest and %WL (all $p > 0.05$).
Conclusions: This study, which serves as an update from a previous series at our center now involving nearly half non-White patients and a predominance of LSG, adds to a growing body of evidence indicating that MBS is a safe and effective method of achieving weight loss in adolescents with severe obesity.

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"Hat Trick" Bariatric Surgeries: Outcomes After Gastric Band Conversion to Sleeve Gastrectomy to Gastric Bypass

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Introduction: There has been a sharp rise in revisional bariatric surgery, currently making it the third most common procedure overall. As a result, there have been cases of "hat trick" bariatric surgeries with the initial conversion of the adjustable gastric band (AGB) to sleeve gastrectomy (SG) followed by Roux-en-Y gastric bypass (RYGB). We aimed to evaluate the outcomes of this subset of patients at our institution in order to help guide surgical planning after failed AGB.
Methods and Procedures: Between 2008 to 2022, patients who had undergone "hat trick" bariatric surgeries at a single healthcare system were identified. The median post-operative follow-up after RYGB was 12.9 months. Data was analyzed using McNemar's test and Wilcoxon signed rank test.
Results: A total of 41 patients were included (92.7% female) with initial mean body mass index (BMI) of 45.6 kg/m2. The main reasons for conversion from AGB to SG were insufficient weight loss/weight regain (65.9%) or reflux (39.0%). Revision from SG to RYGB was chiefly due to reflux (73.2%) and weight (51.2%). A total of seven 30-day post-operative complications including stricture, leak, hernia, and bleeding were seen in six patients (AGB 0; SG 4; RYGB 3) without significant difference in complication rates between AGB to SG and SG to RYGB. Mean BMI was 40.1 kg/m2 following AGB, 37.0 kg/m2 after SG, and 33.6 kg/m2 12 months after RYGB (Figure). Of the co-morbidities evaluated, there was no significant change in HTN, DM, and OSA after conversion. There was a significant increase in reflux with conversion to SG (43.9% to 75.6%, $p = 0.003$) but with significant improvement after revision to RYGB (75.6% to 41.2%, $p < 0.001$). This correlated with a significant increase in PPI/H2 blocker usage after conversion to SG (34.2% to 82.9%, $p < 0.001$) and with a trend towards decreased medication use after RYGB (68.3%, $p = 0.083$).
Conclusion: "Hat trick" bariatric surgeries or conversion of failed AGB to SG followed by RYGB have become more common due to insufficient weight loss/weight regain and reflux. After the final conversion to RYGB, patients saw enhanced weight loss and improved reflux symptoms. Although "hat trick" bariatric surgeries are a viable option, RYGB may be considered as the initial revisional procedure in patients with failed AGB and reflux to minimize the risks and cost of an additional operation.
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Retrospective Study Examining Impact of Implementation of a Bariatric Enhanced Recovery After Surgery Protocol on Post-Operative Opioid Consumption at a High-Volume Bariatric Centre in Ontario

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Introduction: Enhanced Recovery After Surgery (ERAS) protocols have been shown to decrease opioid use, length of stay and re-admissions in patients undergoing multiple types of abdominal surgery. An ERAS protocol was implemented in 2020 in our high-volume bariatric centre for patients undergoing bariatric surgery. This protocol consists of pre-operative pharmacological analgesia and nausea prophylaxis, intra-operative regional anesthesia, and post-operative multimodal analgesia. The purpose of this study is to determine the effect of ERAS implementation on post-operative outcomes in this patient population, specifically opioid use and post-operative pain.
Methods: A retrospective chart review was undertaken for patients who underwent bariatric surgery at a high-volume center between April 1st 2019 and March 31st 2022. Patients who underwent bariatric surgery in the year preceding ERAS implementation were compared to those who underwent surgery in the year following ERAS implementation. Patient characteristics and surgical outcomes were collected from the Ontario Bariatric Registry. Pain scores (using visual analogue scale) and medication administration were recorded by nursing during the patients' hospitalization and collected retrospectively from the hospital's electronic medical record. Comparison

was made for all variables between the pre-ERAS group and the ERAS group.
Results: Three hundred patients from the study period were included in the study, 150 in the pre-ERAS group and 150 in the ERAS group. There was a significantly lower average of total oral morphine equivalent intake in the ERAS group in the first twenty-four hours post-op (44.7 vs 60.3 mg, p-value < 0.001). Length of stay was significantly shorter in the ERAS group (37.6 vs 67.1 h, p-value < 0.001). Pain scores subjectively described by patients on a scale between 1 and 10 displayed a trend towards lower scores in the ERAS group. Post-operative adverse events were similar in both groups.
Conclusion: This study demonstrates the benefits in implementation of an ERAS protocol in bariatric surgery patients, first in reducing post-operative opioid consumption and second in reducing hospital length of stay without contributing to additional adverse events.

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Semaglutide and Tirzepatide for the Management of Weight Recurrence Following Sleeve Gastrectomy

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Introduction: Metabolic and bariatric surgery (MBS) is considered one of the most effective treatment modalities for achieving weight loss, however approximately 20–25% of patients experience considerable weight regain that occurs after achievement of an initial successful excess weight loss of greater than 50%. This study aimed to determine the clinical effectiveness of semaglutide and tirzepatide as an adjunct therapy for managing weight regain and inadequate weight loss following sleeve gastrectomy (SG).
Methods: A retrospective analysis was conducted on 136 individuals with post-MBS weight recurrence, who were treated with semaglutide (n = 86) or tirzepatide (n = 50) at a private clinic.
Results: The mean pre-MBS weight and BMI was 117.8 (27.5) kg and 43.5 (8.8) kg/m2. The mean post-MBS weight and BMI was 78.1 (17.9) kg and 29.1 (5.5) kg/m2, representing a weight loss percentage of -32.8 (10.3) %. The mean (± SD) pre-treatment weight and BMI was 94.6 (24.6) kg 35.3 (6.7) kg/m2, representing a weight regain percentage of 24.2 (23.0) %
Following a semaglutide treatment, the mean post-treatment weight at 3-months and 6-months was 83.9 (19.9) kg and 80.3 (19.6) kg from 91.1 (21.0) kg, corresponding to a statistically significant mean weight change from baseline to 3-months of -6.6 (5.5) % ($p < 0.05$) and to 6-months of -10.7(5.8) % ($p < 0.05$). Following a tirzepatide treatment, the mean post-treatment weight at 3-months was 92.3 (37.5) kg from 100.9 (30.4) kg, corresponding to a statistically significant mean weight change from baseline to 3-months of -9.4 (5.8) % ($p < 0.05$). Weight loss percentage in tirzepatide group at 3-months was significantly greater than the semaglutide group at 3-month.
Conclusion: The use of semaglutide and tirzepatide may be an effective adjunct treatment for managing excessive weight regain or insufficient weight loss in patients who had sleeve gastrectomy. Treatment with tirzepatide resulted in greater weight loss when compared to semaglutide, however larger sample size and longer follow-up periods are needed to strengthen the evidence on the benefits and safety of this treatment approach.

P174

Understanding a Rare Event: Early Marginal Ulceration After Primary RYGB in the MBSAQIP 2015-2021

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Introduction: Early and late marginal ulceration (MU) are known complications following Roux-en-Y gastric bypass (RYGB). While late MU formation is better understood with identified risk factors (e.g. nicotine, NSAIDs, H. pylori), early marginal ulceration (within 30 days) is less well described due to its lower frequency. While prior studies have suggested a low rate of early marginal ulceration, only generalized preoperative risk factors such as coagulopathy, vasculopathy, and severity of obesity were identified. Thus, we hypothesized that early MU following primary RYGB would be associated with specific factors that might help identify patients at risk perioperatively.
Methods: Using all available data from the Metabolic and Bariatric Surgery Quality Improvement Project (MBSAQIP 2015-2021), a total of 1,346,468 records were examined, with 345,112 patients undergoing primary RYGB. After excluding revisions, conversions, pediatric cases, non-binary gender, missing BMI data, and missing operative time. 291,625 patients were included in the study cohort and all reported cases of early MU were identified. Patient characteristics and case information were compared in cases with and without a diagnosis of early MU and modeled to identify at-risk patients.
Results: Early MU occurred in 840 of 291,625 (0.29%) or $\sim$ 1 in 350 patients. Comparison of baseline patient characteristics suggested higher rates of early MU as a function of BMI ($p = 0.0151$), Race ($p < 0.0001$), history of DM ($p < 0.0001$), history of PTC ($p < 0.0001$), history of DVT ($p < 0.0001$), history of PE ($p = 0.0005$), immunosuppressive therapy status ($p = 0.0006$), and anticoagulation status ($p < 0.0001$). Early MU did not have a significant association with smoking status ($p = 0.0881$). Comparison of procedural details suggested higher rates of early MU as a function non-metabolic and bariatric surgeon ($p = 0.0410$), and longer operative time($p = 0.0008$). Rare events logistic regression modeling of early MU demonstrated significant associations with age ($p = 0.002$), insulin dependent diabetes ($p < 0.001$), history of PTC ($p < 0.001$), history of DVT ($p < 0.001$), immunosuppressive therapy status ($p < 0.001$), and anticoagulation status ($p < 0.001$).
Conclusions(s): Early MU is a rare complication. Overall occurrence of early MU is lower than previously reported, suggesting possible improvement in preoperative patient optimization, patient selection, and/or operative technique. Interestingly, smoking status – a well-known association of Late MU—does not appear to be associated with early MU. Continued monitoring of factors influencing the development of this rare event will improve the perioperative management of at-risk patients.

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Is Suboptimal Weight Loss After Index Bariatric Surgery Predictive of Similar Response After Revision Surgery

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Introduction: There has been an uptrend in revision weight loss surgery (rWLS). In 2020, 11% of all bariatric procedures performed in the United States were revisional procedures. Studies suggest about 50% of rWLS are performed due to inadequate weight loss or weight recurrence. Although this is the most common indication, there is no known prognostic factor to help target the individuals likely to require rWLS due to suboptimal weight loss after index bariatric operation. This study aims to evaluate if there is a relationship between poor weight loss after index weight loss surgery and poor response after rWLS.
Methods: This retrospective cohort study included adults from a single institutional database of patients who underwent rWLS surgery between 2016-2018 with indications of weight stalling, inadequate weight loss, and weight regain. Patients who had revision weight loss surgery for any other indications, not mentioned above, were excluded. The database included preoperative BMIs and postop BMI nadirs of both index and revision surgeries, respectively.
Results: A total of 33 patients who underwent rWLS for the indication of weight gain or inadequate weight loss were included. Mean BMI at index surgery was 54.8 $\pm$ 13.9 kg/m2 as compared to a mean nadir BMI after index surgery of 34.4 $\pm$ 7.7 kg/m2 and this corresponded to a 20.4 mean change in BMI. We used the median change in BMI at the nadir after index bariatric surgery of 18.1 to categorize our population into groups A and B. The unpaired t-test comparing the nadir BMI change of group A (Mean = 8.8, SD = 5.6) and B (Mean = 7.3, SD = 3.6) after rWLS was not statistically significant ($p > 0.05$ for 95% confidence interval). Other notable findings include the timing of the largest nadir BMI change which occurred around an average of 26.8 $\pm$ 45.5 months from the date of index bariatric surgery. The mean nadir BMI after rWLS was 36.0 $\pm$ 8.4 kg/m2 which corresponds to 7.8 mean change in BMI.
Conclusion: Our results show that there is no statistically significant difference in post-operative rWLS weight reduction as it relates to prior weight loss following index bariatric surgery. These results support the current recommendations to continue to offer revision bariatric surgery to patients with suboptimal weight loss after index bariatric surgery while they are optimized with dietary, lifestyle or pharmacologic measures.

P176

Comparison of Postoperative Pain Scores and Operative Duration Between LiVac Retraction Device and Traditional Liver Retractor Systems

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Objective: To compare operative duration and postoperative pain scores in patients undergoing bariatric surgery using a LiVac retractor versus a traditional Nathanson liver retractor.
Background: Liver retraction allows adequate visualization of the esophageal hiatus in bariatric surgery. Traditional liver retractors require a dedicated port and involve additional liver manipulation. The LiVac Retractor does not require and an additional trocar and minimizes liver manipulation, allowing the potential to reduce postoperative pain. The aim of this study was to compare postoperative pain in patients undergoing bariatric surgery using a LiVac retractor versus a traditional liver retractor.
Methods: A retrospective review was performed of patients who underwent laparoscopic sleeve gastrectomy, Roux-en-Y gastric bypass, and bypass revision between 2017-2022 using either a traditional (Nathanson) or the LiVAC retractor. Variables, including post anesthesia care unit (PACU) pain scores, use of narcotic pain medication during PACU stay, duration of PACU stay, and surgery time, were evaluated. All patients were operated on by the same surgeon, were placed in the same PACU, and managed postoperatively by the same anesthesia staff.
Results: A total of 166 patients were included, of which 115 used the Nathanson Liver Retractor and 51 used the LiVAC Retractor. Compared to the traditional retractor group. LiVAC group had a significantly shorter median operative duration (174.0 vs. 149.0 min, $p = 0.01$). There was no significant difference in median postoperative pain scores between groups (5.0 vs. 5.0, $p = 0.51$).
Conclusion: Compared to using a traditional liver retractor in bariatric surgeries, the LiVac retractor is associated with decreased operative time but does not seem to affect postoperative pain. Larger studies are warranted to further elucidate if utilization of the LiVAC retractor can affect postoperative pain.

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Characterizinig Features of Dehydration in Patients with Early Marginal Ulcer After Roux-en-Y Gastric Bypass

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Introduction: The prevalence of marginal ulcers (MU) after Roux-en-Y gastric bypass (RYGB) ranges from 0.6%-25% and is divided into early (< 90-days) or late (> 90-days) after surgery, with most occurring early (eMU). The literature is replete with studies examining factors associated with MUs including surgical technique, pouch size, staple height/diameter, helicobacter pylori infection, diabetes, smoking, acid-suppression therapy, and use of NSAIDs. However, the prevalence of eMUs continues despite optimal management. Anecdotally, we noticed that patients with symptoms of, or intervention for, dehydration developed eMUs. Therefore, we examined the association of eMU formation and dehydration within 90-days post-operatively.
Methods: After IRB approval, a retrospective study compared patients who developed eMU (n = 43) to those without (n = 316; control [CNT]) within 90-days of primary laparoscopic RYGB. Patients were compared across three domains of care: preoperative (i.e.,baseline medical/social history), peri-operative (i.e.,IV/po fluid intake, anti-emetic use, and LOS), and post-operative (i.e.,reported symptoms at the clinic/ED, and incidence of hydration). Univariate analysis was performed using Kruskal-Wallis tests for continuous variables and chi-squared, or Fisher's exact tests for categorical variables. A $p < 0.05$ was considered significant.
Results: Preoperative: Compared to CNT, the eMU group was less likely to have baseline GERD (46.5% vs 66.8%, $p = 0.0093$), but more likely to be using nonselective NSAIDs (20.9% vs 10.1%, $p = 0.0366$), and to be started on a PPI post-screening upper EGD (19.4% vs 7.3%, $p = 0.0174$). While not statistically significant, the pre-operative prevalence of gastric ulcers (11.8% vs 3.0%, $p = 0.0679$) and H. pylori (16.7% vs 7.8%, $p = 0.0783$) was higher in the eMU group. There were no differences in sex, race, insurance, smoking status, BMI, or obesity-related comorbidities.

Perioperative: There were no differences between groups across examined variables including IV/PO fluid intake, anti-emetic use, ulcerogenic discharge medications, and hospital length of stay.

Postoperative: Postoperative EGD demonstrated a 12% eMU rate detected ~ 45-days after surgery. Compared to CNT, the eMU group were more likely to present to the ED with nausea within 14-days (11.63% vs 4.11%, p = 0.0342) and 30-days (20.93% vs 3.48%, p < 0.001). Further MU patients were more likely to receive ED IV hydration (16.3% vs 6.3%, p = 0.02 and 32.6% vs 10.4%, p < 0.0001; < 14 and < 30-days respectively).

Conclusion: The need for ED IV hydration as early as 14-days after surgery is associated with eMUs, suggesting an opportunity for more aggressive early prophylactic outpatient hydration. Additionally, given the association with new PPI administration, perhaps earlier gastric "priming" is warranted. Future studies are aimed at examining these avenues.

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Venous Outcomes After Metabolic and Bariatric Surgery in Patients with History of Deep Vein Thrombosis—An MBSAQIP Perspective

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Background: The relationship between obesity and deep vein thrombosis (DVT) is well-established, as chronic inflammation, altered cytokine profiles, and impaired perfusion physiology increase the risk of thrombosis. Metabolic and bariatric surgery (MBS) is an effective treatment for severe obesity, but it carries a significant risk of perioperative venous complications. These include venous thromboembolic events (VTEs) and pulmonary emboli (PE), which increase perioperative morbidity and mortality. Although history of DVT may further increase the risk of complications, the impact of such thrombosis on postoperative outcomes is worthy of investigation. This study aims to investigate the venous outcomes after MBS in patients with a history of DVT.

Methods: To investigate the impact of history of DVT on postoperative outcomes following MBS, a retrospective analysis was conducted using the MBSAQIP 2015-2018 participant usage file (PUF) database. A logistic regression test was performed to identify independent predictors of venous complications, including pulmonary emboli (PE) and venous thromboembolic events (VTE), as well as 30-day mortality after bariatric surgery in patients with a history of DVT.

Results: Out of 760,076 patients, 13,104 had history of DVT, and these patients had a significantly higher incidence of postoperative venous complications, including VTE (OR = 6.76; P < 0.001) and PE (OR = 4.61; P < 0.001), as well as an increased risk of mortality (OR = 4.09; P < 0.001; CI 95 = 3.136-5.349). Regression tests revealed that male gender (OR = 1.8; P = 0.032; CI 95 = 1.052-3.063) and smoking (OR = 1.96; P = 0.044; CI 95 = 1.018-3.760) were associated with increased risk of PE. Hyperlipidemia (OR = 0.463; P = 0.015; CI 95 = 0.248-0.862) was associated with reduced risk of PE. An inferior vena cava filter did not show a statistically significant prophylactic benefit against PE (P > 0.05). In addition, inferior vena cava filter for VTE (OR = 1.57; P = 0.032; CI 95 = 1.039-2.366) and therapeutic aspirin use in the preoperative period (OR = 1.39; P = 0.003; CI 95 = 3.136-5.349) were associated with increased risk. Coronary interventions (OR = 0.468; P = 0.026; CI 95 = 0.239-0.915) were found to be associated with reduced risk.

Conclusion: In the preoperative period, patients with a history of DVT have an increased risk of mortality and venous complications. Considering the independent predictors for venous complications, it is seen that the effectiveness of prophylactic IVC filters and aspirin use should be discussed in a multidisciplinary environment and with the patients to ascertain their risk to benefit ratio and prevent unnecessary interventions.

Table 1. History of DVTs as an independent predictors of venous system complications

Outcome	Odds Ratio	P-value
Venous thromboembolism	6.76	0.001
Pulmonary Embolism	4.61	0.001
Mortality	4.1	0.001

Table 2. Predictors of Pulmonary Embolism

Outcome	Odds Ratio	P-value	CI 95
Male Gender	1.8	0.032	1.052-3.063
Smoking	1.96	0.044	1.018-3.760
Hyperlipidemia	0.463	0.015	0.248-0.862

Table 3. Predictors of Pulmonary Embolism

Outcome	Odds Ratio	P-value	CI 95
IVC Filter (VTE)	1.57	0.032	1.039-2.366
Therapeutic Aspirin	1.39	0.003	3.136-5.349
Coronary Interventions	0.468	0.026	0.239-0.915

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The Association of Preexisting and Postoperative Gastroesophageal Reflux Disease with Early Interventions Following Sleeve Gastrectomy: An Analysis Of The ACS-MBASQIP Database

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Introduction: The sleeve gastrectomy (SG) is the most commonly performed bariatric surgery in the United States. While weight loss can lead to resolution of gastroesophageal reflux disease (GERD), due to alteration in esophageal and gastric anatomy following SG, it is possible that SG can lead to new or worsening GERD despite weight loss. The purpose of our study was to determine if there is an association between preoperative GERD and early 30-day interventions following SG. We hypothesize that a preexisting diagnosis of GERD is associated with more 30-day re-interventions following SG.

Methods and Procedures: All patients undergoing first-time, elective laparoscopic SG for morbid obesity from 2015-2019 were identified within the American College of Surgeons Metabolic and Bariatric Surgery Quality Improvement Program Database (ACS-MBSAQIP). The association between preoperative GERD diagnosis and 30-day interventions, including treatment for dehydration, esophagogastroduodenoscopy (EGD), and reoperation, were investigated. A generalized Linear Mixed Model (GLMM) was utilized to provide a robust framework for analyzing the hierarchical structure of the data. To control for confounding variables and ensure a balanced

comparison between cohorts, propensity score matching was employed as a verification method.
Results: A total of 603,782 patients met inclusion criteria; 168,066 (28%) had a preoperative diagnosis of GERD. There was a statistically significant association between GERD and 30-day interventions ($p < 0.0001$). The most common intervention was therapeutic EGD ($p = 0.0001$). Patients with a preoperative diagnosis of GERD were more likely to undergo treatment for dehydration ($p < 0.0001$) and reoperation within 30-days of surgery ($p < 0.0001$).
Conclusion: A preexisting diagnosis of GERD is associated with more 30-day re-interventions following SG. The long-term sequela of these interventions with respect to long-term success of SG requires further investigation.

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Six-Year Analysis of Laparoscopic vs. Robotic Sleeve Gastrectomy Outcomes: MBSAQIP Database Study

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Introduction: Sleeve gastrectomy is a popular weight loss procedure, predominantly performed via laparoscopy, although robotic techniques are gaining popularity. This study compares robotic and laparoscopic sleeve gastrectomy in the MBSAQIP database regarding preoperative morbidity, demographics, intraoperative factors, and postoperative outcomes.
Methods and Procedures: We analyzed 692,380 cases in the MBSQIP database (2016-2021) with CPT code 43775 for primary sleeve gastrectomy, excluding emergency, conversion, revisional, endoscopic, prior other foregut surgery, and open cases. We compared preoperative demographics, morbidity, and intraoperative nuances using statistical tests (chi-square and t-test) and analyzed postoperative outcomes with multivariate logistic regression (STATA version 15). Serious morbidity was defined as a composite variable with organ space infection, wound disruption, ventilator dependence, acute kidney injury, progressive renal failure, cerebrovascular accident, cardiac arrest, myocardial infarction, transfusion requirement, pulmonary embolism, sepsis, septic shock, coma, bowel obstruction, or GI bleeding.
Results: 600,779(86.76%) patients underwent laparoscopic sleeve gastrectomy, while 91,601(13.24%) underwent robotic sleeve gastrectomy. Laparoscopic cases were performed in significantly higher percentages ($p < 0.01$) of white patients, Hispanic patients, smokers, and with the use of staple line reinforcement. Robotic cases were performed in patients with higher percentages ($p < 0.05$) of non-white ethnicities and comorbidities (hypertension, GERD, immunosuppression, sleep apnea). Robotic procedures had significantly ($p < 0.01$) longer operative times, more mid-level provider assistance or no assistance, more staple line over-sewing, and routine swallow evaluations. Postoperative outcome analysis of laparoscopic sleeve gastrectomy cases showed significantly lower odds of serious post-op morbidity (OR: 0.82 (0.77-0.88); $p < 0.01$), surgical site infection (OR: 0.8 (0.72-0.88); $p < 0.01$) and transfusion requirement (OR 0.8 (0.73-0.88); $p < 0.01$). The laparoscopic group had higher odds of unplanned ICU admission (OR: 1.2 (1.07-1.33); $p < 0.01$), hospital stay > 2 days (OR: 1.24 (1.20-1.28); $p < 0.01$) and outpatient dehydration treatment (OR: 1.22 (1.17-1.27), $p < 0.01$). The two groups had no significant difference in 30-day mortality and leak rate.
Conclusion: Robotic sleeve gastrectomy patients exhibit higher instances of serious postoperative morbidity and infectious complications, but shorter hospital stays and less need for intraoperative assistants. Further research is needed to refine the use of this state-of-the-art technology.

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Patient Factors Independently Predict Selection for Primary Robotic Bariatric Surgery: An MBASQIP Analysis Of 318,151 Patients

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Introduction: Adoption of robotic bariatric surgery has increased dramatically over the last decade. Yet, while outcomes comparing bariatric and laparoscopic approaches continue to be debated, little is known about patient factors responsible for the growing delivery of robotic bariatric surgery. A better understanding of these factors will help to better guide planning of bariatric delivery and resource allocation.
Methods and Procedures: Data was extracted from the MBSAQIP registry from 2021 to 2022. Patient population was organized into two cohorts (1) those who underwent a primary robot bariatric procedure (Sleeve gastrectomy (SG) or Roux-en-Y gastric bypass (RYGB)) and (2) those who underwent a laparoscopic procedure. Bivariate analysis and multi-variable logistic regression modeling were conducted to characterize differences between the cohorts and identify independent patient predictors of robotic selection.
Results: Of 318,151 patients, 65,951 (20.7%) were identified as having undergone a robot assisted bariatric procedure. Patients undergoing robotic procedures were older (43.4 ± 11.8 vs. 43.1 ± 11.8; $p < 0.0001$) and had a higher body mass index (BMI) (45.4 ± 7.9 vs. 45.0 ± 7.6; $p < 0.0001$). Robotic cases also had higher rates of medical comorbidities including sleep apnea (38.0% vs. 36.8%, $p < 0.0001$), hyperlipidemia (23.5% vs. 21.7%, $p < 0.0001$), GERD (32.4% vs. 29.8%, $p < 0.0001$), and medication-dependent diabetes (23.7% vs 22.6%; $p < 0.0001$). The majority of patients underwent SG (73.3%) with robotic cases more likely to undergo RYGB (27.4% vs. 26.4%; $p < 0.001$). Patients undergoing robotic procedures had higher rates of post-operative complications (3.2% vs. 2.8% $p < 0.0001$) including higher rates of 30-day readmission (3.3% vs. 2.8%, $p < 0.0001$) on univariate analysis. After adjusting for comorbidities, independent predictors of robotic procedural selection include increased BMI, female sex, GERD, metabolic dysfunction, RYGB, black racial status, and reduced nutritional status.
Conclusion: After adjusting for comorbidities, patients with a greater burden of metabolic comorbidities, of black racial status and those undergoing RYGB were more likely to receive robotic bariatric surgery. There was no significant difference in serious complications with a robotic approach after adjusting for comorbidities. A more comprehensive understanding of patient factors fueling the adoption of robotic delivery is needed in order to better guide healthcare resources as the landscape of bariatric surgery continues to evolve.

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Banded Mini Gastric Bypass for Obese and Super-obese Patients—A Single Israeli Institution Experience

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Background: The prevalence of super-obese patients (body mass index (BMI) $\geq$ 50) has significantly increased over the past three decades, surpassing the rise in the general population of overweight patients. Weight loss outcomes after bariatric surgery in super-obese patients are less favourable, with a higher incidence of weight regain. To address this issue, variations of existing bariatric procedures have been proposed. One such variation is the addition of a gastric band to limit the expansion of the newly created pouch. Limited data exist regarding the effectiveness of the banded one anastomosis gastric bypass (BOAGB) procedure compared to other bariatric surgeries.
Method: A retrospective study compared all patients who underwent the BOAGB procedure at the bariatric surgery unit in the Soroka University Medical Center with a post operative follow-up of at least 1 year, with patients who underwent the one anastomosis gastric bypass (OAGB) or sleeve gastrectomy (SG) procedures. Data collected included demographic information, comorbidities, surgical outcomes, complications, and postoperative quality of life assessments.
Results: During the relevant study period, 24 patients underwent the BOAGB procedure, 43 underwent OAGB, and 44 underwent SG. The BMI was significantly higher in the BOAGB group compared to the other procedures. Additionally, a higher prevalence of diabetes was observed in the BOAGB group. The duration of surgery was significantly longer for the BOAGB procedure. No significant differences were found in surgical complications. Overall, all procedures resulted in significant excess weight loss (EWL), improvement in comorbidities, and improved quality of life postoperatively.
Conclusions: The BOAGB procedure, similar to OAGB and SG, demonstrated favorable weight loss outcomes and weight maintenance one year postoperatively, without significant differences between the procedures. The BOAGB procedure is a relatively new procedure with good bariatric outcomes and a favorable safety profile. Long-term research is needed to further evaluate the efficacy of different bariatric procedures.

P185

Robotic Sleeve Gastrectomy and Staple Line Leak and Bleeding: A Two Technique Comparison

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Objective: This study compares the robot-assisted sleeve gastrectomy (RSG) staple line leak rates, staple line bleeding rates, and perioperative morbidity between two surgical techniques: staple line oversew (SLO) with absorbable suture and staple line buttress (SLB) with bioabsorbable polyglactin and polydioxanone (Echelon Endopath).
Background: Staple line leaks and bleeding negatively impact postoperative outcomes and increase hospital cost and patient morbidity. Staple line reinforcement is an operative technique used to mitigate staple line leaks and bleeding but there is no standard practice.
Methods: A prospective comparative study was conducted during a 32-month period (December 2020 to July 2023) on consecutive patients undergoing RSG at a single institution. Patients in the SLO group underwent staple line reinforcement with a running absorbable (3-0 V-loc) suture. The SLB group received staple line reinforcement with Echelon Endopath. Exclusion criteria included concomitant procedures except hiatal hernia repair.
Results: A total of 518 patients were included in the analysis, 445 patients comprised of the SLO group, and 73 patients were included in the SLB group. Both groups had similar patient characteristics with no significant differences in mean age, BMI, and percentage of patients with higher preoperative morbidity (ASA > 3). In the SLO group, the mean age was 41 years ($\pm$ 11), the average BMI was 44 $\pm$ 10. In the SLB group, the mean age was 37 years ($\pm$ 8), the average BMI was 46 $\pm$ 7. There was no significant difference in the operative times, SLO (51 min, $\pm$ 27) and SLB (60 min, $\pm$ 18). The average length of stay was less than 2 days (SLO 1.5 $\pm$ 0.6, SLB 1.4 $\pm$ 0.5). There were no staple line leaks observed in either group. There were 5 cases (1.1%) of staple line bleed in the SLO group and no cases in the SLB group. Two patients (0.4%) in the SLO group required reoperation for bleeding. There were no cases of intraoperative morbidity. Postoperative morbidity was 3.0% (SLO) and 2.6% (SLB), with no difference between the two groups, p = 0.77. The most common complication was dehydration. Similarly, the 90-day readmission rate was 3.2% (SLO) and 2.7% (SLB), with no difference between the groups, p = 1.0.
Conclusion: No staple line leaks were encountered in this consecutive cohort of robot-assisted sleeve gastrectomies. The use of SLO and SLB resulted in equivalent outcomes. While both operative techniques had similar clinical outcomes, they do have markedly different operative costs. The staple line oversew technique is a cost-effective alternative for staple line reinforcement.

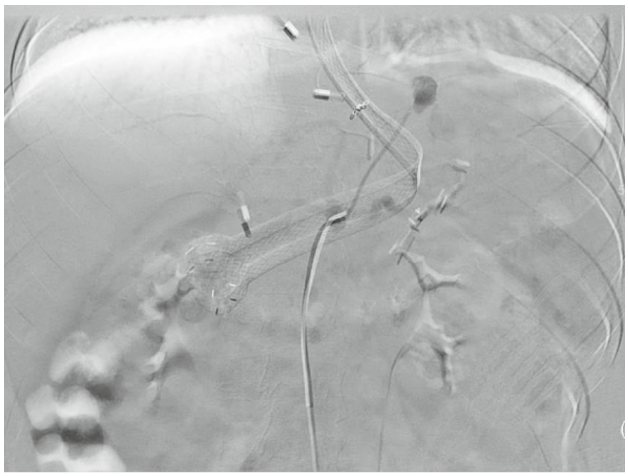
P186

Bleeding Pseudoaneurysms Secondary to Sleeve Gastrectomy Leaks a Rare and Potentially Life-Threatening Complication: A Case Series

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Introduction: Laparoscopic Sleeve Gastrectomy (LSG) is the most common performed bariatric surgery, and while safe and effective, it can be infrequently associated with morbid complications such as gastric leaks and bleeding. Bleeding in the context of managing a gastric leak post LSG is attributed to a wide range of etiologies. Bleeding can be minimal and obscure or can progress into a life-threatening condition. We are presenting a case series of four patients with bleeding secondary to leak related pseudoaneurysms, this case series is the highest reported in literature.
Methods: We retrospectively reviewed all patients managed for LSG leaks at a high-volume referral centerx from the year 2011 – 2023. Of which, four patients developed massive bleeding during their treatment course.
Results: Of 165 patients who were managed for gastric leaks post LSG, four patients (2.4%) developed massive bleeding from a pseudoaneurysm. Presentation ranged from melena and bleeding within the drain output to hemorrhagic shock. Three were from splenic artery pseudoaneurysms and one from an inferior phrenic artery pseudoaneurysm. Two patients needed emergent laparotomy to control the bleeding. One of which arrested during the procedure however revived after CPR and control of the bleeding. The other two were managed with angioembolization. All of them survived the massive bleeding, healed their leak, and recovered well.

Figure 1 Angiogram showing inferior phrenic artery pseudoaneurysm post gastric leak.



Conclusion: Bleeding from pseudoaneurysms post LSG leaks can be life threating. Early recognition and management can be lifesaving and allows for a less invasive angioembolization rather than surgical control.

P187

Acutely Incarcerated Jejunojejunostomy in Recurrent Umbilical Hernia in Patient with Remote Laparoscopic Roux En-Y-Gastric Bypass: A Rare Case Report and Review of Literature

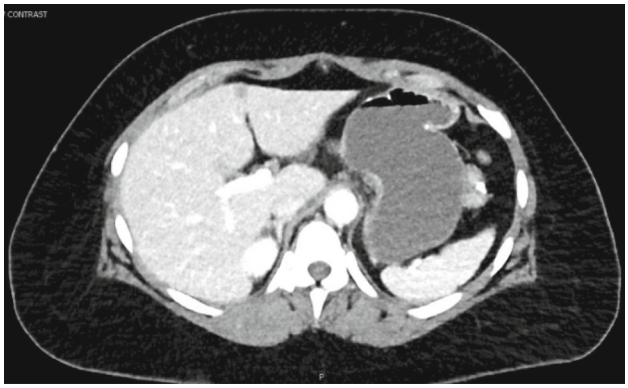
Denston Carey, MD; Alexander Vu, MD; Avery Brown, MD; Loic Tchokouani, MD, FACS; New York University Langone Health

Laparoscopic Roux En-Y-Gastric Bypass (LRYGB) is an established treatment for morbid obesity; however, patients often present with ventral hernias and their management remains a subject of debate. We present a 50-year-old female with a history of LRYGB complicated by recurrent jejunojejunostomy (JJ) intussusception, requiring revision with concurrent repair of an incisional hernia which was unfortunately complicated by recurrence with subsequent acute JJ incarceration. This is the first reported case of JJ anastomosis incarceration through an abdominal wall defect, a complication with serious consequences and a stark reminder of the importance of prompt repair of abdominal wall hernias in post-LRYGB patients.

Figure 1 CT scan showing incarceration of jejunojejunostomy within ventral hernia.



Figure 2 CT scan showing marked gastric pouch dilation.



P188

Total Bowel Length in Bariatric Surgery Patients in Middle East

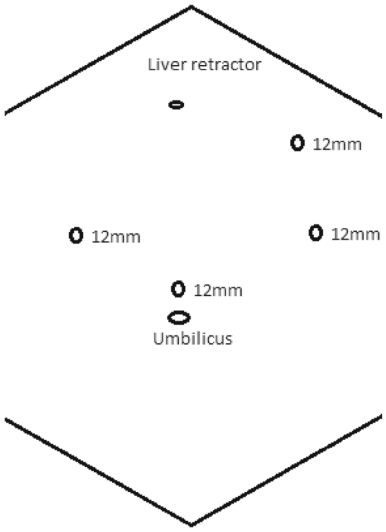
Nouran Alkhoori[1]; Juan Barajas-Gamboa[1]; Gabriela Restrepo-Rodas[1]; Carlos Abril[2]; Syed Amer Hussain Andrabi[1]; Juan Pablo Pantoja[1]; John Rodriguez[1]; Alfredo D Guerron[1]; Javed Raza[1]; [1]Digestive Disease Institute, Cleveland Clinic Abu Dhabi, Abu Dhabi; [2]Cleveland Clinic Abu Dhabi

Introduction: Accurate assessment of total bowel length (TBL) is paramount in optimizing surgical strategies for bariatric procedures and predicting postoperative outcomes. Understanding the variability in bowel length within this population is essential for tailoring surgical approaches and ensuring successful weight loss outcomes as well as early identification of patients who are at risk of malnutrition if following the standardized lengths in bariatric procedures. Unfortunately, data on TBL remains limited, especially in the middle east population. As such, the objective of this study was to evaluate the TBL in patients undergoing bariatric surgery and to characterize the baseline demographics.

Methods and Procedures: We conducted a retrospective analysis utilizing data from our bariatric surgery registry at Cleveland Clinic Abu Dhabi (CCAD). Patients who underwent bariatric procedures between October 2022 and June 2023, and with TBL assessment in the surgical descriptions were included in the study. For the evaluation, TBL was measured using pre-measured laparoscopic instruments running the bowel from the ligament of Treitz until the ileocecal valve. This was easily performed using standardised 12 mm port placement as demonstrated in Fig. 1. Hyoscine Butylbromide was given to the patients after induction of anesthesia. Demographic information including age, gender, body mass index (BMI), and comorbidities were collected and analyzed.

Results: The study included 40 consecutive bariatric surgery patients. The mean age was 41 years and the mean initial BMI was 38.4 kg/m2 and 80% were females. 75% of the patient underwent revision Roux-en-Y Gastric bypass (RYGB) where majority included extensive adhesiolysis and hiatal hernia repair (RYGB) whereas 25% underwent primary RYGB. The most common comorbidities included gastroesophageal reflux disease (GERD) (n = 11, 27.5%), hyperlipidemia (n = 2, 5%), obstructive sleep apnea (OSA) (n = 2, 5%). The mean operative time was 204 ± 52 min. The mean TBL was 533 ± 66 cm. In forty cases (100%), the TBL assessment was successfully completed with no iatrogenic bowel injury.

Conclusions: This study provides valuable insights into the TBL of patients undergoing bariatric surgery, shedding light on the demographic characteristics in this region. This experience demonstrates that measurement of TBL does not significantly increase the operative time and does not increase the intraoperative complication rates. Tailoring bariatric procedures to individual bowel length variations may lead to enhanced surgical outcomes and improved weight loss results as well as prevention of malnutrition due to following the standardized bowel measurements during bariatric procedures.



P189

Gastric Remnant Leak After Revisional Bariatric Surgery for Laparoscopic Gastric Plication: A Rare Case Report and Review

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Background: Laparoscopic gastric plication (LGP), although not gold standard, is a common weight loss procedure outside the United States.. Given its high rate of subsequent revisional surgery, bariatric surgeons must be aware of the indications for surgery and how to recognize and treat the complications that may arise. Here we present a unique case and literature review of revisional bariatric surgery for LGP complicated by postoperative leak.

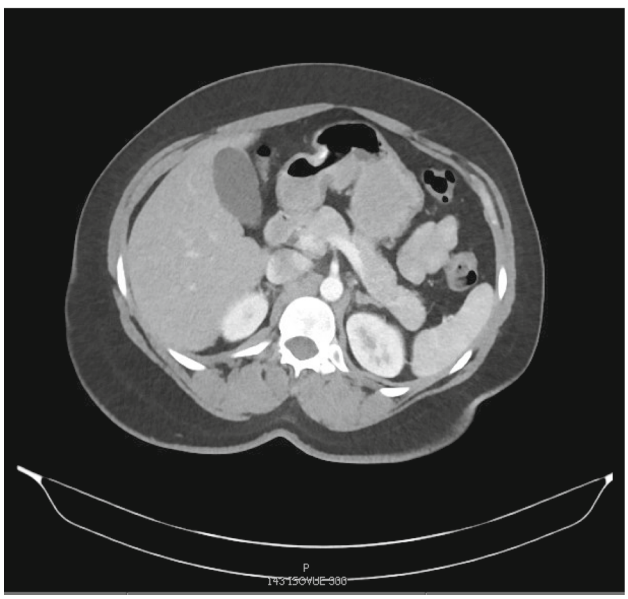
Case Presentation: A 33 year-old female who underwent a LGP with inadequate weight loss and GERD was offered revisional Roux-en-Y gastric bypass (RYGB) (Fig. 1 and 2). Intraoperatively, the patient's stomach was redundant and folded. Prolene sutures from the patient's previous repair were noted to loosely invaginate the fundus. Extensive adhesiolysis was required to unfold the stomach back to its anatomical position. A laparoscopic RYGB was performed with a side-to-side jejunojejunostomy anastomosis, a 150-cm roux limb, and 2-0 silk hand-sewn gastrojejunostomy (GJ), with a negative methylene blue leak test. On postoperative day 1, the patient became septic from a leak at the gastric remnant and required emergent re-exploration (Fig. 3). The disrupted gastric remnant staple line was closed with prolene sutures, again negative leak test. She ultimately was discharged from the hospital, and with successfully sustained weight loss and resolution of GERD.

Discussion: Revisional bariatric surgery is technically complex and associated with a significant rate of complications. Compared with primary surgery, revisional RYGB is associated with greater perioperative morbidity, with complication rates ranging up to 33% (1,2). Specifically, the mechanism of leaks could be related to tension or ischemia, and risk factors include poor wound healing and obstructive sleep apnea on positive pressure ventilation (3). Current literature does not favor one particular method for revisional surgery, and thus surgical management should be patient-specific (4).

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Figure 1 Preoperative CT scans multiple views showing the gastric plication.





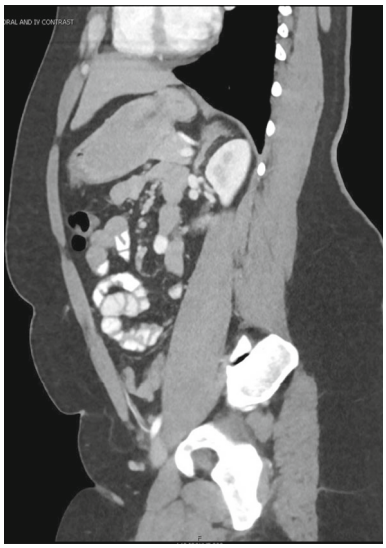


Figure 2 Preoperative EGD pictures of the gastric plication.

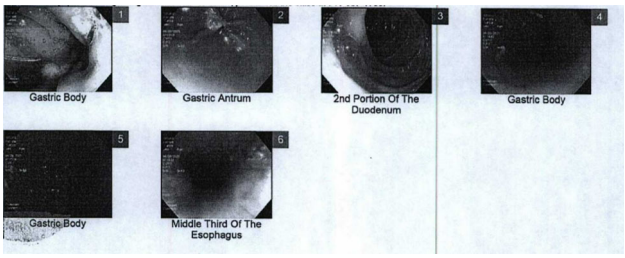
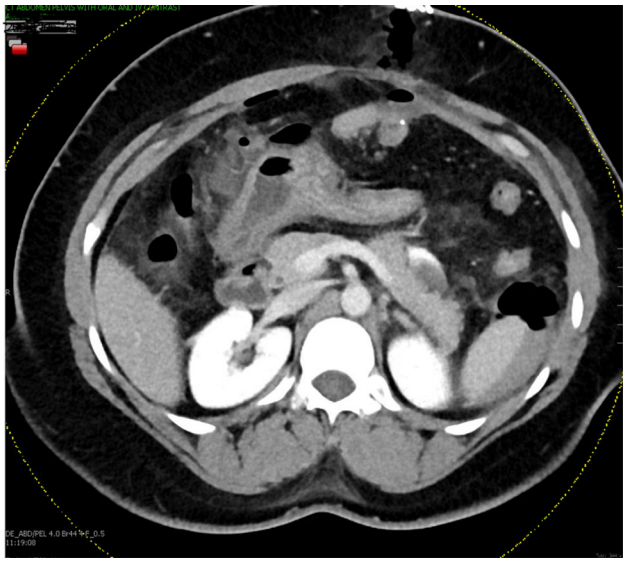


Figure 3 CT multiple views demonstrating leak after RYGB.





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Gastroduodenal Intussusception After Roux-en-Y Gastric Bypass

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Introduction: Gastroduodenal intussusception is an extremely rare presentation of intussusception in adults. It results when a portion of the stomach invaginates through the pylorus into the duodenum. There are only several case reports describing mobile gastric tumors as a cause of the intussusception. We present a case of gastroduodenal intussusception in a patient who had previously undergone a Roux-en-Y gastric bypass.

Case Description: The patient is a 56-year-old female with a past medical history of hypothyroidism, gastroesophageal reflux disease, and prior gastric band placement with subsequent conversion to a

Roux-en-Y gastric bypass five years prior, who presented to the emergency room with nausea and vomiting for approximately two days. Computer tomography of her abdomen and pelvis revealed an unusual appearance of the first portion of the duodenum likely representing gastroduodenal intussusception (Picture 1). No obvious mass or lead point could be seen. The patient was recently worked up for persistent epigastric pain and regurgitation, and her last esophagoduodenoscopy two years prior was unremarkable, showing healthy mucosa at her gastrojejunal anastomosis. Due to the concern for possible malignancy associated with intussusception in adults, the patient was brought to the operating room for diagnostic laparoscopy with laparoscopic assisted transgastric gastroduodenoscopy.

Upon entry in the abdomen, we noted normal gastric remnant anatomy, without evidence of gastroduodenal intussusception. A gastrotomy was made in the remnant stomach, and the gastric wall was secured to the 15 mm port to allow for endoscopic access. Gastroduodenoscopy was performed, which showed mucosal irritation at the pylorus, which was possibly due to intussusception. A small duodenal polyp was identified and biopsied. The gastrotomy was closed and a gastropexy was performed, securing the remnant stomach to the left subcostal area. The patient's abdomen was closed, concluding the case. The patient had an unremarkable postoperative course and she was discharged the following day. Pathology results revealed normal small bowel mucosa without pathologic changes.

Conclusion: Gastroduodenal intussusception has not been described as a complication of Roux-en-Y gastric bypass, and its clinical significance is unknown. Gastroduodenal intussusception should be further evaluated due to its associated risk of malignancy. If there is no identifiable cause of the intussusception, gastropexy of the gastric remnant should be considered to prevent further recurrent in patients with Roux-en-Y gastric bypass anatomy.



Picture 1

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Perioperative Complications in Metabolic and Bariatric Surgery: How Frequent and How Fatal?—An MBSAQIP Study

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Introduction: Metabolic and bariatric surgery (MBS) is considered one of the safest types of contemporary surgical interventions. However, it has extensively faced criticism and misunderstanding due to the incidence of perioperative complications over decades. This study aims to explore the most current frequency of perioperative complications and their potential impact on 30-day morbidity and mortality by utilizing data from the MBSAQIP database.

Methods: To investigate the frequency and impact of perioperative complications on postoperative outcomes following MBS, a retrospective analysis was conducted using the MBSAQIP 2015-2018 participant usage file (PUF) database. Chi-square tests and logistic regression tests were performed to determine risk factors of perioperative mortality and morbidity. Statistical significance threshold was taken as $P < 0.001$ due to large sample size.

Results: Postoperative 30-day mortality was observed in only 868 out of 760,076 patients (0.1%). Perioperative complications exhibited varying frequencies, ranging from 0.002% to 1.6%. The four most common complications within 30 days were reoperation (1.6%), reintervention (1.5%), the need for intensive care unit (ICU) admission (0.8%), and blood transfusion requirement (0.8%). On the other hand, the most fatal complications were coma (OR: 2376; frequency: 0.002%), the need for cardiopulmonary resuscitation (CPR) (OR: 1706; frequency: 0.05%), and the requirement for re-intubation (OR: 228; frequency: 0.2%).

Conclusion: MBS has demonstrated a higher safety profile compared to various major surgical subspecialities within general surgery with respect to perioperative complications and mortality. However, despite the rarity of certain complications, the implementation of a meticulously designed strategy and a predictive algorithm becomes imperative to effectively address these infrequent occurrences and decrease morbidity and mortality.

Table 1. Perioperative Complications in Metabolic and Bariatric Surgery

Complication	Frequency	Odds Ratio for Mortality	CI 95
30-day mortality	***0.1 %***		
Unplanned need for ICU	0.8 %	69.1	59.950-79.588
Deep vein thrombosis*	0.2 %	9.7	5.810- 16.216
Acute Renal Failure	0.1 %	192.7	153.487- 242.032
Need for CPR	0.05 %	1706	1360.6 – 2139.2
Coma	0.002 %	2376	927.6 – 6087.1
Stroke	0.01 %	109.5	58.309 – 205.555
MI	0.03 %	110.0	72.824 – 166.253
Peripheral nerve injury	0.004 %	20.8	2.866 – 151.645
Progressive renal insufficiency	0.7 %	53.6	36.840 – 77.905
Pulmonary Embolism	0.1 %	56.2	42.123 – 74.962
Need for Transfusion	0.8 %	18.8	15.340 – 22.996
Need for Re-Intubation	0.2 %	228.2	193.23 – 269.48
Wound Disruption	0.1 %	3.0	0.744 – 11.981
Need for reoperation (30-day)	1.6 %	26.8	23.173 – 31.906
Re-intervention (30-day)	1.5 %	8.9	7.274 – 10.939
Incisional hernia	0.09 %	11.9	6.124 – 22.975
Prolonged discharge (drainage) (30-day)	0.3 %	5.1	3.031 – 8.743

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The Use of Sleeve Gastrectomy for Elderly Obese Patients Is Safe, and It Resolves Their Comorbidities in Most Cases

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Introduction: In 2000, 600 million persons were aged 60 years or older, simultaneously, the obese population is expanding, and the utilization of bariatric surgery for this population may possess somewhat different short- and long-term operative outcomes compared to a younger population.
Material and Methods: Data on patients who underwent Laparoscopic Sleeve Gastrectomy (LSG) in our university-affiliated, Medical Center were included in a prospectively maintained database under IRB approval. A dedicated bariatric surgeon's team operated on all patients with similar operative techniques.
Results: in 2009-2022, 895 patients underwent LSG, 85 patients over 60 years old (Elderly Group), and a control group of 810 patients between 18 and 59 years old. The mean age was 64 vs. 39 years, $p = 0.00$, the elderly group had a higher frailty index according to the Memorial Sloan Kettering Frailty Index, (mean, 1.68 vs. 0.77, $p < 0.01$). The co-morbidities rates were significantly higher for the elderly group; Diabetes mellitus (%, 49 vs. 24, $p < 0.01$), Hypertension (73 vs. 25, $p < 0.01$), Obstructive sleep apnea (%, 21 vs. 10, $p < 0.01$), Dyslipidemia (%, 66 vs 33, $p < 0.01$). The perioperative course was similar for both groups in terms of 30-day and long-term complication rates.
For both groups, the co-morbidities improved or resolved in the vast majority of patients; DM (%, 100% vs 97% $p = 0.14$), OSA (%, 100 vs 100 $p = 0.25$), HTN (%, 93 vs 91, $p = 0.67$) Dyslipidemia (%, 89 vs 93 $p = 0.11$). In terms of Excess Weight Loss, the results were less favorable for the elderly group; 1 year (%, 74 vs 82, $p < 0.01$), 2 years (%, 72 vs 81, $p = 0.02$), 3 years (%, 64 vs 76, $p < 0.01$) and 5 years (53 vs 70, $p = 0.02$).
Conclusion: The Use of Sleeve gastrectomy for older patients is safe. Its positive impact on their comorbidities is notable and significant, although sustainable weight loss is not as high as in the younger group.

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A Journey Through Time: Jejunoileal Bypass Reversal 43 Years Later—An Illuminating Case Report and Clinical Insights

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Introduction: Jejunoileal bypass, once a prominent surgical approach for weight loss in the 1960s and 1970s, has undergone a significant transformation in its clinical perception and utilization. Initially celebrated for its efficacy in achieving weight reduction, this surgical procedure later revealed a darker side, marked by severe complications such as liver failure. Consequently, the medical community shifted its focus towards early identification and prompt reversal of this once-popular intervention. Among the various reversal cases, we present a remarkable and scarcely documented instance of jejunoileal bypass reversal, conducted four decades after the initial procedure. This extraordinary case serves as an illuminating example, shedding light on both the complexities of the reversal process and the unusual anatomical challenges it presents.
Case: The concept of jejunoileal bypass reversal has garnered increasing attention as a crucial aspect of managing the long-term consequences associated with this surgical approach. Despite extensive literature available on the topic, there exists a notable scarcity of comprehensive case studies detailing the procedural intricacies and the appearance of the affected bowel upon reversal. In this report, we bridge this knowledge gap by presenting a unique case study of BS, a 69-year-old female who sought medical attention due to chronic diarrhea following jejunoileal bypass performed an astonishing 43 years ago. Her journey through multiple interventions, including an unsuccessful enteroenteric anastomosis in 2020, followed by exploratory laparotomy in 2023, wherein the jejunoileal bypass was finally reversed.
Conclusion: This case serves as an important reminder of the challenges posed by the legacy of jejunoileal bypass, especially when performed in an era when electronic medical records (EMR) were not prevalent. In such circumstances, the preoperative period becomes inherently complex, hampered by poor documentation and the labyrinthine intricacies of small bowel rerouting. Through a detailed examination of this case, we aim to discuss the potential pitfalls encountered during the reversal procedure and provide valuable recommendations to guide future medical practitioners in similar endeavors. As we delve into the unique intricacies of this case, we illuminate the importance of understanding and documenting the anatomical intricacies of jejunoileal bypass reversal, ultimately contributing to enhanced patient care and surgical success.

P194

A Case of Spontaneous Celiac Artery Dissection After Laparoscopic Conversion of Sleeve Gastrectomy to Gastric Bypass

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Background: Isolated visceral artery dissection is a rare diagnosis, but becoming more prevalent due to advanced radiologic imaging. Isolated celiac artery dissection is even more rare, with only a handful of cases reported. Celiac artery dissections are primarily iatrogenic, or secondary to hypertension, trauma, pregnancy, or congenital disorders of the vasculature. Iatrogenic causes include recent abdominal surgery, as was the case in this patient.
Case Report: A 46 year-old female with a history of hypertension underwent a laparoscopic conversion of sleeve gastrectomy to roux-en-y gastric bypass (RYGB) with hiatal hernia repair for refractory reflux. Postoperative course was unremarkable and discharged on postoperative day (POD) 2.
The patient presented to the emergency room on POD 6 with severe right-sided back pain. Physical exam was unremarkable other than tachycardia. CT of the chest, abdomen and pelvis with IV contraast revealed a focal dissection at the origin of the celiac artery with severe stenosis, as well as an area of hypo-enhancement in the left hepatic lobe, thought to represent embolic infarcts. The hepatic vessels were patent.

The patient was started on atorvastatin, aspirin for antiplatelet therapy, and metoprolol for blood pressure control. She underwent a mesenteric angiogram the following day due to persistent pain. Two bare metal stents were placed. Her pain improved and she was discharged on dual antiplatelet therapy.
Discussion: Spontaneous visceral artery dissection is rare and presentation can vary widely. Although not a typical complication after bariatric surgery, the incidence is increasing due to improving imaging modalities. This patient's morbid obesity, hypertension and recent abdominal surgery likely contributed to the development of isolated celiac artery dissection. CT Angiography is considered the gold standard for diagnosis. Treatment options can range from non-

operative management with pain and blood pressure control to endovascular or surgical revascularization, depending on severity and presence of end organ ischemia. Further studies should continue to compare outcomes between conservative and more invasive interventions, as well as identify specific risks factors, such as morbid obesity and bariatric surgery, that contribute to the development of this condition.

P195

Chylous Ascites in a Distal Roux en Y Gastric Bypass

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Case report of a 37 year old woman on the unusual clinical presentation of chylous ascites developing following Roux en Y Gastric Bypass (RYGB). This patient lost 300 lbs after her bariatric surgery and postoperatively had a 2 year history of undiagnosed mid abdominal pain. Our CT scan revealed mesenteric stranding and edema surrounding the jejunojejunostomy (JJ). A diagnostic laparoscopy revealed milky intraperitoneal fluid with high triglyceride level along with a blind end of the JJ. Further work up revealed likely signs and symptoms of blind pouch syndrome. Patient underwent revision of the JJ and recovered well.

P196

Efficacy of Endoluminal Stenting in the Management of Sleeve Gastrectomy Leaks

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Background: Laparoscopic sleeve gastrectomy (LSG) is widely adopted as a safe and effective treatment for morbid obesity. Among all potential complications, staple line leakage remains a major adverse event with increased morbidity and prolonged hospital stay. Aside from sepsis control, antibiotics, and nutritional support, endoscopic stent placement is one of the preferred methods in the management of LSG leaks. We evaluated the efficacy and complications of self-expandable metal stents in the treatment of sleeve gastrectomy leaks.
Methods: Between May 2015 and July 2023, 91 patients who were managed for sleeve gastrectomy leaks with available data were identified, Data regarding demographics, procedural success and adverse events were collected.
Results: 91 patients with a mean age of 36.1 ± 11 and mean BMI of 40.6 ± 13.1 presented with staple line leak, 50.5% were females, the median time to presentation was 2.8 weeks. 26 out of 91 had their primary procedure performed at our institution. All patients underwent stent placement for management of their leak. 25 patients (27.5%) required ICU admission, 70 patients (76.9%) underwent percutaneous drainage while 17 (18.7%) underwent surgical washout and drainage to manage intra-abdominal collections. Median duration of stent placement was 8.1 weeks (2.7-20.7 weeks). Success rates for a single and multiple stent placement were 73.6% and 92.3% respectively. 7 patients (7.7%) required revisional surgery. Stent migration was observed in 20 patients (21.9%). Esophageal narrowing or stricture was observed in 24 patients (26.4%). All cases of stent migration and esophageal narrowing and strictures were managed endoscopically with no complications. One patient on high dose steroids developed esophageal perforation following stent placement and was managed surgically.
Conclusions: Endoluminal stenting offer a minimally invasive effective option for management of sleeve gastrectomy leaks, stent complications including migration, and esophageal perforation or strictures are influenced by patient comorbidity, stent size and duration.

P197

The Effect of Glucagon-Like Peptide-1 Receptor Agonists and Intragastric Balloon Placement on Weight Loss: A Network Meta-Analysis of Randomized Controlled Trials

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Introduction: Promising results for short-term weight loss have been demonstrated with both glucagon-like peptide-1 receptor agonists (GLP-1RAs) and intragastric balloons. A network meta-analysis was conducted to perform a comparative analysis of the efficacy of intragastric balloons and GLP-1RAs, both between and within groups of overweight or obese adults with or without diabetes.
Methods: PubMed and Scopus were searched for randomized clinical trials (RCTs) that evaluated the efficacy of GLP-1RAs and intragastric balloons for weight loss in overweight or obese adult patients with or without diabetes. Two independent reviewers performed study selection and data extraction. The primary outcomes were the mean change in percentage total weight loss (%TWL) at 6 months. The mean differences (MD) and 95% confidence intervals (95% CI) and the cumulative ranking were evaluated for outcome by network meta-analysis.
Results: This meta-analysis included 22 trials with 14359 participants. Both GLP-1RAs and intragastric balloons had shown to be superior to placebo. Compared to placebo, The most effective approach was Tirzepatide 15 mg (mean difference [MD] of %TWL -9.98, 95%CI -12.16 to -7.81) followed by Efinopegdutide 10 mg (MD -9.37, 95%CI -11.55 to -7.20). Orbera balloon (MD -7.86, 95%CI -10.46 to -5.26) had the best outcomes in balloon groups. The difference between Tirzepatide and Orbera balloon was preferred to Tirzepatide (MD -2.12, 95%CI -5.51 to 1.27) with similar results to other balloons. Compared to Liraglutide 3 mg, Orbera and Spatz balloons significantly yielded better %TWL with MDs (95%CI) of -3.32 (-6.12 to -0.53) and -3.29 (-6.52 to -0.05), respectively. A non-significant trend of better %TWL was also observed from these balloons compared to Semaglutide 2.4 mg.
Conclusions: Both GLP-1RAs and intragastric balloons has demonstrated similar weight reduction efficacy in overweight or obese adults. Tirzepatide shows potential as a more favorable option among GLP-1RAs for its efficacy for weight reduction.

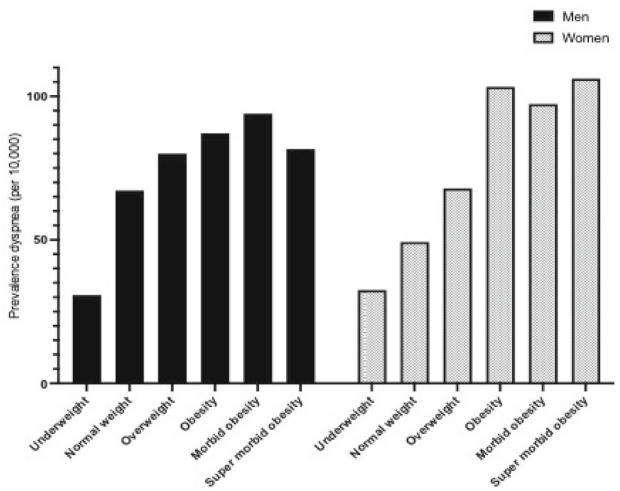
P198

Association Between Dyspnea and Body Mass Index: A Cohort Study

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Introduction: Dyspnea is a commonly reported symptom amongst patients with obesity. Many components of weight may contribute to the development of dyspnea, such as obstructive sleep apnea, restrictive lung disease, obesity hypoventilation syndrome, heart failure, and deconditioning.
Objective: To evaluate the association between dyspnea and body mass index (BMI) in patients who present for routine clinical care for a primary diagnosis of dyspnea.
Methods: Cohort study including all patients older than 16 years seen in any UCLA Health outpatient clinic between January 2018 to June 2023. Only patients with ICD-10 codes for dyspnea coded as the primary reason for a clinic visit were included. Demographic data such as age, sex, race, BMI were obtained. Dyspnea was coded under the group R06. The primary endpoint was prevalence of dyspnea per weight group, defined as underweight (BMI £ 18.5), normal weight (BMI 18.5-24.9), overweight (BMI 25.0-29.9), obese (BMI 30.0-39.9), morbidly obese (BMI 40.0-49.9), and super morbidly obese (BMI ^{3} 50.0).
Results: A total of 1,362,440 patients were screened, of which 9,790 reported dyspnea. The cohort was 57.6% male with a mean age of 62.5 years. Mean BMI was 27.6 kg/m2. The overall prevalence of dyspnea was 0.72%. In the overall population, the odds ratio (OR) for dyspnea decreased for underweight patients, OR = 0.56 (CI: 0.48-0.66). As BMI increased, the OR for dyspnea increased as well, with an odds ratio in overweight patients of 1.32 (CI: 1.26-1.38), obese patients 1.69 (CI: 1.60-1.78), morbidly obese patients 1.70 (CI: 1.53-1.88), and super morbidly obese patients 1.74 (CI: 1.38-2.18). The association between dyspnea and obesity was more pronounced in women as compared with men, with odds ratio for dyspnea in obese female patients of 2.11 (CI: 1.97-2.26), in morbidly obese female patients of 1.98 (CI: 1.74-2.56), and super morbidly obese female patients of 2.17 (CI: 1.66-2.84).
Conclusion: The prevalence of dyspnea increases substantially with increases in BMI. Patients who have obesity have a higher frequency of comorbid conditions such as physical deconditioning, sleep apnea, or CHF that contribute to dyspnea. Though significant focus is placed on obesity and its relationship with diabetes, this data highlight the importance of further evaluation of the effects of weight loss and bariatric surgery on dyspnea.

Figure 1. The prevalence of dyspnea stratified by BMI categories and sex



P199

Suspected Common Bile Duct Stones: Which Test is Best?

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Introduction: The American Society for Gastrointestinal Endoscopy (ASGE) guidelines for common bile duct (CBD) stone management were created to risk stratify patients into low, intermediate, and high-risk groups to optimize interventions. Low risk patients typically proceed to cholecystectomy with or without Intra-operative cholangiogram (IOC) whereas high risk patients typically proceed to common duct clearance. The optimum management of intermediate risk patients still widely varies. This study aims to characterize the use of MRCP, IOC, and Endoscopic Ultrasound (EUS) in patients with intermediate risk of CBD stones.
Methods and Procedures: This is a retrospective analysis of data from the Eastern Association for the Surgery of Trauma (EAST) Retained Common Bile Duct stone database comprised of deidentified data and outcomes of patients prospectively admitted with suspected CBD stones and/or acute biliary pancreatitis from 12 US medical centers between 2016-2019. Analysis of the testing characteristics sensitivity (SN), specificity (SP), and predictive values (positive (PPV) and negative (NPV)) were calculated for MRCP, EUS, and IOC based on definitive identification of CBD stones.
Results: 736 patients met inclusion criteria. 521 met the ASGE intermediate risk of choledocholithiasis criteria. 208/521 (39.9%) underwent pre-op MRCP, 44/521 (8.4%) underwent pre-op EUS, 238/521 (45.7%) underwent IOC.
Sensitivity and Specificity

Test	SN	95% CI	SP	95% CI
MRCP	68.2%	57.1–77.7%	83.7%	75.8–89.5%
EUS	95.0%	73.1–99.7%	91.2%	71.5–98.5%
IOC	78.4%	68.1–86.2%	88.7%	82.2–93.1%

Predictive Values

Test	PPV	95% CI	NPV	95% CI
MRCP	74.4%	63.0–83.3%	79.2%	71.0–85.6%
EUS	90.5%	68.2–98.3%	95.6%	76.0–99.8%
IOC	80.2%	70.0–87.7%	87.5%	80.9–92.1%

Conclusions: There is little role for MRCP for ASGE intermediate risk patients as this modality has both lower sensitivity and specificity than EUS and IOC. When available either EUS or IOC are preferred options for diagnostic clarification to identify choledocholithiasis in this group.

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Development of Predictive Model for Use in Biliary Disease

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Introduction: Gallstone disease is a leading cause of emergency department presentation. The diagnosis of biliary disease using Point of Care Ultrasound (POCUS) is growing. Surgeon acceptance of POCUS diagnosis in the emergency department is cited as being hampered by inconsistent imaging of the common bile duct (CBD) by POCUS. We set out to determine the relative clinical contribution of ultrasound-identified CBD size to patient and biochemical factors in predicting choledocholithiasis.
Methods and Procedures: In this retrospective cohort study, we included 665 patients over the age of 18 years, who received inpatient ERCP procedures (June 2014-May 2019) at a tertiary care centre. Patients who received ERCP for cancer, liver transplant, bile leak, or trauma were excluded. Patient age, sex, BMI, CBD size, liver enzymes (ALT, AST, ALP, Lipase, Amylase, GGT), and Total and Direct Bilirubin levels prior to ERCP were captured through a review of medical charts. Using multivariate logistic regression modelling, we determined the predictive value of these clinical factors in identifying choledocholithiasis. The optimal cutoff points for continuous variables were calculated using Liu index method (Total Bilirubin = 32.55; Direct Bilirubin = 22.85; AST = 138; ALT = 127.5; ALP = 219). CBD size was divided into tertiles (< 6,6-10, > 10 mm) based on significance in clinical decision-making practices.
Results: After exclusions, 361 patients were included in the analysis, 65% had ERCP-confirmed choledocholithiasis. In univariate logistic regression, CBD size > 10 mm [OR = 2.2, p-value = 0.02], Total Bilirubin [OR = 13.79, $p < 0.001$], Direct Bilirubin [OR = 8.37, $p < 0.001$], AST [OR = 3.62, $p < 0.001$], ALT [OR = 3.22, $p < 0.001$], and ALP levels [OR = 1.71, p = 0.017] were significantly associated with choledocholithiasis. Using a backward stepwise multivariate model, Age, Sex, White Blood Cell count, Direct Bilirubin, ALP, and ALT were not independently associated with stone disease. The significant variables in this model were CBD size > 10 mm [OR = 3.2, p = 0.02], Total Bilirubin [OR = 16, $p < 0.001$], and AST [OR = 2.54, p = 0.04], with pseudo-R2 = 0.32 and ROC of 87%. In the analysis without CBD size in the model, Total Bilirubin [OR = 17, $p < 0.001$)] and AST levels [OR = 2.46, p = 0.028] remained significant predictors of choledocholithiasis, with pseudo-R2 = 0.27, and ROC of 82%. From this logistic regression model, a decision tool (scoring system) excluding CBD size was developed for users of biliary ultrasound in the emergency department.
Conclusion: In this analysis, we have successfully demonstrated that biochemical parameters are useful in predicting choledocholithiasis. Even without CBD size, these biochemical parameters remained significant for identifying patients with choledocholithiasis. Therefore, users of point-of-care biliary ultrasound in the emergency department can feel confident ruling out choledocholithiasis even when the CBD is not visualized.

P201

Biliary Colic: A True Diagnosis or a Symptomatic Descriptor?

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Introduction: Biliary colic, characterized by intermittent right upper quadrant abdominal pain often after a fatty meal, is primarily associated with gallstones without indications of infection on imaging or biochemical tests. As the primary treatment for biliary colic is surgical, we aimed to compare the preoperative diagnosis with the histologic diagnosis to gauge diagnostic concordance.
Method: We retrospectively reviewed patients who underwent cholecystectomies at a single academic institution between January 2021 and December 2022. The collected data encompassed demographics, preoperative diagnosis, histologic findings, and imaging techniques. The preoperative diagnosis of biliary colic was juxtaposed with the histologic diagnosis.
Results: During the study period, 213 patients underwent cholecystectomy, comprised of 168 men and 45 women, with a median age of 62 (range: 23-89). Of these, 120 cases (56%) were elective, while the remaining 93 cases (44%) were classified as non-elective, arising from inpatient or ED consultations. In the elective group, 112 patients (93%) had undergone a preoperative US, 65 of them (54%) also had a CT, and 19 (16%) received a HIDA scan. Furthermore, 67 patients (56%) in this group were diagnosed with biliary colic $\pm$ cholelithiasis based on their operative notes. Histologic evaluation revealed that 62 out of these 67 patients (92%) had either chronic and/or acute cholecystitis. The remaining histologic assessments for this group showed one normal gallbladder, three cases with only cholelithiasis, and one with adenomyosis. Turning to the non-elective group, 81 patients (87%) had a preoperative US, 71 of them (76%) also had CT, and 10 (11%) underwent a HIDA scan. Within this group, 11 patients (12%) received a preoperative diagnosis of biliary colic. Histologically, 9 were found to have chronic cholecystitis, one had both acute and chronic cholecystitis, and one was diagnosed with adenomyosis.
Conclusion: Though ultrasound (US) is effective for cholelithiasis diagnosis, it has a significant false-negative rate for cholecystitis. Our findings suggest many patients diagnosed with biliary colic are afflicted by cholecystitis. This highlights the potential benefit of recommending early cholecystectomy in elective settings and considering oral antibiotics as an adjunct to supportive care in outpatient setting.

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The Effectiveness and Outcome of Percutaneous Cholecystostomy: A Retrospective Study in a Single Institute

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Background: Percutaneous cholecystostomy (PC) is often done in patients with acute cholecystitis with multiple underlying illnesses or unfit for cholecystectomy. The outcome and the efficacy of the procedure can always vary due to many factors such as the severity of acute cholecystitis, the patients' age and comorbidities, and other ongoing illnesses during each hospital admission. So, we aim to assess the effectiveness and analyze the outcome of percutaneous cholecystostomy at our hospital.

Methods: We did an observational retrospective cohort study on patients who underwent percutaneous cholecystostomy at Bhumibol Adulyadej Hospital, RTAF, Thailand from March 2019 to May 2023. We collected the basic demographics (age, sex, BMI), diagnosis, length of stay, bile culture, number of cases with surgical intervention, morbidity and mortality, number of drainage days, and date of most recent follow-up to assess the patients' well being. The severity of the cases were categorized using the Tokyo guideline 2018.
Results: Fifty-four patients underwent PC placement from March 2019 to May 2023. Fifty-two percent were male (n = 28) and 48% were female (n = 26). The mean age was 75 years old (range 46—100). The mean BMI was 23.96 kg/m2 (Range 17.6—37.8). Fifty-nine PC placement was done due to 3 patients having theirs exchanged. The Tokyo guideline 2018 was used to categorize the severity of acute cholecystitis: 2% (n = 1) were grade I (mild); 50% (n = 27) were grade II (moderate); 48% (n = 26) were grade III (severe). The 30-day mortality rate was 31.5% (n = 17). Eleven patients died from respiratory or cardiac complications relating to their comorbidities. After PC placements, eight patients underwent cholecystectomy and 5 patients underwent ERCP. The mean drainage time was 54 days (range 3-144). The mean length of stay was 20 days (range1-71). Seven patients were treated as outpatient care. The mean number of days from the PC placement to the follow-up date was 166 days (range 1—1457). Fifty-one bile cultures were collected during the PC. Fifty-five percent (n = 28) showed no growth while 47%(n = 24) positive culture showed 29.1% (n = 7) of Klebsiella pneumoniae, 75%(n = 18) of E.coli, 29.1%(n = 7) of others.
Conclusion: Percutaneous cholecystostomy is undoubtedly effective as an alternative intervention prior to cholecystectomy and in patients with higher risks, can be a definite treatment. However, there is still more to explore regarding indications on patient selection for percutaneous cholecystostomy.

P203

Association of Preoperative Neutrophil to Lymphocyte Ratio (NLR) with Difficult Laparoscopic Cholecystectomy Among Patients with Cholecystitis

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Gallbladder pathologies constitute one of the most frequently seen disease groups in daily practice, the most common of which is cholelithiasis. Severe cholecystitis carries a significantly high mortality rate, which has been reported to be between 15 and 50% 4. Thus, prompt detection and proper management of patients at risk of severe cholecystitis are essential in preventing associated complications. However, severe cholecystitis has been identified as a risk factor for difficult laparoscopic cholecystectomy due to the extensive inflammation. Neutrophil to lymphocyte ratio has been established as a biomarker for severe inflammation, making it a potential biomarker for severe cholecystitis and consequently, a difficult laparoscopic cholecystectomy as well. The main objective of this study is to determine the association of preoperative neutrophil to lymphocyte ratio with difficult laparoscopic cholecystectomy among patients with cholecystitis. It is designed as a single-center retrospective cohort study conducted at Asian Hospital and Medical Center. Chi squared test was used to determine the predictors of difficult laparoscopic cholecystectomy. A cut-off value for the neutrophil to lymphocyte ratio that will determine to know if a patient will undergo difficult laparoscopic cholecystectomy was determined using the receiver operating curve (ROC).
Results of this study showed that higher preoperative NLR was significantly associated with difficult laparoscopic cholecystectomy. Age and the male gender were also significantly associated with difficult laparoscopic cholecystectomy. Using the ROC, a preoperative NLR cut-off value of 4.8 in predicting difficult laparoscopic cholecystectomy was found. Using this cut-off value, sensitivity and specificity obtained were 95.0% and 70.0%, respectively. This can be used to predict the difficulty of operative techniques among patients who will undergo laparoscopic cholecystectomy. Using this cut-off value, surgeons will be able to prepare and stratify patients pre-operatively. NLR > 4.8 may be used a guide for increased likelihood of a difficult operation and potential complications, which can help the operating surgeon to plan and operate with appropriate help and expertise around as well as appraise their patients accordingly.

P204

Laparoscopic Cholecystectomy with And Without Indocyanine Green Fluoroscopy: A 5-Year Randomised Control Trial

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Introduction: Laparoscopic Cholecystectomy is the most common surgical procedures carried out for the treatment of Cholelithiasis. Injury of the common bile duct is one the feared complications that occurs intra-operatively. Indocyanine Green dye, a fluorescent dye injected intravenously is excreted in the biliary tree. Real time imaging using infra-red light enables clear visualization of the biliary tract. The outcomes of Laparoscopic Cholecystectomy with and without the use of ICG are compared.
Methods: Outcomes of Laparoscopic Cholecystectomy with and without ICG were compared in a 5 year randomised control trial. Multiple parameters, chief among them being the time taken to reach the Critical View of Safety and the rate of bile duct injury were analysed. The intraoperative and postoperative complications, rate of conversion to open surgery and overall outcomes were seen.
Inclusion Criteria:
Cases of Cholelithiasis with/without Cholecystitis (acute or chronic)
Cases of Biliary Pancreatitis
Post ERCP cases of Cholecystectomy
Exclusion Criteria:
Cases with end stage liver disease
Portal Hypertension
COPD
Cases unfit for General Anaesthesia
Results: A total of 127 patients underwent Laparoscopic Cholecystectomy, 63 with and 64 without the use of Indocyanine Green Fluoroscopy. The median time taken to reach the Critical View of Safety was 18 min with and 23.1 min without ICG. The rate of bile duct injury, and therefore conversion to Open Surgery, was 2.33% in the group without ICG and none in the group with ICG.
Laparoscopic Cholecystectomy
With ICG (63)
Without ICG (64)
Median time taken to reach CVS
18 min
23.1 min
Bile Duct Injury
0
1
Conversion to Open Surgery
0
1
Conclusion: Laparoscopic Cholecystectomy with the use of Indocyanine green dye enables better & easy visualization of the Biliary tree anatomy and reduces the chances of Common Bile Duct injury.

P206

Identification of Early Learning Curve Changes in Objective Performance Indicators during Robotic Cholecystectomy

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Objective performance indicators (OPIs, metrics calculated directly from robotic data streams) have been used to quantify surgical efficiency and quality in robotic-assisted urologic surgery. There is a paucity of such data for robotic cholecystectomy (RC), a commonly performed general surgery operation. Our study evaluates OPI data for meaningful changes of surgeon behavior over time, which may provide objective insight into learning curves during RC. We hypothesize that as a surgeon performs more robotic-assisted cholecystectomies, surgical efficiency increases, reflected in OPI changes.

We collected a single surgeon's robotic event, kinematic and video data during RC with the DaVinci XI platform using the Intuitive Data Recorder over a 2-year period. Cases were segmented into surgical steps by professional annotators, and OPIs were calculated for each step. The surgeon is experienced in laparoscopic cholecystectomy. The data represents the surgeon's transition from laparoscopic to robotic cholecystectomy. Thirty-three procedures (7-39th career robotic cholecystectomy) were analyzed for step-specific changes in OPIs over time using Spearman rank correlation.

There were over 30 OPIs that showed significant change over time. Most importantly, step duration during the ligation/division of the cystic duct decreased ($p = 0.04184$) over time. This was associated with reduction in the active time of dominant and nondominant robotic arms during this step ($p = 0.02251$ and $p = 0.004607$, respectively). As the surgeon performed more cholecystectomies, master clutch was used more during ligation/division of the cystic artery ($p = 0.009396$). During the dissection of the triangle of Calot and dissection of the gallbladder off the liver bed steps, there were many changes in the speed and acceleration of both the dominant and nondominant arms, but this did not correlate to a reduction in step duration.

As the first study to evaluate truly objective metrics throughout a learning curve in cholecystectomy, this work identifies relevant OPIs that may be critical for proficiency tracking in the future. Excitingly, this study uncovers over 30 OPIs that impact a surgical step with a steep learning curve in the transition from a laparoscopic to robotic surgeon, the ligation/division of the cystic duct. More studies are needed to validate and compare such OPIs of interest throughout critical segments of surgery.

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Polymer Versus Metal Clips in Laparoscopic Cholecystectomy: Surgeon Preference and Outcomes

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Introduction: Surgeon experience and use of intraoperative cholangiography reduces the risk of complications during laparoscopic cholecystectomy. Metal or polymer clips are placed on the cystic duct and cystic artery prior to their ligation during laparoscopic cholecystectomy. Surgeon practice patterns of metal and polymer clip preference has not been studied. This study aims to describe differences in surgeon preference for the type of clip and 30-day outcomes after elective laparoscopic cholecystectomy.

Methods: The electronic medical record at a single institution was queried for patients older than 18 years who underwent elective laparoscopic cholecystectomy (CPT code 47562 and 47563) from 2017 to 2019. Surgeons in the Division of Abdominal Transplant, Minimally Invasive Surgery, Surgical Oncology, and Trauma Acute and Critical Care Surgery were included. Surgeons were stratified by preference of clip, defined as greater than 50% of total procedures using metal or polymer clips. Surgeon characteristics and 30-day outcomes were compared using Pearson's chi-square for categorical variables and Wilcoxon rank-sum for continuous variables. The primary outcome was 30-day complications.

Results: Altogether, 38 surgeons performed 1,244 elective laparoscopic cholecystectomy procedures using metal or polymer clips. More surgeons preferred metal clips (N = 22, 57.9%) compared to polymer clips (N = 16, 42.1%) (Table 1). Surgeons who preferred polymer clips graduated medical school more recently, with a median year of 2002 versus those who preferred metal clips graduated with a median year of 1994 ($p = 0.02$). Fellowship completion did not differ between the surgeons ($p = 0.3$). Surgeons in the Division of Surgical Oncology did not use polymer clips, while surgeons in other divisions used both types of clips ($p = 0.05$). Of the surgeons who preferred metal clips, polymer clips were used in 0.8% of cholecystectomies. The surgeons who preferred polymer clips used metal clips in 4.7% of procedures. Intraoperative cholangiograms were more often utilized by surgeons who preferred polymer clips. Rates of readmission, postoperative fluid collection, infection, and endoscopic retrograde cholangiopancreatography were similar surgeon groups ($p > 0.05$). There were no bile duct injuries in this study.

Conclusion: Surgeons predominantly use one clip type during elective laparoscopic cholecystectomy. Surgeon preference for type of clip was not associated with increased 30-day complications. Future studies should investigate the influence of fellowship training on surgeon's attitudes toward new technology.

Table 1

Surgeon Characteristics *(number of surgeons)*	Metal (N=22)	Polymer (N=16)	p-value
Surgeon Division			
Abdominal Transplant	3 (13.6%)	1 (6.3%)	0.05
Minimally Invasive Surgery	8 (36.4%)	6 (37.5%)	
Surgical Oncology	6 (27.3%)	0 (0.0%)	
Trauma, Acute and Critical Care	5 (22.7%)	9 (56.3%)	
Years of Medical School Graduation			0.02
Median	1994	2002	
Q1, Q3	1982, 2003	1998, 2006	
Surgeon Fellowship			
No	8 (36.4%)	3 (18.8%)	0.3
Yes	14 (63.6%)	13 (81.3%)	
Number of Procedures			
Median	18.0	7.0	<0.001
Q1, Q3	5.0, 49.0	3.0, 25.0	

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Comparative Analysis of Operative Outcomes of Laparoscopic and Robotic Cholecystectomies: A 5-Year Single Center Study

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Introduction: Despite the SAGES Safe Cholecystectomy Program enhancing patient safety in laparoscopic cholecystectomies, bile duct injuries remain a non-zero event. The clinical benefit of robotically assisted cholecystectomies has been questioned. In the context of a robust robotic resident training program, we sought to compare operative outcomes between laparoscopic and robotic approaches. We hypothesized similar incidences of bile duct injuries, salvage procedures, and conversion to open surgery.

Methods and Procedures: A 5-year retrospective review at a university-affiliated academic hospital with 1,690 cholecystectomies from January 2018 to 2023 was conducted. Data included patient demographics, diagnosis, comorbidities, surgical approach, and complications. Strasberg A-E bile duct injuries, need for salvage procedures, and conversion to open were compared between laparoscopic and robotic groups.

Results: Of the 1,690 cholecystectomies, 613 were robotic and 1,070 were laparoscopic. Seven open cholecystectomies were excluded. Patient demographics, BMI, and comorbidities were consistent across both cohorts, except that the laparoscopic group was more frequently associated with prior abdominal surgeries and adhesions ($p = 0.009$). Twenty-one of 1683 patients (1.25%) had Strasberg A-E bile duct injuries. The robotic group had a statistically significant lower injury rate (Robotic: 2 [0.32%] vs. Laparoscopic: 19 [1.77%]; $p = 0.009$). Three of nineteen laparoscopic patients had common bile duct (CBD) injuries and required a hepato-jejunostomy. The remaining injuries, primarily cystic duct leaks were managed with drains and/or endoscopic stenting. Zero robotic patients had CBD injuries.

Laparoscopic surgery more frequently led to conversion to an open procedure (Laparoscopic: 39 [3.64%], Robotic: 3 [0.32%]; $p < 0.001$) and salvage procedures such as a subtotal cholecystectomy (Laparoscopic: 16 [1.56%], Robotic: 8 [1.33%]; $p < 0.001$). Robotic cholecystectomies had lower postoperative pain scores ($p < 0.001$).

Conclusion: Our results indicate that expansion of robotic cholecystectomy in the environment of a high-volume surgical residency training program is still associated with fewer bile duct injuries of any severity with no patients in the robotic group incurring a common bile duct injury. Patients who received a robotic-assisted cholecystectomy had a lower incidence of conversion to open and the need for any salvage procedure. Additionally, robotic techniques offered lower postoperative pain scores. Robotic cholecystectomy remains safe in academic training programs and may offer lower bile duct injury rates and need for salvage procedures as compared to laparoscopic techniques.

P209

A Rare Presentation of Simultaneous Emphysematous Cholecystitis, Emphysematous Pancreatitis and Ascending Cholangitis

Toufeeq Suliman, MD; David Denning, MD, FACS; Stephen Wilson, MD, FACS; Marshall University SOM

Ascending cholangitis (AC), emphysematous cholecystitis (EC), and emphysematous pancreatitis (EP) are rare but life-threatening conditions, often requiring prompt procedural intervention to establish adequate source control. The latter two conditions are even more fatal and rarely occur simultaneously. While EC and EP typically mandate emergent surgical resection, non-operative management has been reported in hemodynamically stable individuals.

We present a 62-year-old male with a history of diabetes and hypertension who presented with nausea, vomiting, and abdominal pain. Subsequent evaluation revealed AC, EC, and EP, likely secondary to gallstone pancreatitis. Initially, he sought care at an outside emergency department with symptoms of nausea, vomiting, and a cough, where he was diagnosed with respiratory rhinovirus and discharged. Three days later, he arrived at our facility with worsening symptoms, including nausea, vomiting, upper abdominal pain, and jaundice. On physical examination, his abdomen was soft, distended, and tender, with localized peritonitis. He was hypotensive upon arrival, initially responsive to fluid resuscitation but eventually requiring vasopressors. Laboratory tests indicated leukocytosis (WBC 15.96), acute kidney injury (creatinine 3.17), hyponatremia (sodium 128), and transaminitis with direct hyperbilirubinemia (direct bilirubin 14.4, total bilirubin 17.9). His BiSAP and Ranson scores were 4, and the LRINEC score was 10. Computed Tomography (Fig. 1) revealed an obstructive stone in the distal common bile duct (CBD) with extensive pneumobilia, along with EC and EP and small volume pneumoperitoneum. After extensive discussions with the patient and his family, outlining the guarded prognosis irrespective of treatment, they elected to pursue aggressive intervention. The patient underwent an exploratory laparotomy, cholecystectomy, CBD exploration, and pancreatic debridement. Intraoperatively, a necrotic gallbladder with foul-smelling drainage was identified, and complete clearance of the distal CBD was unattainable without trans-duodenal sphincterotomy, necessitating the placement of a T-tube for biliary tree decompression. The pancreas was found to be necrotic and was debrided, with the abdomen left open due to ongoing hemodynamic instability. The patient was transferred to the intensive care unit for continued resuscitation but experienced further deterioration, leading to the initiation of comfort measures approximately two hours postoperatively.

AC, EC, and EP are rare and potentially lethal conditions, with an increased mortality risk when presenting concurrently. Given the scarcity of such cases, there is a paucity of clear treatment guidelines, warranting further research. Additionally, while the LRINEC score is valuable for assessing necrotizing soft tissue infections, its potential utility in necrotizing/emphysematous intra-abdominal infections should be explored further.

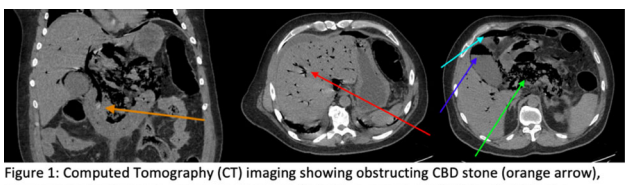


Figure 1: Computed Tomography (CT) imaging showing obstructing CBD stone (orange arrow), pneumobilia (red arrow), pneumoperitoneum (light blue arrow), air-fluid level within the gallbladder (dark blue arrow), and air within the pancreatic tissues (green arrow).

P210

Robotic Cholecystectomy as a Novel Bailout Alternative to Laparoscopic Cholecystectomy

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Introduction: Our intent is to prompt an evaluation of robotic technology as an intraoperative conversion strategy, aimed at mitigating the morbidities associated with open cholecystectomy while optimizing patient outcomes. Laparoscopic cholecystectomy has transformed gallbladder disease management, offering many minimally invasive benefits, such as, shorter hospital length of stays (LOS), decreased postoperative pain, and faster recovery. Nevertheless, unforeseen intraoperative challenges occasionally mandate conversion to open cholecystectomy, amplifying morbidity and healthcare costs. Robotic-assisted cholecystectomy has emerged as a promising surgical tool, providing augmented dexterity, precision, and visualization. However, its role as a potential bailout strategy during challenging laparoscopic cholecystectomy cases remains underexplored. In this case report, we present two cases that highlight the potential of robotic-assisted cholecystectomy as a novel and efficient strategy when facing intraoperative complexities, ultimately aiming to improve patient care and surgical outcomes in the management of gallbladder disease.

Case 1

A 28-year-old female with a recent history of complex pulmonary disease who presents with acute acalculous cholecystitis. Laparoscopic exploration uncovered thick rind encasing the gallbladder, revealing a thin necrotic gallbladder wall. The fragility of cystic duct necrosis prompted a conversion to robotic-assisted cholecystectomy. The robot allowed for fine movements and precise dissection and clipping of minimal healthy cystic duct from the take- off. The patient's post operative recovery remained absent of complications. Patient was discharged on post operative day 3 with removal of surgical drain after normalization of white blood cell count, normal serum bilirubin, and minimal nonbilious drain output.

Case 2

The second case involves a 48-year-old female presenting with gallstone pancreatitis and concurrent pyelonephritis. Initial laparoscopic cholecystectomy was impeded by complex adhesions enveloping the cystic triangle. Inadvertent tubular structure injury raised bile duct injury suspicions, leading to a seamless transition to robotic-assisted cholecystectomy. The nuanced robotic movements enabled cholangiography, ultimately ruling out injury, and completion of careful judicious dissection of critical structures. Recovery mirrored our first case, with prompt white blood cell count normalization and normal serum bilirubin levels.

Discussion: These cases illustrate an alternative bailout option for difficult cholecystectomies that would have otherwise required conversion to open cholecystectomy. Advantages to this option are not just limited to the clinical benefits we have already described. Decreased post-operative LOS will optimize hospitals' diagnosis related group (DRG) metrics, and even lead to net cost savings. Future studies with larger sample sizes would adjudicate the financial advantages to this proposed option.

P212

Case Report: Cholecystocolonic Fistula Requiring Right Hemicolectomy qnd Subtotal Cholecystectomy

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Introduction: Gallstone ileus is a well-studied complication of cholecystitis. Standard surgical management involves exploratory laparotomy and enterotomy to extract stones. While a fistula between gallbladder and colon is the second most common location for this complication, clinical signs are less specific, imaging findings vary and surgical approaches are debated. We report a case of cholecystocolonic fistula that required exploratory laparotomy, hemicolectomy and subtotal cholecystectomy.

Case Report: A 66-year-old man with history of recent cholangitis, presented to the ED in septic shock with diffuse abdominal pain. Workup revealed leukocytosis with bandemia, lactic acidemia and mild transaminitis with normal bilirubin. Abdominal ultrasound demonstrated a large frond-like mass in the gallbladder without reported wall thickness, pericholecystic fluid nor Murphy's sign (Fig. 1). Subsequent CT showed marked gallbladder inflammation (Fig. 2), possible fistulization with the colon (Fig. 3) and likely gallstone in the colon (Fig. 4).

The patient was taken to the operating room for exploratory laparotomy. The visible anterior gallbladder was necrotic. It was filled with pus and stool with a large fistula to the right colon. Gallbladder wall was also scarred to the gastric antrum and proximal duodenum. Posterior gallbladder wall was contiguous with a liver abscess. First, the right and transverse colon were mobilized. Both the duodenum and right ureter were identified and preserved. Next, the ileum was divided just proximal to the ileocecal valve and the colon was divided at the level of the preserved middle colic vessels. A large portion of the anterior gallbladder was removed with the colon specimen. Because the rest of the gallbladder wall was scarred to surrounding organs, a subtotal cholecystectomy was performed. The posterior wall was debrided and a large volume of stool and stones was removed. The abdomen was irrigated. A side-to-side ileo-colostomy was performed and a Blake drain was placed in the right upper quadrant before fascia was closed.

Patient was downgraded to regular nursing floor from stepdown 2 days later and was found to have intra-abdominal abscess on postoperative day 6. He underwent percutaneous drainage without complication and was discharged with outpatient IV antibiotics.

Conclusion: As most cholecystocolonic fistulae are incidental intraoperative findings, this case is unique with CT imaging showing a likely colonic fistula preoperatively. The severity of inflammation and contamination led to the safe decision of a subtotal cholecystectomy and also increased risk of infection postoperatively. Postoperative complications after a cholecystocolonic fistula operation warrant further study.



Figure 1. Ultrasound of Gallbladder

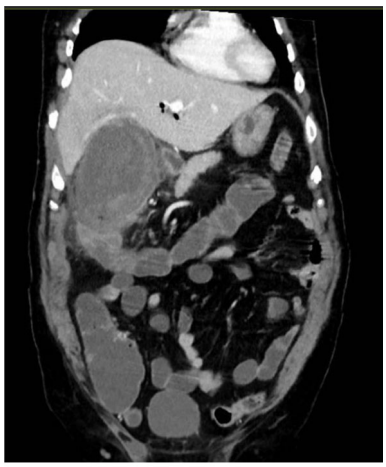


Figure 2. CT of gallbladder

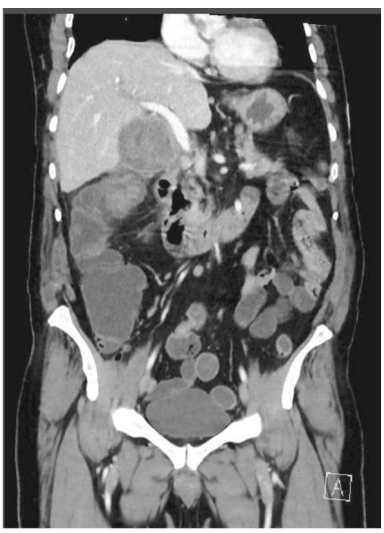


Figure 3. Gallbladder and Colon Fistulization



Figure 4. Gallstone in Colon

P213

Kratom Induced Cholecystitis and Hepatotoxicity: A Case Report

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There are a variety of gallbladder pathologies that plaque society. With the rise of several new street drugs like Kratom, it can make diagnosing and treating gallbladder disease a challenge. Kratom (Mitragyna speciosa), is an herbal supplement that is native to southeast Asia. Due to its analgesic and opioid like effects, it has made its way into the United States being sold at gas stations, smoke shops, and online. Kratom has documented abuse and addiction potential but its effects on the hepatobiliary system are still being researched and no clinical guidelines are yet in place [15]. In this case report, a 43-year-old female presented to the emergency department with abdominal pain, pruritis, dark urine, scleral icterus, and jaundice. The patient also had elevated liver enzymes. Infectious and autoimmune causes were ruled out and upon further questioning the patient revealed she had been taking Kratom for four days at an unknown dose. Lab work and imaging showed cholecystitis with an acute on chronic presentation and she subsequently underwent a laparoscopic cholecystectomy with an endoscopic retrograde cholangiopancreatography (ERCP). At one month follow-up, the patient saw resolution of symptoms and labs were within normal limits. Given its increase in prevalence in the United States, we recommend Kratom be included in the list of etiologies when evaluating drug induced cholecystitis and liver injury.

P215

Clinical and Imaging Predictors in Defining Difficult Laparoscopic Cholecystectomy—An Observational Study

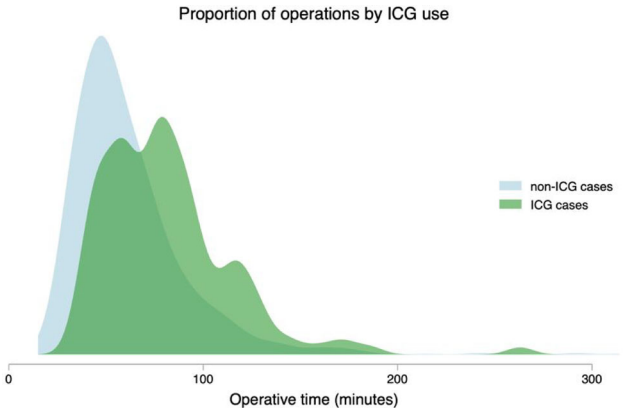
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Introduction/Background: Laparoscopic cholecystectomy (LC) is one of the most common laparoscopic procedures being performed by general surgeons all over the world. Preoperative prediction of the risk of conversion or difficulty of operation is an important aspect of planning laparoscopic surgery. The purpose of our prospective study was to analyse various risk factors and to predict difficulty and degree of difficulty preoperatively using a scoring system.
Aims & Objective: To determine clinical and imaging predictors which define difficult laparoscopic cholecystectomy and formation of the scoring system.
Methodology: This was a prospective observational study, conducted in the Department of General Surgery, All India Institute of Medical Sciences Patna, over a period from June 2020 to November 2021. The demographic, clinical, radiological details and operative findings were entered in a pre-designed proforma. Data were analysed with Statistical Package for the Social Sciences (SPSS) Statistics.
Results: A total of 287 patients were included in the study. Among the 174 were females, and 113 were males. Mean age of the patients was 42.7 years. The average BMI was 25.86 and 13.6% of the patients were obese. Patients aged more than 50 years had higher chance of having difficult LC as compared to age less than 50 years (98.8% vs 96%). Male patients have higher chance of having difficult LC as compared to females (97.1% vs 96.5%). Patients with history of previous abdominal surgery had higher proportion of difficult surgery compared to those who had not. Patients with Gallbladder wall thickness $\geq$ 4 mm had a higher chance of having difficulty as compared to group less than 4 mm (97.8% vs 78.6%,)Patients with no visible gall bladder on insertion of scope have a higher chance of having difficult LC as compared completely visible on insertion of scope (99.3% vs 97.4%,). History of previous attack, palpable gall bladder, WBC count, did not significantly correlate with difficulty of surgery. The six independent risk predictors of difficulty of surgery were revealed by multivariate analysis and they were correspondingly assigned points. Difficult LC was highest in the group with a score $\geq$ 5 than the group with score $<$ 5.
Conclusion: In conclusion, we derived a simple scoring system comprising six parameters that can be used in routine surgical practice to identify difficult laparoscopic cholecystectomy preoperatively. It should help to avoid an inexperienced laparoscopic surgeon having to operate on a gallbladder which is too difficult for him to perform laparoscopically.

P216

Evaluating the Impact of Indocyanine Green (ICG) Use in Laparoscopic Cholecystectomies

Amanda Bader, MD; Justin Hatchimonji, MD, MSCE; William Yi, MD; Maria S Altieri, MD, MS; Hospital of the University of Pennsylvania



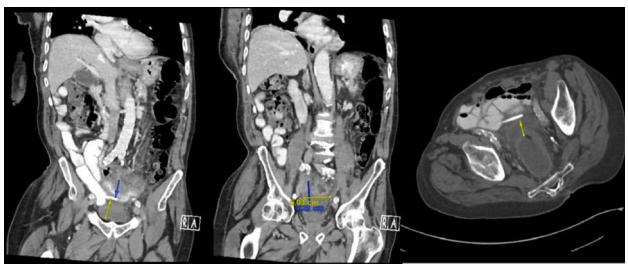
Background: Since the advent of laparoscopic cholecystectomy (LC), the incidence of bile duct injuries has increased. In the last decade, the use of indocyanine green (ICG) during laparoscopic cholecystectomy has increased as it allows surgeons to better delineate extra-hepatic biliary anatomy in order to prevent such injuries. ICG is safe, easy to administer, and preliminary data is in support of ICG use during LC. Despite this, its utilization remains disappointingly low. To investigate this, we performed a retrospective cohort study using electronic medical record data from a single institution.
Methods: All patients aged $\geq$ 18 years who underwent LC between January 2017 and May 2023 were included and those who had an iodine allergy (contraindication to ICG use) were excluded. Because this type of comparison may lend itself to confounding by indication, we performed propensity score matching before analyzing the data. The propensity score was generated using a multivariable logistic regression model based on selected covariables including age, sex, race, BMI, several comorbidities, diagnosis associated with surgery, ASA classification and emergency status. Matching was performed using 3:1 nearest neighbor matching. Our primary outcome of interest was operative time, and our secondary outcome of interest was readmission at 30 days post-procedure.
Results: A total of 1,609 patients were eligible and included in this study. Median age was 48 years (IQR 34 – 63) and the population was predominantly female (72.2%). The majority of cases were done for cholelithiasis (57.1%); other indications included acute and chronic cholecystitis, choledocholithiasis, cholangitis, gallstone pancreatitis, biliary dyskinesia and gallbladder mass or polyp. Median operative time was 56 min (IQR 43-75). In this cohort, 137 patients received

ICG pre-operatively or intraoperatively. After matching and accounting for performing surgeon in a mixed effects model, we found that operative time was 11 min longer in patients who received ICG compared to those who did not (95% CI: 2.9 – 20.0, p = 0.009). Readmission at 30 days post-operatively was 45% less likely in those who received ICG compared to those who did not, although this did not reach significance (OR = 0.55 95% CI: 0.20 -1.51, p = 0.248).
Conclusions: In this single institution study, operative time was found to be slightly longer in cases where ICG is used. Prolongation of case length may therefore hinder adoption of this technology by surgeons despite the potential benefit of preventing unintended injury. Larger, prospective studies are needed to fully evaluate the added benefit and safety of ICG use during LC.

P217

Customized Surgical Approach to Small Bowel Perforation Secondary to Biliary Stent Migration; A Case Report and Review of the Literature

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Introduction: Biliary stent placement is a well-established practice to prevent unnecessary surgical interventions. However, it can be associated with some complications including migration. Proximal or distal SM is relatively uncommon with an overall incidence of 6%.1 Distal SM can cause intestinal perforation in approximately 1%, with 10-31% mortality, requiring emergent surgical intervention.2
Case Presentation: A 79-year-old male with past surgical history of perforated gastric ulcer, wound dehiscence, and multiple incisional hernia repairs presented with lower abdominal pain associated with nausea and vomiting. He also had a history of cholangitis 18 months prior which was managed with common bile duct stent placement. An attempt to retrieve the stent endoscopically three months ago was unsuccessful. Upon presentation, the heart rate was 120, with no fever. On examination, there were multiple old midline, para-midline, and transverse abdominal scars with tenderness and guarding in the lower abdomen. He also had leukocytosis of 14.6 with normal lactic acid. Computed tomography (CT) of the abdomen and pelvis revealed that the biliary stent had migrated into a right lower quadrant small bowel loop, with perforation and an adjacent localized pelvic abscess without free fluid (Fig. 1).
Since the finding of matted bowel and severe adhesions were anticipated, a customized low transverse/oblique incision just above the presumed abscess/perforation was made to avoid unnecessary extensive adhesionolysis. Intraoperative findings confirmed the biliary stent migration and ileal perforation with localized abscess (Fig. 2). The stent was removed and the bowel was repaired primarily. He was discharged on postoperative day four with no issues.
Discussion: multiple factors can increase the risk of SM including the biliary pathology, type and shape of the stent, previous history of biliary surgery (altered bile flow), proximal or distal stricture/obstruction, and presence of inflammation or infection.3,4 If distal SM happens, any intestinal wall weakness due to pre-existing diverticulitis, abdominal wall hernia, small bowel adhesions, or inflammatory bowel disease may increase the risk of bowel perforation.5 Regardless of the cause and location, the migrated stent should be removed. The surgical approach should be customized, based on the patient's anatomical variations, prior surgeries, and surgeon's preference.
Conclusion: Small bowel perforation due to SM although rare, carries about 30% mortality. This case reminds surgeon to include it in their differential diagnosis and highlights the fact that a customized limited open surgical approach, can offer more direct access while avoiding extensive adhesiolyis and potential bowel injuries.

P218

Robotic Transcystic Common Bile Duct Explorations: A Case Series

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Introduction: Adoption rates for robotic cholecystectomy have increased over the last several years. While laparoscopic transcytic common bile duct explorations (LCBDE) have been described and performed for over 20 years, robotic transcystic common bile duct explorations (RCBDE) are relatively new given the recent adoption of the robotic approach for cholecystectomy. The robotic platform can help overcome some of the ergonomic and technical challenges that come from LCBDE. ?This study describes our experience performing robotic transcystic common bile duct explorations.
Methods: This is a retrospective review of a prospectively maintained database from a single surgeon at an academic medical center from October 2022 to August 2023. Patient demographics, pre- and post-operative laboratory and imaging studies as well as outcomes were recorded. Success was defined as complete clearance of common bile duct (CBD) stones.
Results: A total of 13 patients underwent RCBDE between October 2022 and August 2023. Mean age of patients was 62.69 ± 16.59 years. Successful clearance of the CBD was 92.31% (12/13). 1 patient required a post-operative ERCP (7.69%). Postoperative complications included 1 patient who developed a DVT (7.69%). Average operative time was 228.07 ± 91.64 min. Average length of stay was 5.08 ± 3.82 days. Techniques for CBE stone clearance included balloon dilation, lithotripsy, flushing, basket retrieval, Spyglass, and choledochoscope. 53.85% (7/13) used balloon dilation, 38.46% (5/13) cases used lithotripsy, 61.54% (8/13) used flushing, 15.38% (2/13) used basket retrieval, 15.38% (2/13) used

Spyglass, and 84.62% (11/13) cases used a choledochoscope. A combination of these techniques was used in 76.92% (10/13) cases.
Conclusion: RCBDE is a safe alternative to LCBDE for removal of common bile duct stones with a success rate of 92.31%. RCBDE may provide an alternative to LCBDE due to improved visualization, use of the picture in picture function, and ability to maintain retraction on the gallbladder and cystic duct. Future studies should focus on comparing outcomes between robotic and laparoscopic CBDE and whether RCBDE improves success of CBD clearance while maintaining low complication rates.

P219

Impact of Metal vs Polymer Clips During Laparoscopic Cholecystectomy

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Introduction: Titanium metal clips have classically been used to occlude the cystic artery and duct during laparoscopic cholecystectomy. Non-absorbable polymer clips are a more recent, cost-efficient alternative that offer a locking feature. There is limited research evaluating the adoption and safety of these clips during cholecystectomy. We sought to describe their use and associated outcomes at our institution.
Methods: A retrospective review was conducted on all adult patients undergoing laparoscopic cholecystectomy from 2017 to 2019 at a single institution to collect patient, operative, and treatment characteristics. The cohort was divided based on the use of metal or polymer clips. The primary outcome was 30-day presentation to the emergency department (ED). Secondary outcomes included readmission, infection, fluid collection on CT scan, and need for endoscopic retrograde cholangiopancreatography (ERCP). Chi square and Wilcoxon rank-sum tests were used for univariate associations and multivariable logistic regression was used to control for age, body mass index (BMI), disease diagnosis, trainee as secondary surgeon, procedure time, cholangiogram, and surgeon years in practice.
Results: A total of 1,244 patients were included of which 934 (75.1%) had metal clips and 310 (24.9%) had polymer clips. Within the polymer group, there was a significantly higher BMI (32.9 kg/m2 vs 31.3 kg/m2, $p = 0.001$) and rate of acute cholecystitis (28.4% vs 17.2%, $p < 0.001$). Polymer clips also had a significantly longer median operative time (68 min vs. 47 min, $p < 0.001$), though this group had a higher rate of intraoperative cholangiograms (28.1% vs 4.1%, $p < 0.001$) and trainees present (83.0% vs. 67.3%, $p < 0.001$). For the entire cohort, thirty-day ED presentation was 8.4%, with a significantly higher rate for the polymer group (12.3% vs 7.2%, $p = 0.005$). In the adjusted analysis, ED visits were higher in the polymer group (odds ratio 1.79, 95% confidence interval 1.03—3.11; $p = 0.038$). Despite higher presentation to the ED, 30-day readmission was similar for polymer clips compared to metal clips (4.8% vs 3.2%, $p = 0.18$, respectively), as were infection (1.9% vs 0.8%, $p = 0.08$), need for ERCP (0.9% vs 0.9%, $p = 0.09$), and presence of fluid collection on axial imaging (1.3 vs 0.6%, $p = 0.27$).
Conclusion: Polymer clips may be an effective alternative to metal clips, with a similarly low complication rate despite increased presentation to the ED. Given laparoscopic cholecystectomy is one of the most performed operations worldwide, a more cost-efficient option, such as polymer clips, warrants further evaluation.

P220

Assessing Patient Safety in Laparoscopic Cholecystectomy During Surgical Residency Training: Safety Culture Checklist and Staff Supervision

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Laparoscopic cholecystectomy (LC) is essential for the qualification of general surgery at Bhumibol-Adulyadej-Hospital. Our program first started in 1976 and became one of the oldest surgical residency training centers in Thailand. The objective is to prioritize patient safety in clinical setting, specifically in LC, during surgical training. This retrospective study demonstrates patients who underwent LC between January 2015 to December 2021. The safety culture checklist used in LC comprises three crucial steps: clear critical view of safety, identification of cystic artery and possible aberration, and dissection of encircled cystic duct before clipping. All attending staff were board-certified surgeons by the Medical council of Thailand with more than 5 years of practice in general surgery. The residents who performed the LC were proven eligible by LC assistance records in logbooks and participation in laparoscopic workshops. All the LC done by the residents, including the cases that attending staff took over, are the study group. The control group was the LC solely done by attending staff. The statistical data was analyzed under IBM-SPSS using t-test for continuous data and the chi-square test for categorical data with statistical significance of p-value < 0.05. Results: 2,345 patients who underwent LC during the study period were included in this study. Residents performed 165 cases as the study group, and attending staff performed 159 cases as the control group. Patient characteristics showed no statistical difference between the two groups. Statistically different in pathological diagnosis as chronic cholecystitis, acute cholecystitis, and cancer (89.7%, 7.3%, 3% vs. 73.6%, 24.5%, 1.9% (p 0.01, 0.01, 0.51), emergency-LC (1.8% vs. 10.1%, p 0.02(OR 0.17, 95%CI 0.05-0.58), postoperative hospital stay(4.34 vs 5.09 days, p 0.01(95%CI 0.17-1.34), operative-time(91.33 vs 87.98 min, p 0.13, (95%CI -11.62-4.92) and EBL (25.90 vs 35.38 ml, p 0.035, (95%CI -5.94-24.76). However, no significant difference in overall complication (11.5% vs 5.7%, p 0.06, (OR 2.17, 95%CI 0.95-4.95), conversion rate(1.8%% vs 5.7%, p 0.07, (OR 0.31, 95%CI 0.08-1.162), bile duct injury (n = 1 vs n = 2, p 0.61, OR 0.48, 95%CI 0.95 0.04-5.33) and surgical site infection(2.4% vs 1.9%, p 0.74, OR 1.23, 95%CI 0.29-5.86). The surgical residency training in laparoscopic cholecystectomy is safe under the supervision of attending staff with a safety culture checklist. However, randomization and selection bias could not be avoided in this study.

P221

Choledocholithotripsy Using Holmium Laser Is a Noble Procedure in Selected Cases

Foridul Hussain, Dr; Dew care Hospital and Research centre

Introduction: Transcystic choledocholithotripsy with laser during laparoscopic cholecystectomy is safe and simple proceedure associated with fewer complications. Aim of the study is to establish TC Choledocholithotripsy during lap cholecystectomy as a single stage clearance of CBD calculi.
Materials and Method: Patient undergoing LCBDE with selected case having < 4 calculi and calculi distal to the cystic duct insertion to CHD, normal or minimally dilated CBD, intraoperatively detected

dilated CBD or calculi on Inta-operative Cholangiogram, transcystic route was attempted in all cases with choledocholithotripsy with Holmium laser. However in failed cases of transcystic route, LCBDE with trans-ductal route was followed. We have used ureteroscope instead of choledochoscope for the proceedure.
Results: 523 cases of LCBDE has been performed during a period of 2017-2023. However since last 1 year, we are using Holmium Laser for choledocholithotripsy and 29 cases has been performed. patients were discharged on 3rd post op day without any complications like pancreatitis or bile leak etc. All patients were followed up with abdominal ultrasound at 1 month.
Conclusion: Laser choledocholithotripsy is an effective, safe technique for uncomplicated CBD calculi.

P223

Routine Use of the DaVinci Robotic Platform for Cholecystectomy: A High Volume Center Impact

Juan S Malo, MD; Joseph Lim, MD; Houssam Osman, MD; D. Rohan Jeyarajah, MD; Joseph Buell, MD, MBA; Methodist Richardson Medical Center

Introduction: Critics have challenged the routine use of robotics for cholecystectomy. With the stable optics and interchangeable instruments of the Xi DaVinci platform we analyzed the clinical and financial benefits of routine use of a robotic approach.
Methods: Retrospective analysis of matched Intuitive and clinical data was performed to evaluate the clinical use, outcomes and financial impact of the routine use of the DaVinci Xi robotic platform for cholecystectomy. Cost analysis was performed using 80% utilization of robotic systems and average hospital cost data for the United States.
Results: The study cohort had similar demographics and clinical presentation including Obesity (BMI > 35), cirrhosis, acute cholecystitis, pancreatitis and percutaneous cholecystostomy tube placements:

	Age (years)	Male (%)	BMI > 35 (%)	Acute (%)	Percutaneous Cholecystostomy (%)	Cirrhosis (%)	Pancreatitis (%)	Conversion (%)	OR time (min)	LOS (days)
Robotic N = 97	43.8	29.9	8.2	13.4	6.1	11.3	7.2	0	30.8	0.17
Laparoscopic N = 97	54.0	42.3	10.3	12.4	14.4	11.3	9.3	6.2	42.1	0.86
p-Value	0.318	0.073	0.622	0.831	0.059	1.000	0.604	***0.013***	***< 0.0001***	***< 0.0001***

The robotic group realized a reduction in stays over 24 h (47% to 16%) with equivalent complication rates and significant cost savings OR time $92,990 and length of stay $199,290 with an estimated cost savings of $3013.20 per patient or $584,560 for the entire cohort.
Conclusions: Robotic cholecystectomy in this series required significantly less conversions resulting in lower operative times, overall length of stay and cost reduction per patient. This study will require further analysis of fixed and variable cost associated with robotic systems across variable utilization.

P224

The Elusive Staghorn Renal Calculus Causing Biliary Obstruction and Duodenal Fistula, A Case Report

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Background: Renal calculi are a common ailment with a range of presentations from incidental findings to septic stones. Renal stones may even erode through the kidney and affect surrounding organs. This report describes a complication of renal calculus not described in decades: staghorn calculus causing biliary obstruction and duodenal fistula.
Case Presentation: 67yo female presented to the emergency department 8/22/22 complaining of worsening right lower quadrant pain over several months. Denied fever, chills, nausea, vomiting, burning or urgency with urination. Pertinent history included cholecystectomy but no history of urinary tract infection. Vitals were stable, she had a mild leukocytosis, unremarkable urinalysis but an elevated alkaline phosphatase on initial presentation. Computed tomography (CT) demonstrated biliary ductal dilation with perinephric abscess and associated staghorn calculus in the right kidney. The patient initially left AMA but returned the following day, was admitted, started on IV antibiotics, underwent IR drainage and urology planned for interval elective nephrectomy. The patient re-presented to 10/14 complaining of worsening symptoms. Repeat CT demonstrated persistent biliary dilation with "distal common duct appears extrinsically compressed by a large right staghorn calculus which may have eroded into the second portion of the duodenum". The patient did not show signs of sepsis but was admitted for IV antibiotics and then underwent nephrectomy. The duodenum was found to be fistulized to the renal capsule. A radical nephrectomy was required and then hepatobiliary surgery intervened for duodenal repair. Primary repair with T-tube placement and pyloric exclusion was performed. The patient progressed as expected and was discharged 10/31. She re-presented 11/6 with a retroperitoneal abscess requiring drainage and was discharged 11/14, noted to be noncompliant with care.
Discussion: Pyeloduodenal fistula and biliary obstruction from renal calculi are both exceedingly rare. Literature review provided 8 documented cases of pyeloduoenal fistula since 1975 while biliary obstruction is described twice since the 1950s. A single case of biliary obstruction with pyeloduodenal fistula from renal calculi was reported in 1976. This case describes a rare pathology and provides a discussion of different modern methods for addressing biliary obstruction and duodenal fistula secondary to renal calculi.

P225

Choledocal Fascioliasis as an Uncommon Etiology of Cholestasis, Diagnosis and Resolution Through ERCP: A Case Report.

Luisanna Pantaleon Santana, MD, SPC[1]; Priscilla Guerrero Camarena, MS[2]; Eduardo Bon, MD, SPC[1]; Ivelisse L Jimenez, MD, SPC[1]; Ruben Rivas, MD, SPC[1]; [1]CEDIMAT; [2]UNIBE

Cholestasis currently represents a clinical-therapeutic challenge, encompassing a wide spectrum of pathologic entities with varying degrees of severity and prognosis. From an etiological perspective, rarely cited infectious causes include those associated with hepatobiliary parasites such as the trematodes Fasciola hepatica and gigantica. Fascioliasis is a rare and incidental infection that affects the hepatobiliary system of its hosts. It can present acute conditions such as subcapsular hepatic hematomas with or without hemobilia, as well as chronic conditions with severe symptoms including cholangitis, biliary cirrhosis, and sclerosing cholangitis.

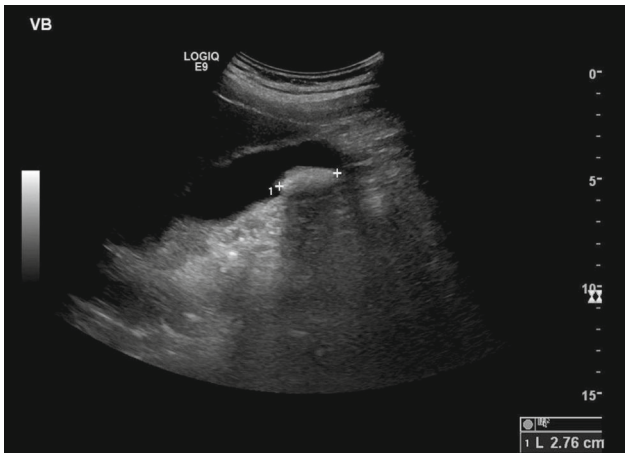
A 60-year-old Dominican farmer, with no relevant clinical history came to our center with a history of intermittent generalized itching with secondary excoriations for a year. He experienced a sudden episode of abdominal pain localized in the epigastrium that radiated to the back and both hypochondriac regions, with a score of 8/10 on the pain scale. Three days after the onset of symptoms, he developed jaundice of the skin and mucous membranes, acholic stools, and dark urine.

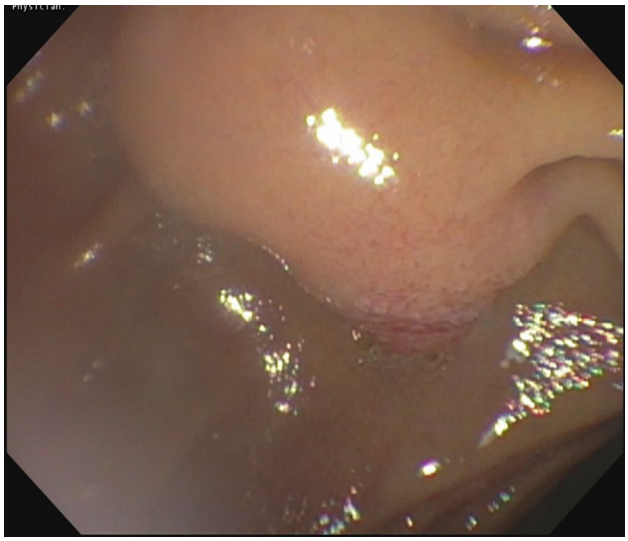
An abdominal ultrasound was performed, which reported cholelithiasis without signs of cholecystitis or ductal dilation. Blood tests revealed: total bilirubin: 6.13 mg/dl, direct bilirubin: 5.05 mg/dl, indirect bilirubin: 1.08 mg/dl, alkaline phosphatase: 328 U/L, gamma-glutamyl transferase (GGT): 80U/L, aspartate transaminase (AST): 290 U/L, alanine transaminase (ALT): 173 U/L, lipase: 12U/L, amylase: 74U/L.

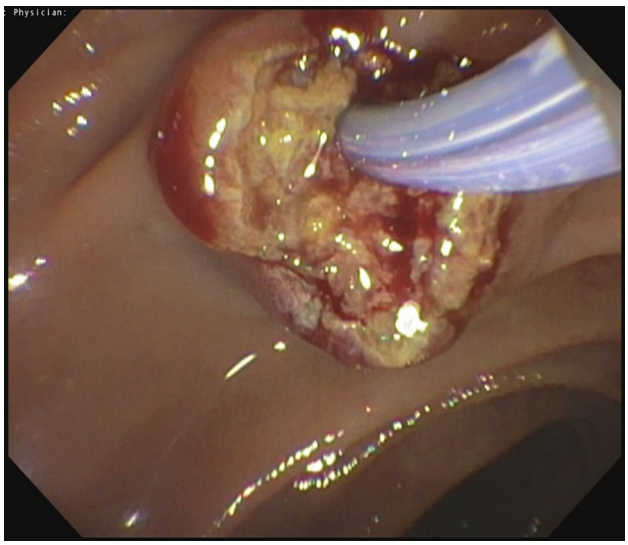
Given the symptoms of cholestasis and high suspicion of choledocholithiasis, an endoscopic retrograde cholangiopancreatography (ERCP) was performed, revealing a prominent Ampulla of Vater. Fluoroscopy revealed a lanceolate image in the distal third of the common bile duct. A complete sphincterotomy was performed, extracting a live parasite, lanceolate leaf-shaped, white-grayish in color with regular borders, morphologically consistent with Fasciola Hepatica. Following its removal, spontaneous bile drainage was observed.

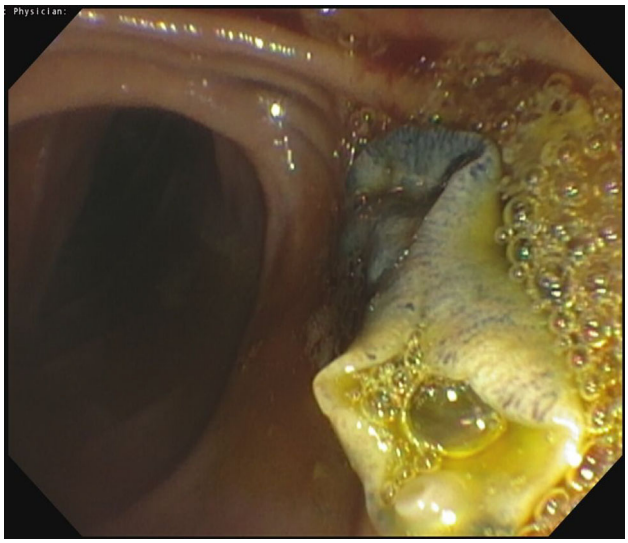
An oral dose of 750 mg triclabendazole was administered every 12 h for 24 h as pharmacological management. An adequate resolution of the condition and satisfactory clinical/paraclinical response to the bimodal management was observed.

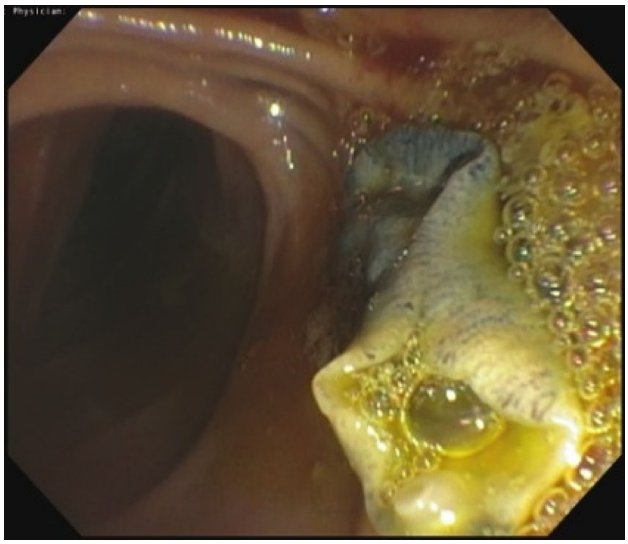
This case illustrates a rare cause of choledocal obstruction, caused by an important parasitic infection of sheep and cattle. Fascioliasis is a tropical disease that should be suspected in patients who work with livestock and present with symptoms of cholestatic jaundice. Its identification as a cause of cholestasis and other morbid conditions facilitates timely resolution of the disease and institution of appropriate therapy.

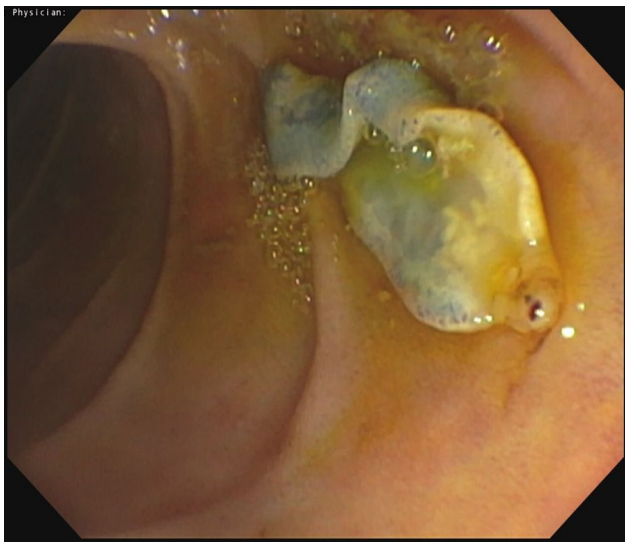












P226

Duplicated Gallbladder in an Elderly Patient with Choledocholithiasis

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First described in 1675 by Blasius et al., duplication of the gallbladder represents a rare congenital anomaly that is infrequently encountered. In this congenital morphology, duplication of the gallbladder has been reported to occur in 1 out of 4000 people [1]. However, this incidence, from a study in 1926, is unexpectedly high given the current number of biliary procedures performed annually. While the presence of an accessory gallbladder does not necessarily confer symptomatology, this pathology is frequently discovered incidentally through routine imaging or unrelated surgical procedure. When symptoms are present, they mimic those seen with more common pathologies including cholecystitis, cholelithiasis, choledocholithiasis, or cholangitis.

Here we present an intriguing case of an 89-year-old female who presented with symptoms and imaging consistent with choledocholithiasis. However, upon review of imaging and endoscopic retrograde cholangiopancreatography, the patient was found to have a duplicated gallbladder. Through shared decision making with the patient and her family, she elected for cholecystectomy. She underwent uncomplicated cholecystectomies, which highlighted a rare anatomical variant. Upon laparoscopy, she was noted to have unique and independent cystic ducts which separately drained into the common bile duct. Additionally, she was noted to have a singular cystic artery with

innumerable branches supplying both the cephalad and caudal gallbladders. Following successful cholecystectomies, the patient had an unremarkable post-operative course and was doing well at follow-up. It is known that biliary anatomy is highly variable, posing daily challenges for surgeons worldwide. However, in this uncommon aberrancy, there is no consistent anatomical morphology which further obfuscates surgical planning and treatment. Numerous anatomical classifications have been described, including Boyden's classification which characterizes the pathology based upon cystic ductal drainage [2]. Interestingly, the patient described here was noted to have an "H-Shaped" or "Ductular type" gallbladder duplication. This case highlights a distinct pathology that is rarely described along with our successful surgical management.

P228

Critical View of Safety Approach vs Infundibular Technique in Laparascopic Cholecystectomy, Which One is Safer? A Systematic Review and Meta-analysis

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Introduction: Laparoscopic total cholecystectomy (LC) remains the gold standard procedure for the treatment of benign gallbladder disease, albeit with the potential for catastrophic complications such as bile duct injury. Recognizing the need to mitigate this complication, various techniques have emerged, including the infundibular technique (IT) as well as the Critical View of Safety (CVS) technique introduced by Strasberg et al. In this systematic review and meta-analysis, we assess the outcomes of both techniques, with a primary focus on evaluating their impact on bile duct injuries.
Methods: We conducted a comprehensive search using PubMed and Scopus databases, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Our initial search retrieved 229 studies out of which 38 were duplicates. After screening the unique studies against our predefined inclusion/exclusion criteria, only 5 met our criteria and were ultimately included. Additionally, a manual search through the literature identified an additional 8 relevant studies, bringing the total number of included studies to 13. The search focused on the incidences of both minor and major bile duct injuries, the conversion rate to open procedure, length of hospital stay, and operative time, which were extracted and investigated. The quality of the included studies was assessed using the Newcastle–Ottawa scale.
Results: The total number of included patients was 4,837 from 13 studies. Approximately two-thirds underwent LC using the CVS technique (61.1%), and 66.3% were female with a mean age of 44.4 ± 11.2 years. The CVS technique was associated with a significant reduction in the total number of bile duct injuries (Relative Risk (RR) = 0.35; 95% Confidence Interval (CI): 0.17—0.72), primarily major bile duct injuries (RR = 0.28; 95% CI: 0.13—0.63). However, there were no significant differences between the two approaches in terms of the rate of minor bile duct injury, conversion rates, length of hospital stay, or operative time.
Conclusion: Our study demonstrated the superiority of the CVS technique in terms of a reduced incidence of major bile duct injuries compared to the IT approach. However, no significant differences were observed in the other outcomes. Further research, including multicentric randomized controlled trials will be necessary to further evaluate the efficacy of these techniques.

P229

Gangrenous Cholecystitis, A Case Series

Maryam Hassanesfahani, MD[1]; Benjamin Seth Williams[2]; Ayesha Zamir Asghar[2]; Martine A Louis, MD, FACS[1]; Nageswara R Mandava, MD, FACS[1]; [1]Flushing Hospital Medical Center; [2]St. George's University, St. George's, Grenada

Introduction: Annually 200,000 Acute cholecystitis (AC) cases are diagnosed in the US (1). Gangrenous cholecystitis (GC) occurs in 2-20% of AC (2), with ischemic necrosis of the gallbladder. GC is often associated with a delay in diagnosis, leading to increased complications, and Length of stay (LOS) GC is associated with mortality rates ranging anywhere from 15 to 50% (3). We present a series of patients who were treated for GC in our institution.
Methods: A retrospective review in a community hospital of patients between October 2012- December 2022 with GC confirmed by pathology. Data collection of demographics, clinical presentation, laboratory data, imaging studies, operative findings, management, and outcomes. The study's aim was to identify risk factors, treatment, and outcomes.
Results: Among 5746 patients who underwent surgery for AC, 67 were diagnosed as GC. The average age was 56 (SD = 16.5) and 64% were male. 37% Hispanic, 28% Asian. Co-morbidities included: hypertension 48% obesity: BMI above 30, (36%), diabetes(33%). 64% presented with right upper quadrant pain, 46% with epigastric pain. On CT imaging 43% had gallbladder distension, 22% had fat stranding, 3% had perforation. The patients were further subcategorized based on the type of surgical intervention: Treatment included laparoscopic cholecystectomy in 75%, laparoscopy converted to open 19%, and open cholecystectomy 3%. Complications included bile leak 7%, wound infection 4%, hematoma 3%, and wound dehiscence 1%. The mortality was 1.4%. (Table 1)
Conclusion: Gangrenous cholecystitis is a serious complication of gallbladder disease. It is often associated with a delayed diagnosis GC is significantly more common in male patients, with higher rates of Laparoscopy conversion to open and increased complications. However, a high index of suspicion and timely surgical intervention can lead to decreased mortality.
Table 1

Demographics	Age (%,n)	55.81	16.55
	Hispanic (%,n)	37%	n + 25
	Male (%,n)	64	64
CT findings	Fat stranding (%,n)	22	15
	Perforation(%,n)	3	2
Treatments	Laparoscopic cholecystectomy (%,n)	75	50
	Laparoscopic cholecystectomy convert to open (%,n)	19	13
	Open cholecystectomy (%,n)	3	2
Outcomes	Complications (%,n)	40	27
	Mortality (%,n)	1.5	1

P230

Subvesicular Bile Duct Leak After Cholecystectomy of a Sinistropositioned Gallbladder

Juyeon Park, MD; Matthew Madion, MD; Matthew Mancini, MD; University of Tennessee Knoxville

Introduction: A sinistropositioned gallbladder (SPG), or a left-sided gallbladder, is a congenital anomaly that is rare and most frequently discovered intraoperatively. There are three major variations with SPG: secondary to situs inversus, right-sided gallbladder with abnormally located ligamentum teres, and a true left-sided gallbladder with the gallbladder on the left lobe of the liver.

Case Description: This was a 38-year-old female with history of laparoscopic roux-en-y bypass who was originally seen in clinic for evaluation of persistent mid-abdominal pain with radiation to the left upper quadrant. Abdominal ultrasound revealed cholelithiasis with a mildly hydropic gallbladder, trace pericholecystic fluid and a common bile duct diameter of 7 mm. There were no preoperative indications of SPG. The patient was planned for a robotic-assisted cholecystectomy with cholangiogram.

Intraoperative description: Three robotic trocar ports and a single assistant port were placed per the surgeons standard robotic-assisted technique. The gallbladder appeared to be located on the left lobe of the liver. There was inadequate retraction of the gallbladder in that left-sided position and clearing of the cystic plate was difficult due to visualization, so a top-down dissection was done. The cystic duct was eventually identified and isolated. A cholangiogram was performed which revealed no evidence of leak or filling defect. Patient was discharged the same day.

Complication: The patient returned to the emergency room on post-operative day three with worsening right upper pain. Labs showed a slight leukocytosis and hyperbilirubinemia. CT scan revealed fluid in the right upper quadrant and subsequent hepatobiliary scan showed concern for persistent bile leak. The patient was taken back to the operating room for diagnostic laparoscopy a bile leak was discovered in the superior aspect of the liver bed, likely a subvesicular duct (Fig. 1). This leak was closed with absorbable suture in a figure of eight fashion (Fig. 2). A drain was placed in the dissection bed. The patient was discharged on post-operative day two with the drain in place. The drain remained serosanguinous and was removed in clinic follow-up.

Discussion: In cases of SPG, a high degree of suspicion for other anatomic abnormalities including portal vein, cystic artery, and biliary tract variations should proceed. Particularly, biliary tract variants not limited to subvesicular ducts (ducts of Luschka) can be a source of morbidity. Additional adjuncts including altered port position, top-down dissection, cholangiography, and fluorescence imaging should be considered when a sinistropositioned gallbladder is encountered.

Figure 1.

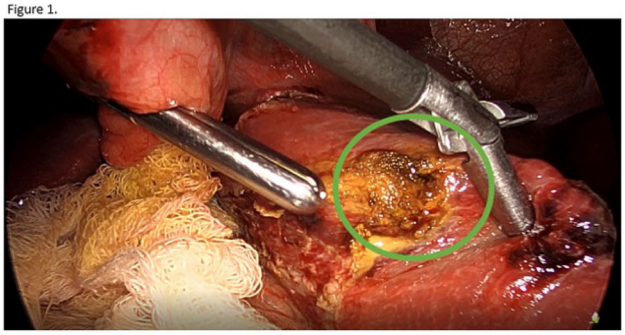
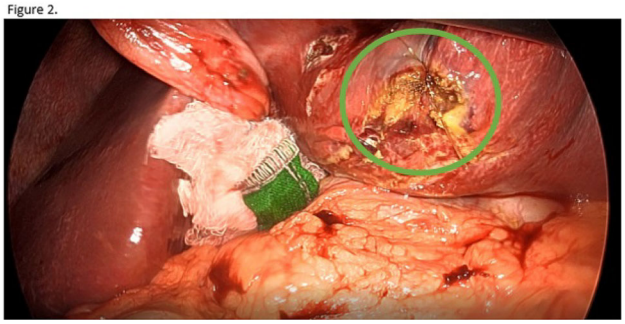


Figure 2.



P231

Difficult Laparoscopic Cholecystectomy with CBD Exploration in Case of Impacted CBD Stones: Our Experience with 3D Laparoscopy

Arti Mitra, MS, FMAS, FIAGES[1]; Unmed Chandak, MS, FIAGES, FMAS[1]; Brijesh Gupta, MS, FMAS[1]; Prasad Y Bansod, MS, FMAS, FIAGES, FALS[1]; Pravin Bhingare, MS, FMAS[1]; Manjusha M Kanetkar, MBBS, FCPS[2]; Shweta B Gupta, MS, FMAS[1]; [1]GMC Nagpur; [2]Chhatrapati Shivaji Maharaj Hospital Kalwa Thane

Background: Common bile duct (CBD) stones have been noted in 10% to 15% of patients with Cholelithiasis. CBD stones usually results from stones originating in the gallbladder and migrating through the cystic duct. Impacted CBD stones & dense gallbladder adhesions often increase the trend towards conversion open procedure during lap CBD exploration.

Materials & Method: A 73 years old female with no prior history medical illness presented with recurrent colicky abdominal pain since 6 months accompanied with vomiting. She had fever with chills & anorexia since 2 months. No history of jaundice, passing clay colored stools, diarrhoea/constipation. She was non-diabetic, and non-hypertensive

On examination, abdomen was soft with mild tenderness in right upper abdomen. No palpable organomegaly or any obvious lump. Her labs were normal except bilirubin 2.7 (Direct-2.1). Ultrasound showed Cholelithiasis with choledocholithiasis. MRCP showed Multiple filling defect in common bile duct and common hepatic duct largest measuring 2.3 cm in CHD.

Patient was taken for Laparoscopic Cholecystectomy with CBD exploration in a 3D camera setup. Dense fibrotic adhesions of GB were removed using harmonic shears. Multiple large impacted CBD calculi were removed after opening the CBD. T-Tube was placed. Cholecystectomy with CBD exploration was completed using 5 ports.

Patient was kept nil by mouth for 24 h. Orally allowed after 24 h, patient tolerated feed well. Sub-hepatic abdominal drain (No 18) was

kept in sub-hepatic space. Nil drain output for 3 days, drain removed on 3rd day. On 5th day T tube cholangiogram done. T tube removed on day 6th. Patient was discharged on POD 7 with bilirubin of 0.8
Results: The first follow-up visit was 15 days after discharge and the patient was tolerating a regular diet without any episode of abdominal pain. Histopathology examination showed chronic Cholecystitis.
Conclusion: Lap Cholecystectomy with CBD exploration is a standard and preferred choice of treatment for large multiple CBD stones. Choledochotomy for CBD clearance with cholecystectomy done in a 3D system eases the visibility and helps in treating calculous biliary tract disease in a single setting without additional anesthesia/procedure. It is very effective in clearing difficult CBD stones even in presence of altered biliary anatomy. It provides depth perception, easy laparoscopic dissection leading to shorter hospital stay & lower hospital cost. Intra op fluoroscopic guided cholangiogram & Post-op T tube cholangiogram help in removal of retained stones. Such a minimally invasive approach would help to improve patient quality of life by minimizing treatment-related discomfort.

P233

Suspected Choledocholithiasis: What Is the Best Way to Manage?

Jesse K Kelley, MD[1]; Jeremy Mormol[1]; Charles Reed[2]; Mary Reiber[2]; Avery Sena[2]; Camille Abutin[2]; Jake Sypniewski[2]; Giuseppe M Zambito, MD[1]; David E Scheeres, MD[1]; Amy L Banks-Venegoni[1]; [1]Corewell Health West; [2]Michigan State University College of Human Medicine

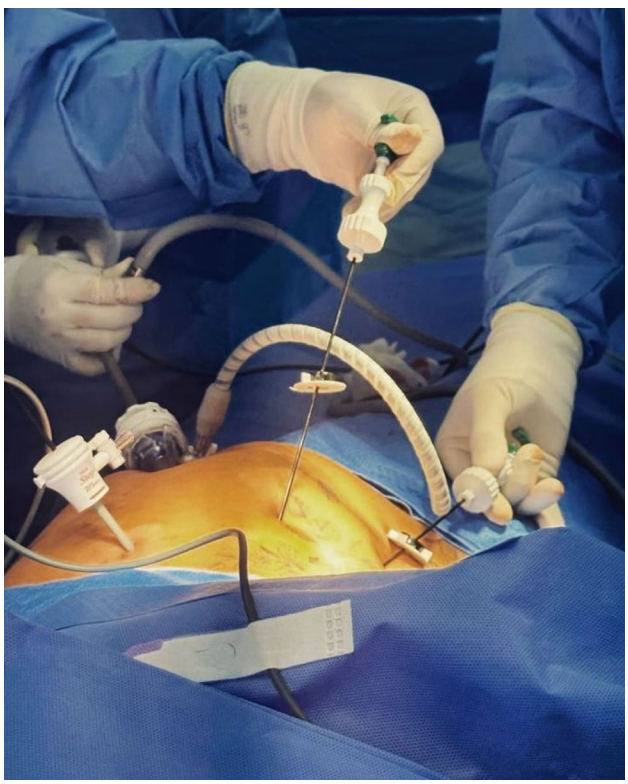
Introduction: Endoscopic retrograde cholangiopancreatography (ERCP) has both diagnostic and therapeutic benefit in treating suspected choledocholithiais prior to surgery but has a complication rate of causing pancreatitis up to 15%. Due to this risk there are those that prefer to perform MRCP first to confirm the presence of CBD stones prior to subjecting patients to ERCP risks. The goal of our study is to evaluate the safest, efficient, and most cost-effective way to manage suspected choledocholithiasis. We hypothesized that patients who underwent ERCP first had decreased length of stay and therefore decreased total hospital costs relative to those who did not undergo ERCP first.
Methods: We conducted a retrospective review of patients over the age of 18 years with suspected chole-docholithiasis, based on labs and imaging, at a single institution between 2017 to 2023. Patients were excluded if they had gallstone pancreatitis. Patients were then characterized into one of three groups based on their management pathway: (1) ERCP first, (2) MRCP first, or (3) surgery first with possible intra-operative cholangiogram pending laboratory trend. Our primary outcome was hospital length of stay. Secondary outcomes of interest included complication rates and whether patients admitted to non-surgical services had increased length of stay relative to those admitted to a surgical service.
Results & Discussion: A total of 132 patients were included, 33 patients (25%) had MRCP first, 60 patients (45%) had ERCP first, and 39 patients (30%) received surgery first. The average age of all patients at time of admission was 50 (SD-20) years. A majority were female (n = 84, 64%), Caucasian (n = 110, 83%), and non-Hispanic (n = 118, 89%). The average BMI was 32 (SD-7) and the average Charl-son Comorbidity Index was 2. The average length of stay for the MRCP, ERCP, and surgery first groups were 3.2, 3.7, and 2.8 days, respectively. On pairwise analysis, there was no statistically significant difference between the three groups (MRCP vs ERCP, p = 0.12; MRCP vs. sur-gery, p = 0.26; ERCP vs. surgery, p = 0.06). The post-ERCP pancreatitis rate was 3%. Over half of the patients were admitted to a surgical service (n = 69, 56%). The average length of stay for those admitted to a surgical service was 2.8 days versus 3.8 days for those admitted to the medicine service (p = 0.01). There was a trend towards significance (p = 0.06) when comparing the surgery first groups to ERCP and MRCP, with a clear clinical benefit with one less hospital day.

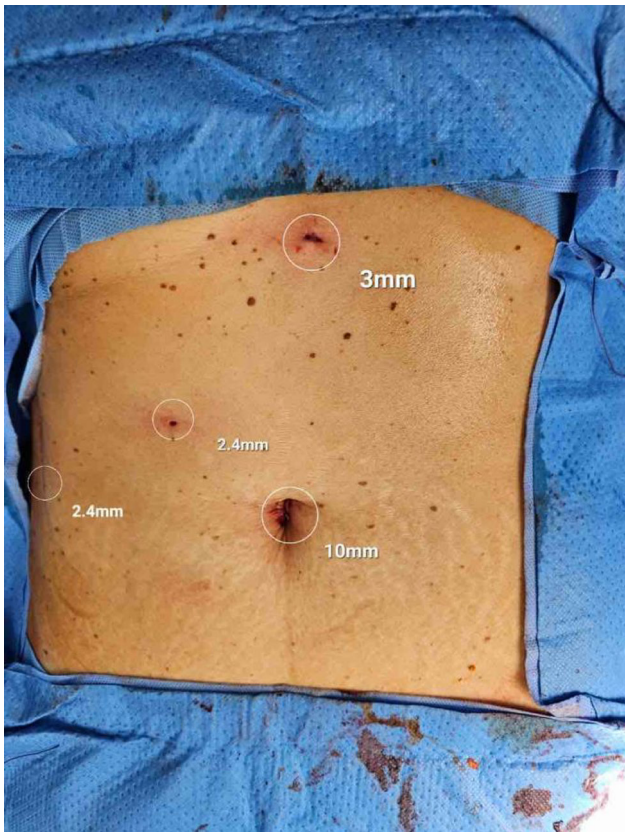
P234

Evaluation of the Feasibility and Safety (by the Correct Obtaining of the Critical View of Safety) using Mini-laparoscopic Devices and Percutaneous Handles During The Different Degrees of Complexity in the Laparoscopic Cholecystectomy

Gabriel Rangel-Olvera[1,2]; Bianca Alanis-Rivera[1,3]; Mario Alberto Gallardo-Ramirez[1]; Ignacio Del Rio-Suarez[1,4]; [1]Hospital Angeles Universidad; [2]ISSSTE Tlahuac; [3]Instituto Nacional de Cancerologia; [4]Hospital General "Dr. Manuel Gea Gonzalez"

Introduction: The advantages of Laparoscopic cholecystectomy (LC) have been proven against the open approach; including less postoperative pain, shortened hospital stay, early return to activity, improved cosmesis, and patient satisfaction. Modified techniques have been postulated to increase the benefits of minimally invasive surgery; mini-laparoscopic (trocars less than 5 mm) cholecystectomy (MLC) is one of the most studied techniques. This study aimed to evaluate the efficiency and safety (evaluating the objective obtaining of the Critical view of Safety, CVS) of the MLC by the different intraoperative complexity.
Methods: A prospective study was performed, evaluating the demographic and surgical variables of the MLC performed by the same surgical team, from March 2021 to September 2023. The MLC was performed using a 10 mm trocar for the scope, one 3 mm trocar, and 2 Percutaneous handles (PH) following the conventional 4 ports LC technique; patients were discharged within the first 24 h from the surgery, with mild analgesics, and prophylactic antibiotics.





Results: A total of 51 MLC were collected; being 38(74.51%) female and 30(58.5%). The complexity using the Parkland grading scale (PGS) was as follows, 13 patients presented a G1(25.49%), 14 were G2(27.45%), 9 were G3(17.85%), 8 were G4(15.69%) and 7 were G5(13.73%). The CVS was satisfactory (Doublet score of 5 or 6) on 37 patients (72.55%); the rest of the obtained scores were as follows: 2 (2,3.92%), 3 (5,9.8%), 4 (7,13.73%), 5 (22, 43.14%) and 6 (15,29.41%). Only 10 patients (19.61%) required more analgesia. As expected a higher PGS presented a higher risk of conversion from the PH to mini-laparoscopic or conventional trocar (OR 2.31, p = 0.13) or conversion of the Mini-laparoscopic Subxiphoid trocar to conventional trocar (OR 2.04, p = 0.005). The mean dissection time of the hepatocystic triangle and knotting of the cystic structures was different between the PGS strata (p = 0.003; mean time on G1 = 27.53 min VS G5 = 47.14 min). Our variables were compared with conventional LC and paired based on the PGS from our database; finding a significantly higher surgical time on the MLC during all phases of the surgery (p = < 0.05) but higher Satisfactory CVS and use of more analgesics (p = < 0.05).

Conclusion: The MLC and the use of PH are safe and feasible even in complex LC; without sacrificing safety measures like the objective obtaining of the CVS and with the benefits of less postoperative pain compared to the conventional laparoscopic approach.

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Incidental Dysplasia in Patients Undergoing Proctocolectomy and Ileal Pouch-Anal Anastomosis for Medically Refractory Ulcerative Colitis

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Objective: To assess the incidence of dysplasia and carcinoma in patients with medically refractory Ulcerative Colitis (UC) undergoing proctocolectomy which was not previously detected during endoscopy.

Methods: We performed a retrospective review of electronic health records of patients who underwent a proctocolectomy and ileal pouch-anal anastomosis (IPAA) for ulcerative colitis from December 2016 to August 2023 at a single center. Patients with dysplasia or carcinoma as the indication for surgical intervention were excluded. Surgical pathology specimens from the total abdominal colectomy and subsequent completion proctectomy and IPAA were reviewed. Pathology reports from most recent endoscopic procedures were also reviewed. To detect factors associated with dysplasia, univariate comparisons were performed using the Mann-Whitney U test for continuous variables and Fisher's Exact test for categorical variables.

Results: 226 patients underwent proctocolectomy and IPAA for UC during the study period. 191 patients did not have an endoscopic diagnosis of dysplasia or carcinoma at the time of colectomy and were included in our study. 115 patients were male (60.2%). The median age at surgery was 32 years (IQR: 24-46) and median time from diagnosis of UC to surgical intervention was 4 years (IQR: 1-10). The indications for surgery were colitis refractory to medical therapy (66.5%) and acute flare of disease while on medication (33%). The incidence of dysplasia in surgical specimens was 6.28% (n = 12). All twelve patients had a colonoscopy with no evidence of dysplasia prior to surgery. Median duration between the most recent colonoscopy and colectomy was 4 months (IQR: 0.5-8). Ten patients had dysplasia identified at the time of total abdominal colectomy and two patients had dysplasia identified at the time of completion proctectomy and IPAA. The dysplasia was low grade dysplasia in ten patients and high grade dysplasia in two patients. One patient had invasive adenocarcinoma that was previously undetected, in addition to low grade dysplasia. On univariate analysis, patients with dysplasia were found to have a longer median time from UC diagnosis to surgical intervention of 9 years (IQR 3-16) compared to 4 years (IQR 1-10) for patients without dysplasia (p = 0.03).

Conclusions: In our review, although most cases of dysplasia and carcinoma in patients with ulcerative colitis were identified at the time of colonoscopy, clinicians and patients need to be aware of the dysplasia/carcinoma burden that remains undetected by colonoscopy.

Table 1: Characteristics of patients with medically refractory ulcerative colitis undergoing proctocolectomy and ileal pouch-anal anastomosis without an endoscopic diagnosis of dysplasia or carcinoma (N=191)	
Age at initial surgical intervention, years	
Median [IQR]	32[24-46]
Sex, n (%)	
Male	115 (60.2)
Female	76 (39.7)
Race, n (%)	
White	155 (81.1)
Black	8 (4.1)
Hispanic	15 (7.8)
Asian	8 (4.1)
Not specified	5 (2.6)
Smoking History, n (%)	
Never Smoker	152 (79.5)
Former Smoker	32 (16.7)
Current Smoker	7 (3.6)
Stages for IPAA, n (%)	
Three-Stage	189 (98.9)
Two-Stage	2 (1.04)
Indications for Colectomy, n (%)	
Refractory to medical management	127 (66.5)
Acute flare of ulcerative colitis	63 (32.9)
With toxic megacolon	5 (2.6)
With large bowel perforation	8 (4.1)
With bowel obstruction	2 (1.0)
Iatrogenic perforation during colonoscopy	1 (0.5)
Duration of time with UC diagnosis, years	
Median[IQR]	4[1-10]
Dysplasia identified at time of surgery, n (%)	
Yes	12 (6.28)
No	179 (93.7)
Type of dysplasia identified at time of surgery, n	N=12
Low grade dysplasia	10
High grade dysplasia	2
Adenocarcinoma	1[a]
IQR=Interquartile Range, UC=Ulcerative Colitis, IPAA=Ileal Pouch-Anal Anastomosis [a] One patient had adenocarcinoma in addition to low grade dysplasia	

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Repair of Recurring Perineal Hernia in Patient with Prior Coccygectomy

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This case report follows a 70-year-old male, MG, who experienced several complications following a coccygectomy. MG first developed a reducible hernia at the incision site of the coccygectomy which led to pain and discomfort while sitting.

Currently, no treatment algorithm is available for perineal hernias. In general, the surgical approach is abdominal, laparoscopic, perineal, or mixed and involves synthetic or biologic mesh and autologous flaps. There is ambiguous evidence on which choices are optimal.

Multiple surgeries were performed on MG to treat the reducible hernia: hernia repair surgery, revision surgeries, and mesh placements, none of which were successful. Afterwards, MG developed chronic neuropathic pain near the incision site and coccydynia.

In 2023, MG underwent a second revision surgery. The first approach was a robot-assisted adhesiolysis, and return of entrapped bowel from hernia to intra-abdominal cavity was performed. Afterwards, MG was flipped to the prone position to free and return remaining bowel positioned close to the skin. Two biomeshes were placed for reinforcement at this time (Figs. 1, 2, 3). At 1-month, the patient's post-operative course was uneventful with minimal pain and no perineal bulge reported.

It seems that a perineal approach was not successful in our patient and that a combined abdominal/perineal approach may have led to permanent repair. Our procedure was similar to a previously described laparoscopic-perineal dual approach; however, the 2 meshes were both placed during the perineal portion in our procedure. In addition, we saw that both a biologic and synthetic mesh failed in MG in his first 2 interventions respectively. This suggests that mesh type may be unrelated to recurrence rate. Finally, rotational flaps were used in all 3 of MG's interventions; if our procedure succeeds permanently, this may suggest that flap type is not related to perineal hernia recurrence rate.

This case report demonstrates the complexity and challenges of hernia recurrences as well as post-operative complications. It also emphasizes the importance of performing adequate surgical techniques, and a careful evaluation to achieve favorable outcomes for patients.

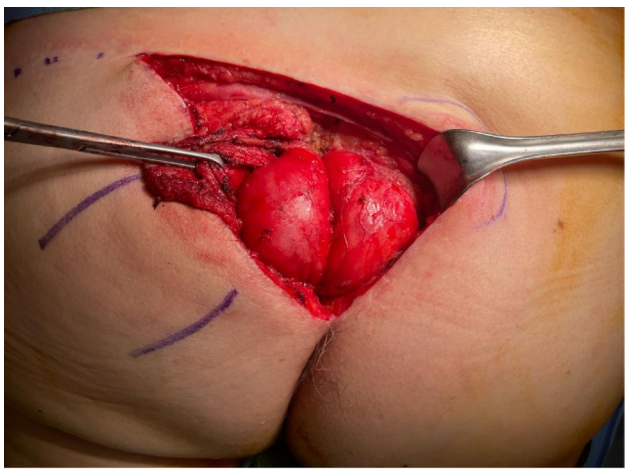


Figure 1 Hernia at coccygeal area.

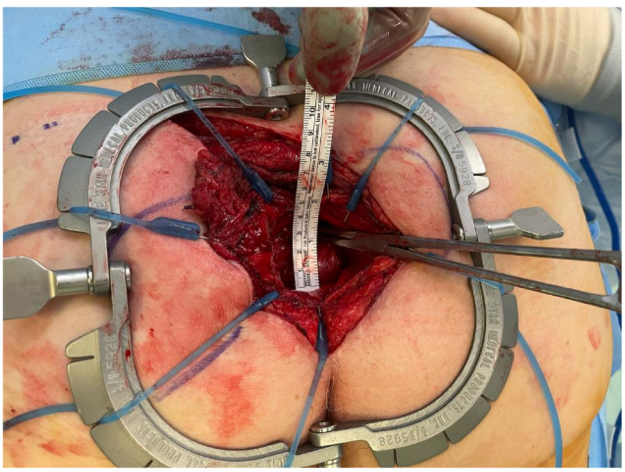


Figure 2 Hernia defect measuring 5 9 5 cm.

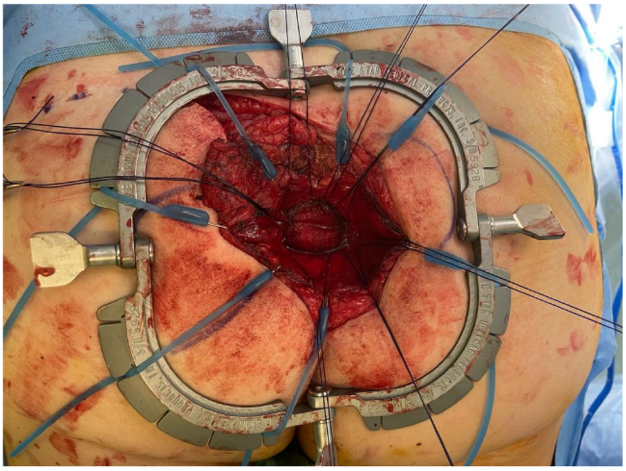


Figure 3 Mesh covering hernia defect.

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Case Report of Histiocytic Sarcoma of Small Bowel

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Introduction: Histiocytic sarcoma (a misnomer due to its spindle-shaped appearance) is a rare neoplasm, representing less than 1% of all non-Hodgkins lymphomas. Most patients present with symptoms due to unifocal or multifocal extranodal disease, most commonly involving the intestinal tract, skin, and soft tissues. Here, we describe a case of histiocytic sarcoma of the small bowel.
Case Report: The patient is a 61-year-old woman with a past medical history of mitral valve prolapse, perforated diverticulitis requiring Hartmann's procedure and subsequent colostomy reversal, prior hysterectomy and appendectomy, and biliary colic who underwent robotic cholecystectomy. Approximately 1 month postoperatively, she presented to the ED with a four-day history of band-like lower abdominal pain such that she underwent a CT scan of the abdomen and pelvis, which revealed a 5 cm small bowel mass associated with lymphadenopathy (Fig. 1). She was counseled regarding small bowel resection and agreed to proceed with this.
Intraoperative procedure: After performing a midline laparotomy, a 90-min adhesiolysis was carried out. The small bowel tumor was identified and was resected with 3 cm margins. The mesentery of the involved segment was divided and the anastomosis was created in a side-to-side functional end-to-end fashion. The common enterotomy was closed in two layers. Mesenteric defect was closed in a running fashion, and the fascia and skin were then closed.
Postoperative Course: The patient was discharged on postoperative day three, but she required readmission on postoperative day five due to an enteric leak from an enterotomy ultimately requiring reoperation on postoperative day 7. The enterotomy was closed with a figure-of-eight suture and buttressed with an omental patch. She recovered uneventfully thereafter. Pathology was sent out to Memorial Sloan Kettering and extensive immunohistochemical studies noted that the neoplastic cells expressed CD 45 (dim), CD 163, PU1, CD4, CD68 (PD-L1), CD68 (KP1), cyclin D1, OCT-2 (dim, focal), lysozyme (focal), p53 (focal, dim), but not CD1a, Langerin, CD 123, BRAF, pERK, S100, CD 117, PAX 5, CD43, CD21, CD23, SOX10, ALK, MDM2, CDK4, SMA, DOG1, desmin, pankeratin, cam 5.2, CK 18, chromogranin, synaptophysin, and INSM1. No abnormal expression of BRG1, BRM, and BAF47 was detected. Ki67 immunohistochemistry was 10%
Conclusion: Histiocytic sarcoma is a diagnostic challeng as it is uncommon and can affect many organ systems. Despite its rarity, this patient demonstrates the importance of keeping a broad differential when evaluating epigastric pain.

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Uncharted Territory: Preliminary Insights from Colonoscopy Screening in the Dominican Republic

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Introduction: This study assessed the status of screening colonoscopies in the Dominican Republic and examined differences in findings based on age. While guidelines recommend starting screening at age 45, the current state of screening in the country remains unclear.
Methods and Procedures: We conducted a preliminary retrospective analysis of medical records from patients who underwent screening colonoscopy at Santo Domingo's Hospital General de la Plaza de la Salud in the year 2022. Patients under 30 and those not screened for preventive reasons were excluded. We categorized patients by age (≥ 50 and < 50) and collected data on polyp and malignancy prevalence and their locations. Descriptive statistics were employed to assess demographic characteristics and the prevalence of findings, with specific attention to their location within the bowel. Additionally, we compared cancer incidence between age groups, utilizing 50 years as the cutoff point. Statistical analysis was conducted using Chi-Square statistics, and the data were processed with SPSS (V29) for Mac OSX Ventura.
Results: Among 433 patients, 61.4% were female. Around 21% had colonoscopies at or before age 45, and 70% were over 50. Polyps were found in 27.5%, with 2.1% having malignancies. The most common polyps were hyperplastic (22.6%), followed by tubular adenomas (2.8%). Advanced neoplasms were present in 7.2% of patients.
The distal colon (splenic flexure onwards) accounted for 62.1% of the findings. There were no significant differences in advanced neoplasm prevalence by age (3.5% vs. 1.1%, $p = 0.238$). Patients over 50 had a higher prevalence of proximal colon lesions (11.3% vs. 2.6%, $p < 0.001$). Polyps were more common in patients over 50 (81% vs. < 50, $p < 0.001$).
Conclusions: The Dominican Republic lacks a strong culture of prevention, resulting in a potential increase in the incidence of early-onset colorectal cancer. The hospital alone has an influx of over 70,000 patients the age appropriate for screening, yet the proportion of patients that get screened remains low.
We found advanced neoplasms in patients under 50, indicating a need for improved colorectal cancer screening and prevention efforts. Addressing this can lead to better outcomes and earlier detection of colorectal malignancy in the Dominican Republic.

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Rare Account of Incidentally Discovered Anal Melanoma

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Introduction: Anal melanoma is a rare and highly aggressive malignancy that carries a poor prognosis. Its incidence ranges from 0.4%—3.0% of all malignant melanomas and 0.1%—4.6% of all anorectal malignant tumors. Due to its variable and ambiguous presentation, it is often misdiagnosed as a hemorrhoid, polyp, or an ulcer with a concomitant rectal prolapse. We report a case of a patient incidentally found to have anal melanoma.
Case Report: A 71-year-old female with no family history of malignancies presented with constipation, straining with bowel movements and bright red bleeding per rectum for two months requiring her to wear a pad. She also reports weight loss of an undetermined amount. Her last colonoscopy was in 2021 and was reportedly negative. The physical exam revealed a four-centimeter bilobed, friable, bleeding mass at the posterior midline anal verge. Pre-operative laboratory investigations were within normal levels and no tumor markers were sent. She underwent an anorectal examination under anesthesia confirming the mass at the anal verge with a thrombosed component. It was excised with pathology revealing a T2 malignant melanoma. Post-operative staging with a CT chest, abdomen, and pelvis was negative for metastatic lesions. The patient is scheduled to begin immunotherapy.
Discussion: Anal melanoma arises from the melanocytic cells in the dentate line and spreads along the submucosal planes, draining to the inguinal and inferior mesenteric lymph nodes. It has a very indolent course and is difficult to diagnose due to its varied presentation. The most common presenting symptoms include bleeding, perianal or rectal mass, and pain. Clinicians usually have a low suspicion of anal melanoma due to its rarity and most people present with metastatic disease at the time of diagnosis. Prompt surgical resection with wide local excision vs. abdominoperineal resection remains the mainstay of treatment as the added benefit of adjuvant chemoradiation or immunotherapy has been controversial. The rate of early recurrence with aggressive metastasis is high and the stage at the time of diagnosis is the best predictor of outcome.
Conclusion: Anorectal melanoma is a rare malignancy that most often presents with regional or distant metastases at the time of diagnosis. No treatment modality so far has been shown to reliably improve survival benefits. Clinicians need to have a high index of suspicion when seeing patients with anorectal bleeding, pain, or mass in order to treat it in its early stages.

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Modified Frailty Index for Patients Undergoing Surgery for Colorectal Cancer: Analysis of the Inpatient Sample 2015-2019

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Background: Frailty has become increasingly recognized as a perioperative risk for numerous surgical diseases. Tools such as the modified frailty index (mFI-11) have been developed to capture these factors and provide important prognostic information preoperatively. Given the age distribution of colorectal cancer (CRC) incidence, this patient population is at high risk of frailty. This study aimed to apply the mFI-11 to the National Inpatient Sample (NIS) for patients undergoing surgery for colorectal cancer.
Methods: A retrospective analysis of the NIS (2015—2019), including CRC patients undergoing elective or emergent CRC surgery, was performed. Individuals were classified into frail and robust categories using the mFI. The primary outcomes were overall in-hospital postoperative morbidity and mortality. The secondary outcomes included system-specific postoperative morbidity, length of stay (LOS), total in-hospital healthcare cost, and discharge disposition. Univariable and multivariable regressions were utilized to compare the two operative approaches.
Results: Of the 53,652 patients undergoing CRC surgery, N = 11,178 (19.1%) were frail. On adjusted analyses, frail patients were at higher risk of postoperative mortality during hospitalization (OR 1.96, 95%CI 1.68-2.30, $p < 0.001$), morbidity (OR 1.75, 95%CI 1.66-1.83, $p < 0.001$), prolonged LOS (OR 1.46, 95%CI 1.29-1.62, $p < 0.001$), and discharge to a skilled nursing facility (OR 1.93, 95%CI 1.82-2.05, $p < 0.001$).
Conclusion: Frail patients undergoing surgery for CRC are at increased postoperative complications. Screening these patients before surgery may improve outcomes and allow for the provision of individualized preoperative counselling.

P241

Adoption of Robotic Colorectal Surgery: Review of Experience and Outcomes in the First 100 Consecutive Robotic Cases at a High Volume Single Surgeon Center

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Introduction: Robotic surgery is increasingly being utilized in colorectal surgery. We seek to describe the experience and outcomes during the initial adoption period of robotic surgery at our single surgeon, high-volume colorectal surgery program. The da Vinci Robotic Surgical System was approved in the year 2001 and continues to gain popularity and adoption by surgeons. A 3D view, stable camera controlled by the operating surgeon, articulating wristed instruments, improved ergonomics, decreased work-place musculoskeletal disorders, and improved ability to work in small and deep spaces, are a few of many reasons surgeons are converting to a robotic approach. As robotic surgical techniques are adopted, the benefits and downsides of robotic surgery for the surgeon, operating room personnel, the hospital, and most importantly the patient, are a constant conversation and outcomes and experience need to be scrutinized.
Methods and Procedures: A retrospective chart review was completed identifying the first 100 robotic cases by the same colorectal surgeon at one community center following robotic platform adoption. Patient demographics, operative indications, and perioperative outcomes data were collected and described.
Results: A total of 100 patients were identified in just the first 6 months following transition to robotic surgery. Demographics revealed a median age of 65 years old (25 to 91 years) and 49% of patients were male. A variety of procedures were performed including 61 segmental colon resections, 15 low anterior resections, and 5 abdominoperineal resections. Diverting ostomy creation, ileocecectomy, and rectopexy comprised the additional procedures. Median operative time was 217 min (64 to 575 min) with only 1 conversion to laparoscopic hand-assist. Of the cases, 64% were for oncologic indications and adequate lymph node harvest was obtained in 63/64 cases and negative margins were achieved in all cases. Median length of stay was 3 days. Across all cases, there was a 5% readmission rate, there was one contained anastomotic leak, no reoperations were performed and there were no mortalities within 30 or 90 days.

Conclusion: Our findings reflect a diverse casemix and acceptable oncologic and perioperative outcomes during the adoption period of robotic surgery at a high-volume community colorectal surgery program.

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Multi-omics Revealed that the Postbiotic of Hawthorn-Probiotic Alleviated Constipation Caused by Loperamide in Elderly Mice

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Constipation is common gastrointestinal disorder with high prevalence and recurrence, making people suffering. However, the treatment for constipation remains ineffectual. Our previous research found the postbiotic of hawthorn-probiotic alleviates constipation. We aimed to the study the mechanisms of it on loperamide modeled old KM mice.

Constipated mice were grouped and treated with 10% lactulose (Y), hawthorn group (S), probiotic group (F) and postbiotic of hawthorn-probiotic (FS).Constituents of F,S and FS were detected by UPLC-MS metabolomics. The components with higher FS than S were screened for network pharmacological analysis. The target of FS action on constipation was found. The contents of these targets in the colon of mice were detected by RT-qPCR, and the contents of IL-6 and IL-17A were also detected. The elevated components of FS were molecular-docked with these targets using AutoDock Tools1.5.6, and with previously discovered TNF-a, AQP3, and Enac-r. At the same time, these components were added to the intestinal organoid model for observation, and the changes of the target were detected by RT-qPCR. The small molecular components whose docking results were consistent with organoid results were selected and molecular dynamics analysis was performed with corresponding targets. The content of short-chain fatty acids in stool of mice was detected by targeted metabolomics.

The metabolomics of UPLC-MS showed that F,S and FS were different. Compared with S, FS showed a decrease in toxic substances and an increase in beneficial substances. There were 19 cross targets of FS and constipation found by network pharmacology. RT-qPCR detected the colons of mice and found that NR1I2 and SULT1A1 decreased and GLP-2r increased in FS compared model group. At the same time, the inflammatory cytokines IL-6 and IL-17A were reduced. Organoid dosification and molecular dockings revealed TNF-Baicalin,AQP3-Quinacridone,Enac-r-Quinacridone,IL17A-Baicalin,SULT1A1-N-Phenyl-2-naphthylamine,GLP2R-[Des-tyr1]-beta-casomorphin is well combined. After binding, small molecules adjust the content of the target back to the content of the normal group. However, IL-6 had poor bonding effect and was not docked. The results of RMSD,RMSF and RG of the above small molecules and targets were all good. Targeted metabolomics showed that the contents of various short-chain fatty acids in feces of F,S and FS groups were different.

Postbiotic of hawthorn-probiotic relieved constipation Except through the combined effects of regulating intestinal water and sodium metabolism, in addition to maintaining intestinal barrier and gut microflora, can also promote epithelial cell proliferation, reduce inflammatory response, and improve short-chain fatty acid metabolism.

Keywords: Postbiotic, Hawthorn, Probiotic, Constipation, Inflammation, Intestinal microenvironment

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Clinical and Economic Consequences of Anastomotic Leakage Following Colorectal Surgery: A Survey of Literature

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Background: Anastomotic leakage (AL) is a serious complication following colorectal surgery, occurring in up to 30% of cases. AL can result in a cascade of secondary postoperative complications, including sepsis, abscess formation, and multi-organ failure, thereby necessitating surgical intervention, prolonging the length of stay (LOS), and increasing the associated cost of care. This review summarizes the clinical and economic burden imposed by AL based on existing literature.

Methods: A comprehensive non-systematic review of recent literature on AL after colorectal surgery was conducted, focusing on publications from 2014 to 2022. The clinical outcomes of interest included morbidity and mortality, rates of secondary complications, reoperation rates, ICU admissions, permanent stoma formation, oncological outcomes, and health-related quality of life (HRQoL). The economic parameters studied included length of stay, cost of hospitalization, and readmission rates.

Results: Tables 1 and 2 summarize the clinical and economic consequences of AL after colorectal surgery. The mortality rates for patients with AL ranged from 10.6% to 18.3%, while patients without leaks had rates of 1.6% to 3.9%. AL also resulted in higher rates of secondary complications, reoperation, and ICU admissions. Economically, AL led to a 2.4 to 5.3-fold increase in length of stay, resulting in increased healthcare costs. AL was also associated with poor oncological outcomes, including a higher risk of cancer recurrence and poor oncologic prognosis. Patients who experienced AL also demonstrated a reduction in their health-related quality of life (HRQoL), showing a significant deterioration in physical function, social function, emotional function, and general health perception. To minimize the negative consequences outlined and improve patient outcomes, various research articles emphasized the importance of early leak detection and management.

Conclusion: Anastomotic leaks are a major complication with both clinical and economic impact. This review summarizes these consequences and demonstrates the urgent need for early leak detection.

Table 1: Clinical Consequences of Colorectal Anastomotic Leakage

Consequence	Reference	Finding
Morbidity & Mortality	(2015 European Society of Coloproctology Collaborating Group, 2020)	Patients with anastomotic leak (AL) had a significantly increased mortality rate (10.6% vs 1.6% in non-leak (non-AL) patients; p < 0.001)
	(McArdle, McMillan and Hole, 2005)	AL mortality rate was reported as 16% vs. 3.9% in non-AL patients. The adjusted relative hazard ratios, for AL and non-AL group were 1.61 (95% confidence interval (95% CI)) 1.19 to 2.16; P = 0.002) for overall survival.
	(Branagan, Finnis, and Wessex Colorectal Cancer Audit Working Group, 2005)	30-day mortality was 18.3% in AL group vs. 3.5% in the non leak group (p < 0.001)
	(Bakker *et al.*, 2014)	Mortality rate in the AL group was 13.3% higher than non-AL group (16.4% vs. 3.1% p < 0.001)
	(Lawler *et al.*, 2020)	Anastomotic leakage was found to have a significant negative impact on overall survival (Hazard Ratio 1.14, 95% CI 1.09 – 1.20)
Rate of Secondary Complications	(Kube *et al.*, 2010)	Postoperative complication rates were 62.7% in AL group vs. 39.9% in non-AL group (p < 0.05).
	(Hammond *et al.*, 2014)	AL patients had a higher postoperative infection rate (0.8–1.9 times increase) compared with patients without leaks (p < 0.001)
	(Gessler, Eriksson and Angenete, 2017)	The overall complication rate was significantly higher in those with leakage (93.3 vs. 28.5%, *p* < 0.001), and more common with more than three complications (70 vs. 1.5%, *p* < 0.001).
Reoperation Rate	(Turrentine *et al.*, 2015)	AL increased the risk of reoperation by more than 10-fold.
	(Gessler, Eriksson and Angenete, 2017)	Reoperation was more common in AL group compared to non-AL group (91.7% vs. 5.4%, p <0.001).
ICU Admission	(Italian ColoRectal Anastomotic Leakage (iCral) study group *et al.*, 2021)	Unplanned ICU admission rate associated with AL was 30.3%.
	(D'Souza *et al.*, 2019)	ICU admission was required in 22.9% of patients that presented with leakage.
Permanent Stoma	(Kulliet *et al.*, 1998)	Risk of permanent stoma after clinical leakage is reported in literature to vary between 10-100%
	(Jutesten *et al.*, 2016)	Overall rate of permanent stoma among AL patients was measured at 65%.
Health Related Quality of Life (HRQoL)	(Marinatou *et al.*, 2014)	Physical function of "leak" patients was significantly worse at all postoperative assessment time points. At 6 and 12 months, their emotional and social function and overall quality-of-life scores were significantly decreased in comparison with the patients with an uncomplicated course. "Leak" patients experienced significantly more "stoma-related problems" and "sore skin" around the stoma site.
	(Di Cristofaro *et al.*, 2014)	Leakage was an independent predictor of quality of life and highly impacted the patient-surgeon satisfaction level
	(Nesbakken, Nygaard and Lunde, 2001)	AL patients showed reduced neorectal capacity (120 versus 180 ml; P = 0.04), more evacuation problems (P = 0.02), and a trend towards more faecal urgency (P = 0.09) and incontinence (P = 0.06) than control patients.
Oncological Outcomes	(Ramphal *et al.*, 2018)	The incidence of local recurrence was significantly higher in the AL group compared to the no AL group (4.7% vs. 1.9%, P = 0.019)
	(Merkel *et al.*, 2001)	On multivariate regression analysis AL was an independent risk factor for locoregional recurrence (relative risk: 1.7, CI 95%: 1.02-2.75, P=0.042).
	(Law *et al.*, 2007)	On multivariate analysis, AL was associated with a worse cancer-specific survival (p = 0.043, hazard ratio: 1.63, 95% CI: 1.02-2.60) and higher systemic recurrence rate (hazard ratio: 1.94, 95% CI: 1.23-3.06, p = 0.004).
	(Ha, Kim and Lee, 2017)	AL was associated with increased local recurrence [RR= 1.90] after curative resection.
	(McArdle, McMillan and Hole, 2005)	The adjusted relative hazard ratios, for AL compared to non-AL group were 1.99 (95% CI: 1.42 to 2.78; P < 0.001) for cancer-specific survival.
	(Branagan, Finnis, and Wessex Colorectal Cancer Audit Working Group, 2005)	Local recurrence in AL group was 19% vs. 9.8% in non-AL group (p = 0.018).

Table 2: Economic Consequences of Colorectal Anastomotic Leakage

Consequence	Reference	Finding
Length of Stay (LOS)	(Hammond *et al.*, 2014)	The mean LOS of patients with AL was 2.4 times higher (23 vs 9.7, $p < 0.001$) than non-AL patients. Total LOS per 1,000 patients was 9,500 days longer in AL patients.
	(Krarup *et al.*, 2015)	The mean LOS was 23.3 days for AL group vs. 8.7 days in non-AL group ($p < 0.001$).
	(Ribeiro Jr. *et al.*, 2019)	AL was associated with a 5.3-fold increase in average LOS (39.6 days vs. 7.5 days, $p < 0.001$).
Cost of Hospitalization	(Braga *et al.*, 2005)	AL is regarded as one of the most expensive postoperative complications as shown in a single-center randomized trial.
	(Phitayakorn *et al.*, 2008)	The overall cost of AL per patient was reported to vary between € 37,609-71,940. 60% of such added cost was attributed to the increased LOS, while 40% of the cost was tied to the resources used to diagnose and treat the anastomotic leak.
	(Hammond *et al.*, 2014)	The mean cost of AL in the US was calculated at over $72,905 per patient. The difference in cost of AL and non-AL per 1,000 patients was equivalent to $28.6 million.
	(Ashraf *et al.*, 2013)	Annual direct healthcare cost associated with AL in the UK was £1.1–3.5 million.
Hospital Readmission	(Hammond *et al.*, 2014)	30-day readmission rate of AL patients was equivalent to 29% whereas the readmission rate in non-AL patients was 13% (1.3-fold increase, $p < 0.001$).
	(Lee, Gregory and Cool, 2020)	Overall readmission cost and LOS upon readmission was 1.9 times and 1.8 times higher respectively for AL patients vs. non-AL patients ($p < 0.0001$).

Table 1. Demographics, Incidence and Diet Preferences Related to Appendicitis

Variables	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	South Atlantic	West South Central	Mountain	Pacific
	1906 (3.7%)	7067 (13.8%)	5859 (11.5%)	2656 (5.2%)	9825 (19.2%)	2581 (5.1%)	6639 (13.0%)	3397 (6.7%)	11120 (21.8%)
Age (±SD)	44.20 (±20.99)	39.75 (±20.18)	43.80(±21.23)	43.37(±21.93)	43.25 (±20.510	42.68(±20.97)	38.79 (20.16)	41.39 (±21.79)	37.73 (±20.34)
Gender									
Female (%)	924 (48.5)	3319 (47.0)	2714 (46.3)	1238 (46.6)	4696 (47.8)	1221 (47.3)	3054 (46.0)	1546 (45.5)	5206 (46.8)
Male (%)	982 (51.5)	3748 (53.0)	3145 (53.7)	1418 (53.4)	5129 (52.2)	1360 (52.7)	3585 (54.0)	1851 (54.5)	5914 (53.2)
Race									
White (%)	1370 (71.9)	3750 (53.1)	4319 (73.7)	1959 (73.8)	5895 (60.0)	1958 (75.9)	3347 (50.4)	1998 (58.8)	4211 (37.9)
African American (%)	105 (5.5)	678 (9.6)	533 (9.1)	131 (4.9)	1273 (13.0)	340 (13.2)	515 ((7.8)	121 (3.6)	316 (2.8)
Other (%)	431 (22.6)	2639 (37.3)	1007 (17.2)	566 (21.3)	2657 (27.0)	283 (11.0)	2777 (41.8)	1278 (37.6)	6593 (59.3)
Mortality (%)	5 (0.3%)	10 (0.1%)	12 (0.2%)	3 (0.1%)	18 (0.2%)	9 (0.3%)	13 (0.2%)	8 (0.2%)	10 (0.1%)
Incidence of Appendicitis (Number of Cases/million population)	11.4	144	106	102	129	113	133	109	160
Vegan / Vegetarian Diet (Number of Restaurants/Million population)	17	18	7	5	11	5	6	10	23

P244

Regional Disparities in Appendicitis Incidence, Demographics, and Mortality Among Vegetarian and Non-Vegetarian Adult Patients Discharged from US Hospitals

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Introduction: Surgeons have been fascinated by appendicitis for a long time because of its diverse presentation and geographical inequalities in incidence and outcomes. We predict that appendicitis incidence, patient characteristics, and mortality rates vary significantly by region in the United States. Additionally, we believe that dietary preferences and decisions between vegetarian and non-vegetarian diets may contribute to these geographical inequalities.

Method: Patients who were discharged from US hospitals between 2019 and 2020 were included in this retrospective analysis using data from the Nationwide Inpatient Sample of the Healthcare Cost and Utilization Project. We enrolled 51,050 adult patients who had been diagnosed with appendicitis. Based on the regions in the United States, cohorts were divided into nine regions. Using a 2020 report outlining the frequency of vegan and vegetarian restaurants, dietary preferences was estimated for each region. Mortality statistics and other demographic information were collected. The number of cases per million people in each region was used to compute the incidence rates of acute appendicitis.

Results: Significant regional disparities in demographics were found, with the Mountain region having the largest percentage of males (45.5%) and the New England region having the highest percentage of females (48.5%). The East South Central region had the highest percentage of African Americans (13.2%), while the West North Central region had the highest percentage of white people (73.8%). Compared to other regions, the New England region had the greatest mortality rate (0.3%). The Pacific region had a high number of people who preferred a vegetarian or vegan diet (23%), based on more vegan and vegetarian restaurants. With 160 cases per million people, this region likewise had the highest incidence of appendicitis compared to other regions.

Conclusion: In terms of patients with various food choices, this retrospective study highlights geographical differences in appendicitis incidence, demography, and mortality. The results highlight the need for additional study in order to completely understand how eating habits and regional variables may affect the prevalence and prognosis of appendicitis. Such knowledge could guide public health initiatives and healthcare treatments to lessen geographical differences in appendicitis outcomes.

P245

Surgical Strategies for Preventive Anastomotic Leakage and No Local Recurrence After Colorectal Surgery " All surgical Techniques for a Good Outcome"

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Background: Colorectal surgery is a cornerstone of treating colorectal malignancies, and the choice of surgical technique, whether laparoscopic or open. This comprehensive research study aims to investigate and compare clinical outcomes between laparoscopic and open surgery in colorectal procedures, with a specific focus on anastomotic leakage and local recurrence, two critical factors influencing outcomes patient well-being.

Objectives: The primary endpoint was anastomotis leakage after operative treatment and secondary endpoint was the tumor recurrence incidence

Materials & Methods: This prospective cohort study included patients diagnosed with colorectal cancer who underwent either laparoscopic or open surgery between October 2017 to October 2019. All laparoscopic colorectal surgery within those 2 years was performed the procedure by single colorectal surgeon. Data on patient demographics, tumor characteristics, surgical details, postoperative complications, and oncological outcomes were collected and analyzed

Results: A total of 150 patients were included in the study, with 75 patients in the laparoscopic group and 75 patients in the open surgery group The laparoscopic group demonstrated a shorter length of stay (5.76 day vs. 7.75 day, $p < 0.001$), no perioperative blood transfusion (0 patient vs. 37 patients, $p < 0.001$), and a shorter postoperative pain scale (4.48 point vs. 8.20 point, $p < 0.001$) and shorter mean of flatus(36.0 h vs. 49.47 h,$p < 0.001$). The overall postoperative complication rate was lower in the laparoscopic group (0%) compared to the open surgery group (8.0%, $p = 0.006$). Anastomosis leakage was lower in laparoscopic group(0%) compared to open surgery group (5.3%,$p = 0.004$). Local recurrent tumor was lower in laparoscopic group (0%) compared to open surgery group (9.3%). DFS of 6 yrs follow up was more in laparoscopic group(100%) and (90.7%,$p = 0.007$). Including the concurrent CCRT, surveillance CT scan and colonoscope, protective stoma were not difference significant between the two groups.

Conclusion: Laparoscopic surgery for colorectal cancer demonstrated superior clinical outcomes compared to open surgery. Laparoscopic surgery was associated with shorter length of stay, no post-operative blood transfusion, shorter postoperative pain scale, and shorter mean of flatus and more number mean lymph nodes. Importantly, anastomosis leakage and local recurrent tumor was lower in laparoscopic

group compared to open surgery group. These findings support the use of laparoscopic surgery as a safe and effective alternative to open surgery for colorectal cancer

Keywords: Colorectal cancer, Laparoscopic surgery, Open surgery, Clinical outcomes

P246

Patient Activation Mitigates the Impact of Low Anterior Resection Syndrome on Postoperative Quality of Life Following Proctectomy

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Background: Bowel dysfunction occurring after proctectomy, called low-anterior resection syndrome (LARS), is common and may significantly impair patients' quality of life (QOL). Previous work has demonstrated that LARS severity does not always correlate with QOL impairment. This could be related to variation in individuals' ability to manage their symptoms (i.e. activation level). The objective of this study is to explore whether patient activation may impact the relationship between LARS and QOL.

Method: A prospective database of adult rectal cancer patients undergoing restorative proctectomy from a single high-volume university center from 09/2018-01/2023 was queried. Patients were excluded if they still had a stoma or had less than 6 months of follow-up. Included individuals were administered the study instruments at their standard surveillance visit: patient-reported bowel-related quality of life (BQOL) impairment, patient activation measure (PAM) and (LARS) score.

Results: Overall, 124 patients were included (mean age 61.3 years (SD10.5), 69% male, 9.3 cm mean distance from anal verge (SD5.5), 47% received neoadjuvant radiotherapy, 4.6 years median follow up (IQR2.2). There were 100 (80.6%) patients with no/minor LARS, and 24 (19.4%) with major LARS. High PAM was seen in 69 (55.6%). There was no difference in age, stage, neoadjuvant radiation, anastomotic configuration or stoma creation in low vs high PAM groups, however there were significantly more males in the low PAM group (78% vs 61%, p = 0.04). In patients with no/minor LARS, a low PAM score was associated with more BRQOL impairment (Table 2). In patients with major LARS, there was no association between PAM level and BRQOL impairment.

Conclusion: In patients with rectal cancer, a higher level of patient activation may help mitigate the effect of minor bowel dysfunction on bowel-related quality of life. These results may help patients and physicians improve shared decision-making by allowing them to better identify those for whom bowel dysfunction may have more impact on QOL.

Table 2 Association between PAM and BRQOL impairment in patients with no or minor LARS (n = 100)

	No impairment in BRQOL (n = 32)	Minor impairment in BRQOL (n = 54)	Major impairment in BRQOL (n = 14)
High PAM (n = 54)	18 (33%)	33 (61%)	3 (6%)
Low PAM (n = 46)	14 (30%)	21 (46%)	11 (24%)

P = 0.028

P247

Minimally Invasive Surgery for Diverticulitis: A Focus on Splenic Flexure Mobilization in Sigmoid Colectomy

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This study evaluates the preoperative and intraoperative factors associated with splenic flexure mobilization (SFM) during minimally invasive surgery (MIS) for sigmoid colon resection of diverticular disease. SFM is selectively performed during sigmoidectomy to facilitate tension-free anastomosis.

A retrospective cohort analysis was performed of patients that underwent conventional laparoscopic, single-incision laparoscopic, or robotic sigmoid resection for diverticulitis from 2019-2022. Chi-square and Mann-Whitney U tests were used to compare categorical and continuous variables, respectively. Multivariable binary logistic regression analysis was performed to assess for intraoperative SFM predictors.

A total of 117 patients were included. Of these, 27 (23.1%) underwent SFM. Patients that underwent SFM presented with higher rates of complicated diverticulitis, defined as the presence of an abscess, fistula, or stricture identified pre- or intraoperatively. (81.5% vs. 42.2%, p = < 0.001). Specifically, the SFM cohort had more abscesses (55.6% vs. 31.5%, p = 0.023) and fistulae (59.3% vs. 17.8%, p = < 0.001). SFM patients more often required extensive adhesiolysis (29.6% vs. 10.0%, p = 0.025). While the proportion of patients undergoing SFM did not vary by MIS approach, patients undergoing SFM were converted to open more often (14.8% vs. 3.3%, p = 0.049). SFM patients experienced longer lengths of stay (4.2 ± 2.8 vs. 3.6 ± 4.3, p = 0.041). There were no significant differences in 30-day morbidity between the two groups. Multivariable binary logistic regression analysis found that fistula presence is the only significant independent predictor of SFM being performed (OR = 5.886; p = < 0.001). Age, gender, MIS approach type, and the presence of an abscess or stricture were not significant predictors of SFM.

Patients who undergo minimally invasive sigmoidectomy for diverticulitis are more likely to require SFM if their disease is complicated, but this has no effect on 30-day morbidity or mortality rates.

		SFM (N = 27)	No SFM (N = 90)	p-value
Demographics	Age, mean ± SD (years)	62.5 ± 14.2	58.8 ± 11.0	0.066
	Female sex	51.9%	61.1%	0.391
	BMI, mean ± SD (kg/m^2)	28.4 ± 3.6	29.8 ± 6.2	0.535
Complications	Anastomotic leak	0%	1.1%	> 0.999
	Surgical site infection	3.7%	7.8%	0.680
	Ileus	11.1%	4.4%	0.350
	Bleeding requiring transfusion	3.7%	5.6%	> 0.999
	Return to OR	0%	2.2%	> 0.999

P248

Laparoscopic Management of Klippel Trénaunay Syndrome Anorectal Haemangioma

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Klippel-Trénaunay syndrome (KTS) is a rare disorder that is present at birth (congenital) and is characterized by a triad of cutaneous capillary malformation, lymphatic anomalies, and abnormal veins in association with variable overgrowth of soft tissue and bone.KTS occurs most frequently in the lower limb and less commonly in the upper extremity and trunk. 22 years young boy, recurrent profuse per rectal bleed, recurrent anemia, recurrent hospitalization. He was diagnosed as having a large long segment circumferential haemangioma up to the distal sigmoid from the anal verge. He had having abnormally large deformed foot and toes. Colonoscopy suggested circumferential haemangioma from the anal verge to the sigmoid colon. laparoscopic Abdominal perineal resection (APR) planned after an MRI pelvis suggested anal sphincter involvement. Laparoscopic APR done. 10 years follow-up kept. no evidence of haemangioma developing in the remaining bowel. Second case KTS was managed by transanal surgery.

P250

Outcomes of Percutaneous Drainage for the Treatment of Contained Ileocolonic Anastomotic Leak

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Background: Anastomotic leak (AL) is a devastating complication of colorectal surgeries. While reoperation provides may be required for AL, non-surgical treatment with IR percutaneous drainage may be considered when the leak is contained, and the patient's clinic status permits. Ileocolonic (IC) anastomoses have a notoriously lower risk of AL, and it follows that there is a paucity of data regarding the efficacy and success of percutaneous drainage of ICALs. This single-institution retrospective analysis investigates the outcomes following drain usage for ICAL, including success of non-operative management, and the factors that allow for avoidance of reoperation.
Methods: The NSQIP database was queried for patients who had a deep space surgical site infection following IC anastomosis. Data regarding demographic data, comorbidities, intra-operative details, and post-operative course was collected. Treatment with a drain was considered unsuccessful if a patient died during the study period or had to return to the operating room for definitive treatment. Unpaired t-tests were used to compare patients successfully vs unsuccessfully treated with drains as well as those initially treated with drains vs not initially treated with drains.
Results: From 2018-2022, 17 patients were diagnosed with an ICAL. Three patients went directly to the OR for definitive treatment. Of the 14 patients who did not undergo initial operative management, 3 patients were unsuccessfully treated with a drain, and 11 patients were successfully treated with a drain alone. The 11 patients successfully treated required one drain to be placed at the index procedure, while the 3 unsuccessful patients required two drains initially. In the successful drain treatment group, patients averaged 38.2 days with a drain (range 8-120) and underwent an average of 2.8 drain checks or exchanges (range 1-10). One of these 11 patients required readmission during the study period. There were no differences in the sex, age, BMI, procedure duration, or the post operative day that the leak was diagnosed between the successfully and unsuccessfully treated group.
Conclusion: IR drainage is a safe and largely effective alternative to reoperation for a contained ICAL. When the leak requires an index procedure of two drains being place, one should be cautious of the success of non-op management. When treated with a drain, a patient should understand that although the treatment is likely to be successful, the drain will be in place for several weeks and will require frequent follow up for drain checks or exchanges.

P251

Horseshoe Abscess as a Rare Complication After Transanal Hemorrhoid Diarterization with Mucopexy

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Transanal hemorrhoidal dearterialization (THD) is a minimally invasive procedure that has gained popularity as a treatment for symptomatic hemorrhoids. It involves ligating the arterial blood supply to the hemorrhoidal plexus, reducing bleeding, prolapse, and pain. Compared to conventional ligation or resection, THD is associated with less postoperative bleeding and pain, allowing for same-day surgery discharge. Horseshoe abscess is a rare but known complication of anorectal surgery, characterized by an abscess that extends around the anal canal, often involving the ischiorectal fossa and adjacent structures. Although horseshoe abscess has been reported after various anorectal surgeries, including hemorrhoidectomy, its occurrence following THD has not been well-documented in the literature.

A 72-year-old male underwent THD for rectal prolapse with internal hemorrhoids and presented to the hospital on postoperative day 6 with severe rectal pain. A computed tomography (CT) scan revealed a large complex horseshoe perirectal abscess with fluid and air and significant rectal wall thickening. A rectal examination under anesthesia confirmed the presence of purulent drainage from the anus, and surgical drainage of the abscess was performed. The patient received antibiotics and analgesics and experienced a favorable recovery.

The exact pathophysiology of horseshoe abscess following THD remains unclear, and the incidence and risk factors associated with this complication are not well-established. Moreover, there has yet to be a consensus on the optimal management of horseshoe abscesses after THD, whether through surgical or medical approaches. This case emphasizes the importance of considering horseshoe abscess as a potential complication of THD and highlights the need for further research to understand better its incidence, risk factors, and optimal management strategies.

P252

Eliminating The Painful 12 mm Stapler Port Paradox in Minimally Invasive Right Hemicolectomy with Intracorporeal Anastomosis

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Introduction: Minimally invasive right hemicolectomy with intracorporeal anastomosis (ICA) has been associated with reduced ileus,

reduced postoperative narcotic utilization, and reduced length of stay, when compared to extracorporeal anastomosis (ECA). In 2015, the ICA technique was adopted at our institution. Patients tend to have the most discomfort and the most disfigurement (dimpling of skin / soft tissue) at the 12-mm port site required for the bowel stapler. In 2015, the 12-mm port placement for the stapler was relocated to the Pfannenstiel extraction site, eliminating the need to close fascia at the other port sites, and thereby solving the painful 12-mm port paradox.
Objective: The present study evaluates the short-term outcomes following ICA right hemicolectomy, and relocation of the 12-mm port for the stapler to the Pfannenstiel extraction site compared to our ECA cohort prior to the change in specimen extraction site practice.
Methods/Participants: An IRB approved retrospective review was performed and included all laparoscopic and robotic right hemicolectomy cases from 2015-2023, performed at a teaching institution performed by the colorectal surgery division before and after adoption of ICA with relocation of the 12-mm suprapubic port placement into clinical practice.
Results: A total of 111 patients underwent minimally invasive right hemicolectomy during the study period. Of the 111 patients, ECA was utilized in 34, and ICA was utilized in 77. The average. operative times between ECA vs ICA were 150 min and 181 min respectively ($p = 0.000184$). The average lengths of stay were shorter in the ICA group (3 days ECA vs 2 days ICA, $p = 0.000184$). The rate of postoperative ileus was greater in the ECA group (8.8% in ECA vs 2.6% in ICA, $p = 0.977$). There were more readmissions in the ECA group (3 vs 1, $p = 0.97$), and one surgical site infection in the ICA group ($p = 1.01$). There were no deaths in the study group.
Conclusion: Minimally invasive right hemicolectomy with ICA is safe and has similar outcomes compared to ECA. ICA is associated with a lower rate of postoperative ileus, and shorter length of stay compared to ECA. Relocating the 12-mm port for the bowel stapler to the Pfannenstiel extraction site with transabdominal fixation and alignment of the terminal ileum and transverse colon with a suprapubic stapler port orientation eliminates the need to close the 12-mm port and solves the painful 12-mm port paradox.

P253

Exploring the Deloyers Procedure: An Innovative Approach to Addressing Complex Challenges

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Introduction: The Deloyers procedure is a surgical technique that has gained recognition for its potential to optimize colonic anastomosis outcomes. This innovative approach involves the mobilization of an extended segment of the colon and a staged anastomosis, which aims to reduce the risk of anastomotic complications.
Case Report: The primary objective of this study is to describe the Deloyers procedure in colonic anastomosis. We present a male patient, 48 years old, with a history of adenocarcinoma of the sigmoid rectum treated with left hemicolectomy + terminal colostomy one year ago, along with 5 cycles of chemotherapy, with the last one in November, and a conventional appendectomy performed 41 years ago. Currently asymptomatic, comes for elective intestinal restitution. Patient underwent supra and infraumbilical laparotomy incision making a transverse colectomy with Deloyers anastomosis due to the shortness of the transverse colon in the pelvic region. Additionally, colostomy resection was performed to reverse a previous colostomy plus a high rectal proctectomy was carried out due to rectal ampulla atrophy, and a protective ileostomy was created. The patient had a favorable recovery and was discharged after 8 days of hospitalization, during which no complications were observed.
Conclusions: Preliminary findings suggest that the Deloyers procedure can be a valuable addition to the surgical armamentarium for colonic anastomosis, especially in cases where a higher risk of anastomotic complications is anticipated. The extended mobilization of the colon and the staged anastomosis technique may contribute to reduced postoperative complications. However, careful patient selection and surgical expertise are crucial for its success. Further research and long-term follow-up are needed to establish the full spectrum of benefits and potential drawbacks associated with the Deloyers procedure in colonic anastomosis.

P254

Ocrelizumab Associated Colonic Perforation: A Cautionary Tale

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Introduction: Ocrelizumab is a humanized anti-CD20 monoclonal antibody that targets B lymphocytes and is an approved treatment for primary progressive multiple sclerosis. Besides the well-known adverse effects of infusion-related reactions and increased susceptibility to various infections, recent literature has shown cases of ocrelizumab-induced colitis with at least two requiring surgical intervention, to our knowledge. Herein we discuss a case of colonic perforation shortly after starting ocrelizumab treatment in a 27-year-old man which has not been previously reported.
Case Details: 27-year-old man who presented to our facility with two days of progressively worsening lower abdominal pain after a few days of constipation and straining during bowel movements. He denies previous episodes of diarrhea, constipation, or similar symptoms. Denies any other associated symptoms. His history was only remarkable for a recent diagnosis of multiple sclerosis 3 months ago and being started on Ocrelizumab two months ago. Had a remote history of cocaine use prior to incarceration but was a non-smoker. Family history was unremarkable. On exam, he was soft but distended with tenderness to palpation diffusely, worse in the lower abdomen. Vitals were remarkable for a fever of 39.5 with tachycardia ranging 100 s to 135 but was normotensive. Labs remarkable only for leukocytosis of 18.4. Imaging showed a moderate amount of pneumoperitoneum with a thickened rectosigmoid colon and thickened small bowel in the right lower quadrant concerning for enteritis.
He underwent emergency surgery, revealing a perforated rectosigmoid colon with inflammation. No masses or heavy stool burden were found in the colon. Given the inflammation, a sigmoidectomy with the creation of an end colostomy was performed. Pathology of the specimen showed inflammation with ischemic changes and ulceration consistent with medication-induced colitis; it was negative for CD20.
Conclusion: Ocrelizumab-induced colonic perforation has never been reported but it is a serious complication that should be in the differential of a patient on a biologic coming in with diffuse abdominal pain. More research is needed to elucidate the mechanisms underlying this severe adverse effect and identify potential risk factors.

P255

Preliminary Results of an Ex Vivo Porcine Large Bowel Mucosal Wound Closure Study Assessing the Indications for and Utility of an Endoscopic Clip Capable of Transiently Grasping One Mucosal Edge to the Opposite Wound Edge

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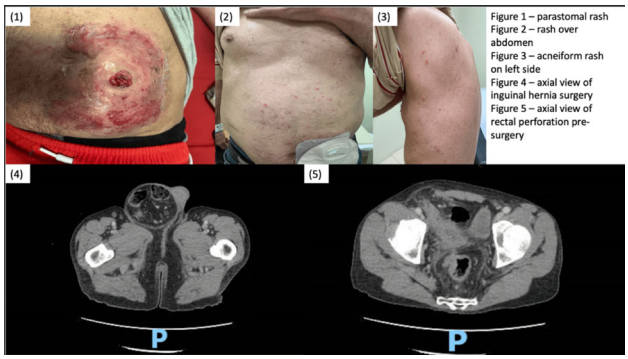
Introduction: An endoscopic clip (Mantis, (M)), recently released, can be partly closed to grasp 1 mucosal edge that is then pulled/pushed to the opposite wound edge and then reopened, the free leg positioned and then fired to join the wound edges. This advanced clip costs more than standard clips and is best used when closure is not otherwise possible. This ex vivo porcine colon wound study was undertaken to determine how often M clips are needed for wounds between 1.7 and 2.5 cm in diameter. The preliminary results are given below.
Methods: 5-6 mucosal wounds were made via longitudinal colotomy in frozen porcine colon. The colon ends were occluded and a colonoscope inserted. An attempt was made to close wounds with resolution clips (Boston Scientific, Boston, MA); if that failed then an M clip was used. The number of clips needed per wound and type of closure was noted (mucosa to mucosa; mucosa to submucosa; or submucosa alone). The diameter and surface area of each wound was also noted.
Results: A total of 30 wounds, in 6 colons, were closed; a total of 86 Resolution (R) type and 26 Mantis (M) clips were used (mean, 3.5 clips/wound). Wound diameters ranged from 1.7—3.5 cm (area, 2.27-9.62 cm2). In 10/30 (33.3%) wounds, closure was possible with R clips alone; in the other 20 wounds (66.6%) M clip(s) were required (1 M, 15 wounds [75%]; 2 M, 4 [20%]; 3 M, 1 [5%]) after which R clips completed the closure. A direct relationship was noted between wound size and need for M clips; M clips were needed in 85% (11/13) of wounds with diameter $>$ 2.26 cm (surface area $>$ 4cm2) vs 53% of smaller wounds (area 2.27- 4 cm2). Mucosa to mucosa closures were obtained in 82% vs. hybrid closures in 12.5% and purely submucosal placement in 5.5%. Clips malfunctioned 10% of the time (broken arm (6), clip fell off delivery tool during closure (2) and prior to placement (1)).
Conclusion: In 2/3 of wounds, closure required 1-2 M clips (plus R clips) after R clip attempts failed: 85% of wounds with diameter more than 2.23 cm required an M clip. An average of 3.5 clips were needed/wound. In 18%, mucosa to mucosa union was not obtained and in 10% the clips broke or failed. The M clip allows clip closure of larger wounds.

P256

Parastomal Rash with Cetuximab in Metastatic Rectal Cancer

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Introduction: Epidermal growth factor receptor inhibitors, such as cetuximab, have been used to treat lung, colorectal, and head and neck cancers. Skin eruptions are a common adverse effect, appearing around 1-3 weeks after chemotherapy initiation in 50-100% of patients, with an increased severity in 5-10%, and can be prophylactically treated with tetracyclines. Cetuximab-induced eruptions have been found to be more common in males and younger patients. However, it is more uncommon for patients to experience rashes and acneiform eruptions after prolonged chemotherapy treatment, and incidence rates for such presentations have not been documented.
Case Presentation: We present the case of a 62 M with PMH of stage IV rectal adenocarcinoma with metastasis on FOLFIRI and cetuximab, hypertension, and right inguinal scrotal hernia status post laparoscopic low anterior resection with end colostomy for rectal perforation now with new complaints of skin irritation under the colostomy bag. The patient previously had a diffuse acneiform rash over his chest that was suspected to be secondary to cetuximab that had self-resolved over the course of a month before his surgery took place. Several months after his resolved rash, the patient is now presenting with a rectangular erythematous patch with satellite lesions, skin maceration in the shape of the tape of the colostomy bag, without fever or other skin complaints. Patient's chemotherapy regimen was held due to this rash, and was started on a combination of amoxicillin/clavulanate before seeing a dermatologist and his oncologist. The patient was additionally prescribed clindamycin lotion, hydrocortisone 2.5% cream, and ketoconazole cream to manage cutaneous symptoms and endorsed marked improvement of symptoms with medication.
Conclusion: Considerations for the differential of skin eruptions on chemotherapy with routine colostomy bag use include folliculitis, seborrheic dermatitis, and contact dermatitis. Despite the increased likelihood of those diagnoses for the general population, it is also important to evaluate the role of cetuximab in skin manifestations, as this presentation is associated with bacterial cellulitis and septicemia in immunocompromised patients like ours.



P257

Progranulin Levels Are Significantly Elevated in Plasma and Wound Fluid for Two Weeks After Colorectal Cancer Resection

HMC Shantha Kumara, PhD; Anuj R Sharma, MD; Neil Mitra, MD, MBA; Aashutosh Sah, MD; Pablo Palacios, MD; Xiaohong Yan, MD, PhD; Vesna Cekic, RN; Richard L Whelan, MD; Northwell Health

Introduction: Progranulin (PGRN), also known as Precursor Cell-Derived Growth Factor (PCDGF), is a widely expressed and secreted glycoprotein. It participates in regulation of cell growth, differentiation, and pathological transformations. As a growth factor, PGRN activates the PI3k and ERK pathways, enhancing the expression of cyclin D1 and cyclin B that foster the growth and longevity of mesenchymal and epithelial cells. Overproduction of PGRN is noticeable in several types of cancers, including breast, ovarian, and renal. Notably, PGRN incites VEGF expression in breast cancer cells in vitro. As a crucial agent in wound healing and tissue repair, PGRN instigates inflammation, accumulation of fibroblasts, and

angiogenesis, all being crucial to wound healing. This study's purpose was to compare perioperative PGRN levels in plasma and wound fluid (WF) in colorectal cancer (CRC) patients (pts) undergoing colorectal resection.

Method: CRC pts undergoing elective surgery enrolled in an IRB-approved tissue/data bank for whom adequate volumes of plasma and intra-abdominal closed drain fluid samples were available made up the study group. Demographic, clinical, and pathological data was reviewed. Preoperative (preop) and post-operative (postop) blood, as well as postop WF samples, were collected preop, post-operative day 1 (POD1), POD 3, and between post-operative days 7-13 (POD 7-13); the latter were bundled and considered as a single time point. PGRN levels (ng/ml) were assessed in duplicate via ELISA, and the Wilcoxon and Mann-Whitney tests were employed for statistical analysis (significance $p < 0.05$).

Results: The study included 29 CRC pts (12 males, 17 females; 5 colon and 24 rectal cancers; mean age 66.10 ± 12.27 years) whose plasma and WF were studied. Minimally invasive colorectal resection (MICR) was done in 25 pts (mean incision length (IL) 8.3 ± 3.5 cm) and open surgery in 4 pts (mean IL 23.8 ± 7.8 cm). The mean length of stay was 9.6 ± 6.3 days. There was a significant increase in plasma PGRN levels on POD 1, 3, and 7-13 (to $P < 0.01$ to $P = 0.03$) compared to preop levels. WF PGRN levels were 4-15 times higher than the corresponding plasma levels at all postop points ($P < 0.001$ to $P < 0.01$) (Fig. 1).

Conclusions: Wound PGRN levels were notably higher at all postop time points. PGRN in the wound likely plays a key role in the healing process. The significant rise in plasma levels after surgery may be related to PGRN diffusion from the wounds. Increased plasma PGRN might stimulate the growth of residual tumor deposits post-surgery.

Title: PGRN protein levels in preop and post op Plasma vs. postop Wound fluids

Time	Plasma (ng/ml)	(n)	Wound fluids (ng/ml)	(n)	*p*
PreOp	51.2; 95% CI: 43.120- 52.269	29	N/A	N/A	N/A
POD1	60.2; 95% CI: 53.240- 6.583	29	117.0; 95% CI: 58.100 - 183.68	27	<0.01
POD3	56.3 95% CI: 51.920- 59.936	27	106.2; 95% CI: 66.770 - 161.36	26	<0.01
POD 7-13	54.6 ; 95% CI: 47.828- 62.675	17	152.3; 95% CI: 92.900 – 209.73	15	<0.001

P258

Sigmoid Volvulus: An ACS-NSQIP Assessment of the Elderly Patient Population over 17 Years

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Background: Sigmoid volvulus results in bowel obstruction necessitating endoscopic or surgical intervention to limit morbidity and mortality. The elderly patient population is at a higher risk of sigmoid volvulus and its sequelae. This study aims to analyze mortality and morbidity in the surgically treated elderly patients and to evaluate the change of practice and outcomes over 17 years.

Methods: The National Surgical Quality Improvement Project from 2005-2021 was queried for patients with a colonic volvulus who underwent left hemicolectomy. The patients were organized into three age groups (< 60; 61-75; > 75 years). A risk factors adjusted multivariable logistic regression was performed to compare mortality, morbidity, and surgical treatment.

Results: Six thousand seven hundred seventy-five patients were included for analyzes. 2067 patients were less than 60, 2239 between 61 and 75, and 2469 were older than 75 years. The elderly patient group contained less females ($p < 0.001$), had lower BMIs ($p < 0.001$), fewer laparoscopic surgeries ($p < 0.001$), more diverting stomas and end-ostomies ($p < 0.001$) and a longer hospital stay ($p < 0.001$). The odds of 30-day mortality were 5.67 (95% CI:3.64,9.20) times the odds of the youngest population and increased by 10% for every year in the elderly population (OR 1.10, 95% CI: 1.06, 1.14). The odds of mortality with emergent surgery were 1.63 (95%CI:1.21,2.22) times that of elective surgery ($p = 0.001$). The odds of postoperative morbidity with emergent surgery were 1.30 (95%CI:1.08,1.58) times the odds of morbidity with elective surgery ($p < 0.007$). Over the 17 year study period, mortality decreased ($p < 0.049$), the use of laparoscopy increased ($p < 0.0068$) and the overall morbidity remained unchanged ($p < 0.7699$).

Conclusion: Patients older than 75 years of age are a vulnerable group with an increased and increasing risk for mortality compared to their young counterparts. Performing elective surgeries in younger patients and avoiding emergency surgery in the elderly population might decrease the mortality associated with surgeries for the elderly.

P259

Trends in Operative Time and Patient Outcomes in Robotic Colostomy Reversal: Surgeons Short-term Pain for Patients Long-term Gain

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Introduction: The purpose of this study was to assess robotic console and total operative time, as well as post-operative outcomes in patients undergoing robotic-assisted colostomy reversal following open laparotomy.

Methods and Procedures: This was a single institution case series of patients undergoing robotic colostomy reversal from January 2020 to September 2023. Demographics, pre-, intra-, and post-operative data were collected and analyzed to evaluate factors associated with prolonged operative times, as well as assess post-operative outcomes. Spearman and Pearson Correlation testing, as well as Linear and Logistic Regression analysis, were used to analyze the data.

Results: 32 patients underwent robotic-assisted colostomy reversal. 20 patients were male. Mean age was 56.9 years and 87.5% were Caucasian. A total of 40.6% had hypertension, 6.3% had DMII, 3.1% had CHF, 6.3% had CKD, 6.3% had COPD, 15.6% had OSA, 6.3% were current smokers and 28.1% were former smokers. Of the 32 patients, 22 (68.8%) had colostomies secondary to perforated diverticulitis, 3 (9.4%) due to perforated or obstructing sigmoid malignancies, 2 following advanced gynecologic and urologic cancer surgeries. 6.3% following traumatic colon injuries, and 6.3% due perforations from Crohn's Disease. 96.9% were fully independent with regard to functional status. 18.9% of cases required pre-operative ureteral stent placement. Two cases (6.3%) were converted to open. Mean console time (time spent on robotic console) was 171.8 min. Total operative time was defined as first incision to dressing placed. Mean total operative time in those who did not undergo pre-operative ureteral stenting was significantly less (257 min), compared to those who did undergo stenting (347 min) ($p = 0.017$). Over the three years study period, there was no statistical increase or decrease in robotic console time ($p = 0.522$) or overall total operative time in either the ureteral stented ($p = 0.566$) or non-stented groups ($p = 0.791$), reflecting time spent on lysis of adhesions. Two patients (6.3%) had post-operative rectal bleeding, one of which required transfusion. No patients had post-operative anastomotic leaks. Mean return of bowel function (passing flatus or bowel movement) was 2.1 days. Mean

length of stay was 4.4 days, with 90.7% of patients being discharged within 5 days. One (3.1%) patient was readmitted within 90 days.
Conclusions: Robotic colon surgery after urgent open laparotomy is a safe and feasible option with a low incidence of complications. OR time remains long, primarily due to the need for minimally-invasive lysis of adhesions. Use of ureteral stents also contributes to longer operative times.

P260

Impact of Age and Rural Hospital Settings on Clinical Outcomes in Appendicitis: A Retrospective Analysis of Geriatric and Non-Geriatric Patients

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Introduction: Appendicitis is a common surgical emergency that can affect people of all ages. Its clinical presentation and management have been extensively studied, there remains curiosity about how age-related variables and the location of rural hospitals impact clinical outcomes. In this retrospective analysis, we hypothesized that older patients (aged $\geq$ 55 years) diagnosed with appendicitis would have worse clinical outcomes compared to younger patients (aged $<$ 55 years), especially within the context of rural hospital settings.
Method: Patients discharged from US hospitals between 2019 and 2020 were included in this retrospective analysis, utilizing data from the Nationwide Inpatient Sample of the Healthcare Cost and Utilization Project. We enrolled a total of 51,081 patients diagnosed with appendicitis. Based on patients' age, the cohorts were divided into two groups: geriatric ($\geq$ 55 years), consisting of 15,080 individuals (29.5%), and non-geriatric ($<$ 55 years), comprising 36,001 patients (70.5%). We abstracted data on clinical outcomes, hospital settings, comorbidities, and demographic information. Statistical analysis involved the use of logistic regression, Chi-squared tests, and ANOVA.
Results: The mean age of the geriatric cohort was 67 years, compared to 30 years for the non-geriatric. The geriatric cohort had a higher prevalence of female patients (52.4% vs. 44.5%, $p < 0.001$) and a greater proportion of white populations (73.8% vs. 49.2%, $p < 0.001$). Geriatric patients had a higher number of elective admissions (3.6% vs. 2.9%, $p < 0.001$), a higher prevalence of complicated diabetes (10.7% vs. 3.3%, $p < 0.001$), and a greater prevalence of complicated hypertension (13.6% vs. 2.6%, $p < 0.001$). Geriatric patients were more commonly found in rural settings (10.2% vs. 7.0%, $p < 0.001$). The geriatric population had a longer duration of hospital stay (4.27 days vs. 2.78 days, $p < 0.001$) and a higher mortality rate (0.5% vs. 0.03%, $p < 0.001$). On logistic regression, after adjusting for gender, admission criteria, and rural setting, the age of patients was found to be associated with an increased mortality risk (OR = 1.097, 95% CI: 1.067–1.129, $p < 0.001$).
Conclusion: Our study underscores the significant influence of age-related factors, particularly the burden of comorbidities, on clinical outcomes in patients with appendicitis. The outcomes for geriatric patients were notably poorer, especially in rural hospital settings. These findings emphasize the necessity for tailored care plans and treatments for older individuals presenting with appendicitis, with a focus on optimizing outcomes in this vulnerable group.

P262

Laparoscopic Management of Grade C Anastomotic Leak Following Left-Sided Colorectal Resection

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Introduction: Management of Grade C anastomotic leak (AL) associated with left sided colorectal resection has traditionally been performed open. With the introduction of minimally invasive surgery (MIS), laparoscopic diversion and drainage has been described to be safe and effective in managing anastomosis leak (AL) requiring surgery, however, limited literature exists to support this approach. We present our experience, review the literature, and offer procedural recommendations.
Methods and Procedures: This study is a case series that consists of six adults that underwent left sided colonic resection complicated by purulent or feculent peritonitis from 2016 to 2023 at our institution. Laparoscopy and intra-operative colonoscopy were performed on all patients. Outcomes measured included days to presentation, operative times, hospital stay, morbidity, mortality, and rates of stoma closure.
Results: All six patients underwent laparoscopic re-intervention without conversion to open. One patient with feculent peritonitis underwent laparoscopic Hartman's with end colostomy. All others had successful laparoscopic drainage with ileostomy with or without repair of AL (suture or endoclip colorrhaphy) and colonic lavage. Median hospital stay was 11 days. Postoperative complications included subhepatic fluid collection (2), hematoma (1), infected seroma (1), and no complications (2). All stomas were closed and no mortality.
Conclusion: MIS approach to Grade C AL in left-sided colorectal resection is safe and feasible. It can be performed with low morbidity and mortality and high rates of stoma closure. A review of the available literature and recommendations are presented.

P263

Colonic Lavage with Loop Ileostomy as an Efficient Option to treat C. Diff Fulminant Colitis: Can We Avoid a Total Abdominal Colectomy?

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Background: Clostridium difficile infection (CDI) is a condition mostly seen in a hospital setting in patients previously treated with antibiotics. It produces a form of colitis with diffuse, watery diarrhea and abdominal pain. Most of the time, the condition is treated medically with oral antibiotics. The infection can worsen and progress to a fulminant disease, where the medical management is usually not enough. Historically, this severe form has been treated by a total abdominal colectomy with end ileostomy. However, in recent years, some studies have been reported about colonic lavage with loop ileostomy for the treatment of fulminant colitis with positive outcomes.
Methods: A 45-year-old male patient who presented with abdominal pain and diarrhea. Past medical history consistent depression and

asthma. Patient subsequently diagnosed with Clostridium difficile infection. She was then admitted and treated with oral Fidaxomicin for the next days. However, on day 4 post-admission, the patient developed acute, severe abdominal pain. CT abdomen demonstrated findings of toxic megacolon. We decided to perform a laparoscopic colonic lavage with Golytely, loop ileostomy and cecostomy tube placement (20Fr). No signs of large bowel ischemia/necrosis were noted. In the post-operative period, patient was treated with vancomycin infusion via the cecostomy tube and metronidazole IV.
Results: We performed serial abdominal examinations every 4 h. At post-operative (POD) 1, the abdomen was soft, non-distended and minimally tender to palpation. Tolerating soft diet and full return of bowel function at POD2The white blood cell (WBC) count decreased from 18.1 at POD1 to 12.4 at POD8. Patient was discharged home on POD8 with all the antibiotics discontinued. During her first post-op visit at the office, the leukocytosis was resolved WBC and the abdominal examination benign. Patient is currently having no limitation on her daily activities. Loop ileostomy reversal to be performed in the next months.
Conclusion: In this case report, we described the case of a colonic lavage with loop ileostomy in the treatment of fulminant Clostridium difficile infection. The benefits of this procedure include its minimal invasiveness, lower mortality/morbidity rate, shorter hospital stays, less operative pain and most importantly, avoiding a total colectomy. We demonstrated that the outcomes following the colonic lavage are promising and effective. We believe that this procedure should be at least considered in cases of fulminant colitis, especially in young, active patients and no signs of bowel ischemia/necrosis.

P264

Insertion Strategies, Tips, Limitations, and Pitfalls Regarding the Use of Standard and Mantis Clips (Boston Scientific Corp., Boston, MA) to Close Large Mucosal Defects

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Introduction: The ability to close colonic mucosal defects after EMR or ESD of sessile adenomas depends on wound size and location. Endoscopic clips are most often used although the X tack platform and Mantis Clip (Boston Scientific Corp, MA) are now options. The X tack joins large gaps but placement is a challenge and not intuitive. The Mantis (M) clip is simpler but requires experience and a placement strategy. An ex vivo porcine colon study was carried out to assess the use of M vs. standard Resolution (R) clips to close mucosal defects. During this study it was noted that with experience the R clip wound closure rate increased and the need for M clips decreased. Also, an M clip placement approach was developed. At times, clips malfunctioned, broke, or were dislodged. The study revealed limitations and pitfalls of both clip types. This poster, based on preliminary results will address these issues and provide tips/information.
Methods: In the preliminary study R clips and, if needed, M clips were used to close 30 porcine wounds in 6 colons. Closures were videoed and analyzed. R and M clip insertion strategies as well as associated problems, challenges, and failures were noted.
Results: Placing the first clip at the wound's side and not the center is advised (zipper approach) as the gap bridged is smaller. As regards the M clip it is best to first grasp the distal wound edge and pull it proximally rather than the opposite which has a higher flap droppage rate. Also, the incident angle between the clip and wound surface impacts placement. An acute angle (30-60°) subjects the distal clip leg to increased pressure during closure and may lead to clip bending/breakage. A 90° incident angle better distributes tension on the clip legs and is advised. Eight of 112 clips (7%) broke or were bent and failed soon after placement. R and M clips can also break if the gap being bridged is too wide. If undue tension is noted during R clip closure then switching to a M clip is advised.
Conclusion: Zipper vs center closure is advised for R clips and initial distal edge grasp and drag for M clips. A 90° incident angle between clip and wound is best for all clips. R clips to bridge large gaps may break, thus, M clips are advised. Clips failed in 7% of firings.

P266

Transverse Colonic Volvulus Presenting in a 19-Year-Old Female with Subsequent Sigmoid Volvulus

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Introduction: Transverse colonic volvulus (TCV) is exceptionally rare and even more rare in teenagers to young adults. A systematic review found 317 TCV cases (0.94%) in patient data over 90 years, and was most commonly seen in patients in their 3rd or 4th decade of life. We present a 19-year-old female who was diagnosed with TCV.
Case Presentation: A 19-year-old female presented to the emergency department with complaints of epigastric abdominal pain, nausea, vomiting, and no bowel movements for 4 days. Past medical history consisted of irritable bowel syndrome, gastroparesis, depression and anxiety, eosinophilic esophagitis, and opioid abuse. Past surgical history included upper and lower endoscopy and genital wart ablation. Family history included a brother with ulcerative colitis. On examination, her abdomen was tympanic and distended with epigastric tenderness without guarding or rebound tenderness. CT scan (Fig. 1) showed distension of the colon due volvulus at the splenic flexure with narrowing of the mesenteric vasculature and free fluid in the abdomen. The patient was emergently taken for an exploratory laparotomy. Intraoperatively, the distal transverse colon was found to be the point of obstruction. Extended right colectomy was performed with ileocolic anastomosis. Eight days post-operation, a CT scan was performed after recurrence of symptoms showing proximal small bowel dilatation (Fig. 2). Repeat exploratory laparotomy was performed, discovering large bowel obstruction secondary to sigmoid volvulus. Completion colectomy with end ileostomy was performed.
Discussion: TCV is a rare cause of large bowel obstruction due to anatomical protective factors including fixation of the hepatic and splenic flexures and shorter mesentery. When it does occur, it most commonly involves the splenic flexure. Risk factors for colonic volvulus in general are surgeries involving bowel translocation, malignancy, and malrotation. Chilaiditi syndrome, a benign congenital defect where a segment of intestine lies between the liver and the diaphragm, is also specifically correlated to predisposing patients to TCV, as well as constipation. The extensive dilatation of the transverse colon puts it as risk for future twisting. Timely diagnosis is critical to prevent the need for resection of the large bowel. Due to its rarity and high mortality, it is at the utmost importance for surgeons to be aware of TCV and keep it on their differential even in a younger patient.



Figure 1: CT abdomen showing colonic distension with volvulus at the splenic flexure.

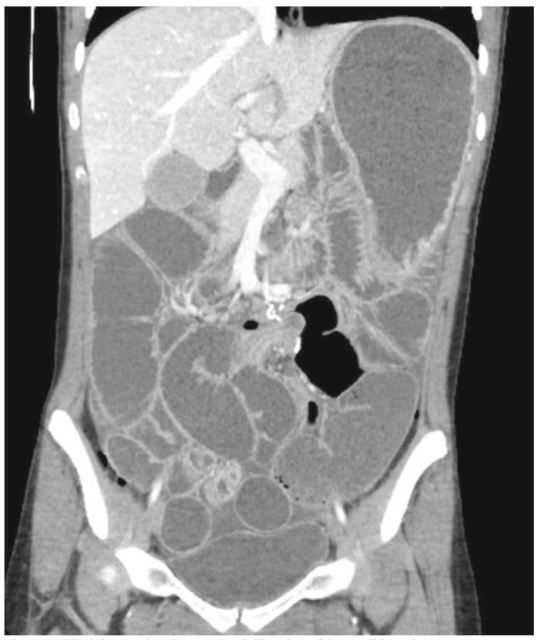


Figure 2: CT abdomen showing proximal dilatation of the small bowel.

P267

External Dynamic Traction for Endoluminal Resection of an Ascending Colon Lesion

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Endoscopic Submucosal Dissection (ESD) offers several advantages in removing large, complex colon lesions, including higher en-bloc resection and lower local recurrence rates. However, ESD is technically demanding and time-consuming due to insufficient endoluminal ability for traction-countertraction. Here we present an endoluminal procedure in a 55-year-old male with a 70 mm laterally spreading tumor in the ascending colon where we performed traction-assisted ESD facilitated by an external dynamic traction platform. The dissection was completed in 49 min without complication.

The external dynamic traction platform can improve traction-countertraction and may decrease procedure time. Further studies are needed to evaluate efficiency and facility.

P268

Timing of Minimally Invasive Colostomy Reversal After Emergent Hartmann's Procedure for Acute Complicated Diverticulitis

Marco Bertucci Zoccali; Osama Jabi; Helena Villa-Reyes; Debbie Bakes; Beatrice Dionigi; David Schwartzberg; Pokala R Kiran; James Church; Columbia University

Background: An obligatory wait period for colostomy reversal after an emergency Hartmann's for diverticulitis facilitates easier handling of intraoperative adhesions reducing morbidity and increasing successful closure. The 6 months wait that is currently widely employed for Hartmann's Reversal (HR) may be arbitrary since there is limited evidence guiding this decision.

Methods: From a prospective institutional outcomes database, patients who underwent minimally invasive HR for diverticular disease between 2012-2022 were included. Based on the time interval from index operation, HR was divided into early (< 6 months) and late (≥ 6 months). Demographics, comorbidity, intraoperative variables, and postoperative outcomes were retrieved. Univariable association between timing of reversal and outcomes was assessed.

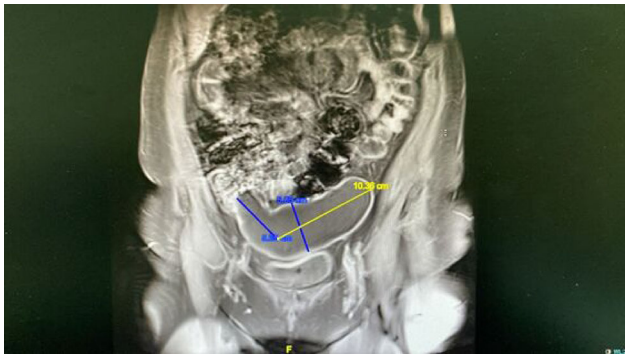
Results: Of 83 HRs during the study period; 50 (60.2%) were minimally invasive. Median interval between index procedure and HR was 5.5 months (IQR 3). Twenty-five patients (50.0%) had early and 25 (50.0%) late HR. The 2 groups were comparable for demographics and comorbidities. Overall conversion to open surgery rate was 32.0% (n = 16), 9 patients (36.0%) after early and 7 patients (28.0%) after late HR (p = .38). Any 30-day post-operative complication rate was 24.0% (n = 12); 5 (20.0%) and 7 (28.0%) (p = .37) after early and late HR. Rates of diverting stoma, intraoperative complications/transfusions, surgical site infection, anastomotic leak, ileus, reoperation, readmission, and ileostomy reversal were also similar, as well as length of stay(Table).

Conclusions: HR can be safely performed minimally invasively with good outcomes in experienced hands. The interval between index procedure and HR did not significantly impact conversion rates and outcomes at a high-volume center.

Table

Selected outcomes				
	Overall cohort (n, %) 50 (100)	**Early HR (n, %) 25 (50.0)**	**Late HR (n, %) 25 (50.0)**	**Univariable p-value**
Conversion	16 (32.0)?	9 (36.0)	7 (28.0)	0.5
Diversion	10 (20.0)?	4 (16.0)?	6 (24.0)	0.7
Any complication	12 (24.0)	5 (20.0)	7 (28.0)	0.5
Anastomotic leak?	1 (2.0)	0	1 (4.0)?	1
Reoperation?	1 (2.0)?	1 (4.0)?	0	1
Ileostomy reversed	9 (90)	4 (100)	5 (83.3)	1
Length of stay (median, IQR)?	4.5 (3)	4 (2)	5 (3)	0.8

CT in detecting peritoneal disease. Surgical resection is the only curative option for LAMN. Surgical approach and lymph node (LN) dissection remain controversial due to the difficulty of preoperative malignancy diagnosis. The use of laparoscopic resection for LAMN has been on the rise. To prevent mucocele injury, surgeons should avoid direct tumor handling and ensure margins, especially in invagination cases. Surveillance for recurrent disease and PMP after appendectomy is recommended, although there is no established guideline regarding the duration and frequency of surveillance.



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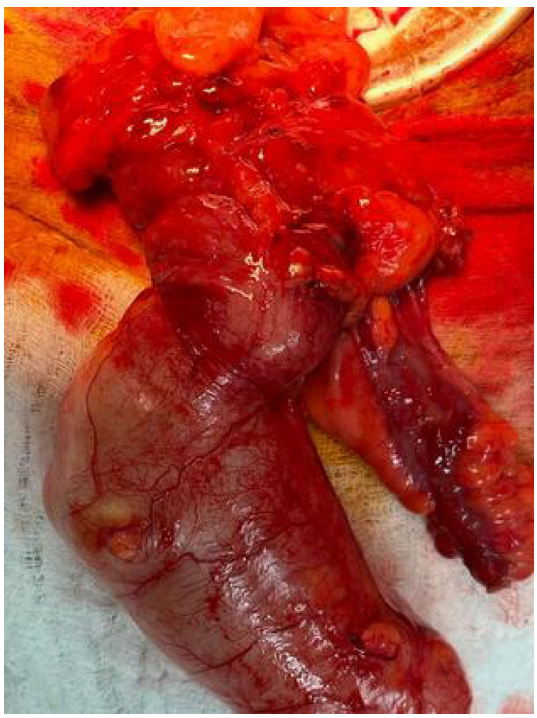
Complete Laparoscopic Resection of Giant Appendiceal Mucinous Neoplasms, Case Report and Literature Review

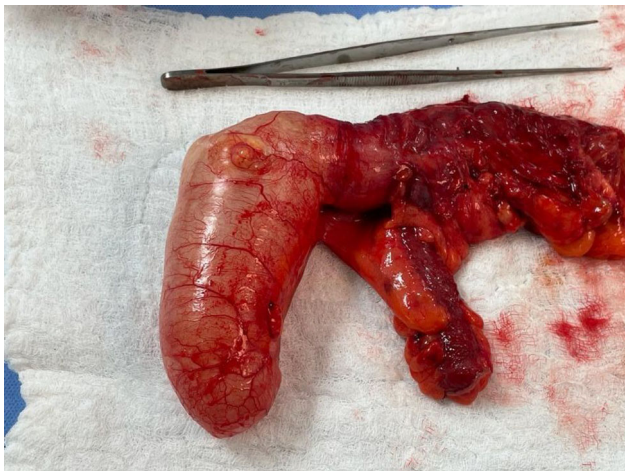
Shatha Althobaiti, Dr[1]; Rayan Makeen, Dr[2]; Abrar Filfilan, Dr[1]; Ahmad Hawsawi, Dr[1]; [1]NSH; [2]KFH- Makkah

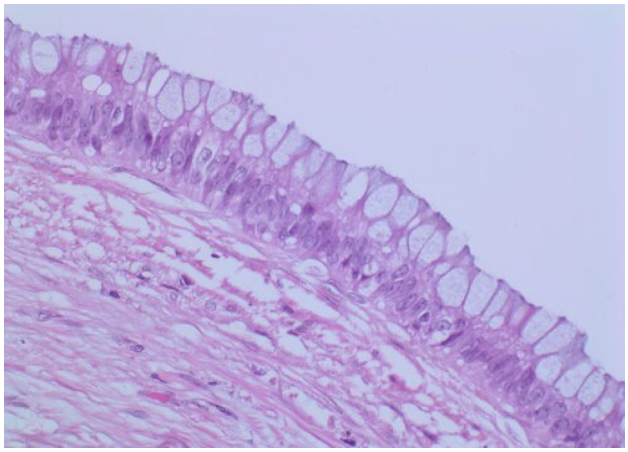
Introduction: We are reporting a case of low-grade appendiceal mucinous neoplasm (LAMN) with a remarkably large size 16 cm x 5 cm that was successfully and meticulously removed using a completely laparoscopic procedure

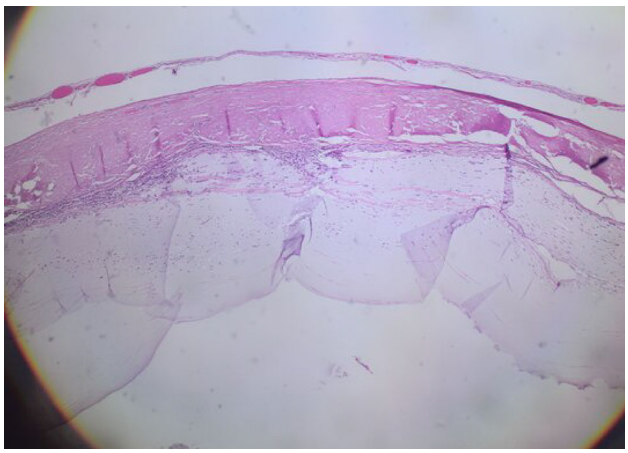
Case Presentation: 33-year-old female patient, presented to the emergency department with abdominal pain, tenderness in the right lower quadrant and a palpable mass. Magnetic resonance imaging (MRI) revealed a large, blind-ended tubular structure originating from the cecum. It measured approximately 16 cm × 5 cm (Fig. 1) there was suspicion of LAMN. As a result, an emergency laparoscopic right-hemicolectomy was performed, along with an end-to-end ileocolic anastomosis and lymph node dissection. During the operation, a large appendicular mucocele with an impending risk of perforation was discovered (Figs. 2, 3). The final pathological diagnosis confirmed LAMN at stage pT3 with no lymph node involvement (Figs. 4, 5).

Discussion: LAMN typically displays epithelial villous adenomatous changes without malignancy. preoperative diagnosis of appendiceal mucinous neoplasms remains challenging. Timely workup and management are crucial to prevent progression to Pseudomyxoma Peritonei and metastasis. diagnosis of LAMN is primarily established through abdominal CT scans. MRI has demonstrated superiority to









Conclusion: Diagnosis of LAMN is typically confirmed through surgical excision.The choice of surgical approach depends on the stage of the disease and the surgeon's experience.The standardization of postoperative follow-up and surveillance protocols for such cases is still in progress

P270

Enhanced Recovery After Surgery (ERAS) Protocol in Colorectal Surgery Is Safe and Effective in the Octogenarian: A Retrospective Cohort Study

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Introduction: With the advent and application of ERAS protocols within colorectal surgery, there has been a notable reduction in overall length of stay (LOS), complications, and readmission. This effect has not been investigated among the geriatric population. Our study aims to assess if the implementation if an ERAS protocol is safe and as efficacious in the octogenarian as it is in the general population.
Methods: This is a retrospective cohort study analyzing all patients undergoing colorectal surgery under the ERAS protocol at Boca Raton Regional Hospital from December 1, 2019 to October 30, 2021. Patients under the age of 18, undergoing emergency surgery, and with incomplete data were excluded. Chi-square or Fischer's exact tests were used to analyze categorical variables as appropriate. Student t-test or Mann-Whitney U-tests were used to analyze continuous variables, as appropriate. A $p < .05$ was considered statistically significant and analyses were done using EZR and R software.
Results: 299 patients met inclusion criteria with 60 (20.1%) over the age of 80 and 239 (79.9%) younger than 80. 140 (46.8%) of the cohort were male. When comparing octogenarians with younger patients there were no differences in compliance with ERAS protocols such as pre-operative medication ($p = 1$) and oral carbohydrate drink consumption ($p = 0.574$), oral intake in PACU ($p = 0.832$), PACU sit and dangle ($p = 0.619$), or adherence to a narcotic sparing regimen ($p = 0.365$). Additionally, there were no differences in complications ($p = 1$), time until bowel function ($p = 0.401$), or time to first ambulation ($p = 0.883$). Octogenarians were more likely to have a longer LOS (4.89 v 3.0 days; $p = 0.006$), disposition requiring either home health care or a skilled nursing facility (SNF) (52.5% v 28.3%; $p = 0.008$), and readmission (42.3% v 20.8%; $p = 0.042$).
Conclusion: The ERAS protocol is safe and effective when used in the octogenarian without decreased compliance or increased complications. Increased LOS, care needed on disposition, and readmission are in-line with other published data of all patients and not likely related to the addition of the ERAS protocol.

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Trends in Surgical Approach for Proctectomies Using ACS-NSQIP

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Introduction: The aim of this study was to evaluate the trends in surgical approach for proctectomies using the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database.
Methods: Proctectomies conducted from 2018-2021 were identified using the ACS-NSQIP Procedure Targeted Proctectomy database. The surgical method, tumor location, and leak rate were all investigated. The Pearson chi-square test was performed to see whether there

were changes in surgical strategy based on the location of the rectal cancer.

Results: Between 2018 and 2021, 18,043 proctectomies were performed. The most prevalent approach (39.3%) was open surgery. From 2018 through 2020, there was a year-by-year growth in the robotic approach (17.4%, 18.6%, and 19.9%). There was a correlation in using the robotic approach for lower rectal tumors (lower third 25.1%, middle third 22.4%, upper third 16.3%) and the laparoscopic approach for upper rectal tumors (upper third 40.5%, middle third 33.6%, lower third 27%) when the data was categorized by tumor location (lower third < 5 cm from the anal verge, middle third 5-10 cm, and upper third > 10 cm) (Table 1).

Table 1

Approach	Lower third (N = 4089)	Middle third (N = 2383)	Upper third (N = 1238)	Unknown (N = 1384)
Robotic	1028 (25.1%)	533 (22.4%)	202 (16.3%)	221 (16.0%)
Laparoscopic	1106 (27.0%)	800 (33.6%)	502 (40.5%)	369 (26.7%)
Open (planned)	1327 (32.5%)	731 (30.7%)	385 (31.1%)	629 (45.4%)
Other	117 (2.9%)	54 (2.3%)	17 (1.4%)	20 (1.4%)
Unknown	511 (12.5%)	265 (11.1%)	132 (10.7%)	145 (10.5%)

Conclusion: While open surgery remained the most common approach in proctectomies, the robotic approach gradually increased and was more favored in lower rectal tumors, while laparoscopy was more favored in upper rectal tumors.

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Beware of Stercoral Perforation in Opiod-dependent Patients: A Report of Two Cases and Review of Literature

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Introduction: Stercoral colitis is an uncommon disease process that is a result of chronic constipation where fecal impaction condenses into a fecaloma which overdistends the colonic wall and increases the risk for perforation. Chronic constipation is seen in 15-20% of adults, but the prevalence of stercoral colitis and risk for perforation are not well documented. It is more commonly seen in elderly patients with dementia, nursing home or bed bound patients and young female patients with psychiatric conditions. But with the rise of opiod and narcotic abuse, we question if stercoral colitis and cases of perforation is a disease process that is underreported in this population subset.

Case Reports: First patient was a 57 year old female with history of major depressive disorder and chronic right knee and left hip pain for which she took 1-2 percocet daily. She presented with worsening lower abdominal pain after attempted use of a rectal suppository for relief the day prior to presentation. CT abdomen Pelvis demonstrated thickened rectosigmoid colon with perforation in posterior pelvis with significant amount of retropertioneal air tracking to level of renal veins with prominent amount of stool to dilated cecum. Intraoperatively, she was found to have an area of necrosis measuring approximately 3 cm At the posterior rectosigmoid junction containing large stool balls within extraperitoneal reflection of the bowel in mesentery. Throughout the colon she was noted to have fixed large hard stool impaction as well.

Second patient was a 35 year old female, hx heroin abuse, presented with worsening left lower quadrant abdominal pain with subjective fevers that initially started three days prior to presentation after receiving a fleet water enema at an urgent care center for abdominal pain presumably due to constipation. CT Abdomen/Pelvis showed perforated rectosigmoid colon contained in the retroperitoneal space. Patient initially refused surgical intervention for a Hartmann/s procedure until she developed worsening pain, leukocytosis, and fevers 2 days after admission. Intraoperatively, she was found to have perforated upper anterolateral rectum secondary to large stool burden with necrosis and large pelvic abscess.

Discussion: Noting that perforated stercoral colitis is a consequence of severe constipation, it is a disease process that should be further studied to determine predictive risk factors for perforation and caution the usage of rectal enema and suppositories in high risk patients.

P273

Assessing the Clinical Utility of Pelvic MRI for Lateral Lymph Node Metastases Detection in Rectal Cancer: A Meta-Analysis

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Introduction: Rectal cancer is a major global health challenge, with the spread of cancer to lateral lymph nodes significantly impacting treatment strategies and patient outcomes. Pelvic Magnetic Resonance Imaging (MRI) has emerged as a promising non-invasive tool for detecting these metastases. However, there are varying reports on the diagnostic accuracy of pelvic MRI, highlighting the need for a comprehensive assessment of its clinical effectiveness. This study aims to evaluate pelvic MRI's effectiveness in identifying lateral lymph node metastases in rectal cancer patients. To achieve this, we will perform a systematic literature review and a meta-analysis of diagnostic accuracy, using histopathology as the benchmark for comparison.

Methods: A comprehensive search was conducted across PubMed, Embase, and the Cochrane Library for publications up to 2023 that examined the accuracy of pelvic MRI in detecting lateral lymph node metastases in rectal cancer, using histopathological analysis as the gold standard. We utilized the R mada package for statistical analysis, which allowed for the integration of sensitivity, specificity, and false-positive rates from various studies while considering variations within and between these studies.

Results: Our analysis included 14 studies comprising 1911 samples. The combined sensitivity, specificity, and false-positive rate for pelvic MRI in detecting lateral lymph node metastases were found to be 70.9% (97.5% Confidence Interval [CI]: 60-79.8%), 88.1% (97.5% CI: 82.6-92.0%), and 11.9% (97.5% CI: 8.0-17.4%), respectively.

Conclusion: This study suggests that pelvic MRI accurately detects lateral lymph node metastases in rectal cancer. These results advocate for the integration of pelvic MRI in clinical decision-making for rectal cancer patients. However, the variability in study results underscores the need for more extensive, prospective research to confirm these findings and develop standardized imaging protocols for enhancing patient care.

P275

Rates of Cancer and Advanced Histology in Small and Diminutive Polyps from a High-Risk Population (NL)

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Background: Small (6 – 9 mm) and diminutive (1 – 5 mm) polyps have relatively low rates of advanced histology and cancer, leading to suggestions that with appropriate endoscopic characterization, these polyps can be resected and discarded. The aim of this study was to assess whether resect and discard would be a reasonable approach in Newfoundland and Labrador (NL), where the incidence and mortality rates of colorectal cancer (CRC) are the highest in Canada. Additionally, current guidelines in NL recommend patients with 1 – 2 small polyps without advanced histology return to FIT testing rather than undergo future endoscopy. This subset of patients might make excellent candidates for resect and discard approaches.
Methods: A retrospective chart review of patients undergoing colonoscopies for positive fecal immunochemical testing (FIT) was performed for the year April 1, 2022 – March 31, 2023, identifying patients who had 1 – 2 small/diminutive polyps resected. Pathology reports were then reviewed to determine rates of advanced histology and cancer in these polyps.
Findings: 366 patients with 430 polyps met our inclusion criteria, 65.6% (n = 282) were diminutive and 34.4% (n = 148) were small. Of all polyps, 0.9% (n = 4) were considered advanced, including 2% (n = 3) of all small polyps and 0.4% (n = 1) of all diminutive polyps. No high grade dysplasia was noted in any of our specimens, and 1 small polyp contained adenocarcinoma. Of note, sessile serrated lesions without dysplasia, which are not considered advanced but require continued endoscopic surveillance, made up 3.5% (n = 15) of all polyps in our study. If all polyps in our study had been discarded and all patients returned to FIT testing, 4.6% would have missed out on recommended future colonoscopy.
Conclusions: Rates of advanced histology and cancer in small and diminutive polyps in the NL population analysed here are similar to those reported in the literature, suggesting NL could be considered for resect and discard approaches, despite its higher overall CRC incidence and mortality rates.

P276

Clinical Outcomes of Perforated Colorectal Cancer Surgery - Impact of Laparoscopic Surgery

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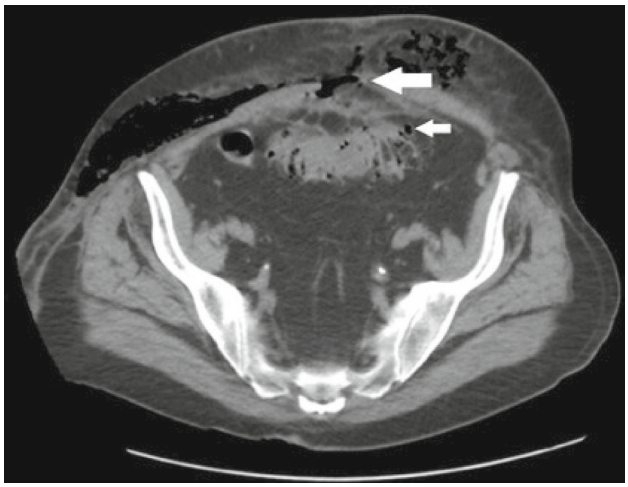
Background: Perforated colorectal cancer is a fatal disease that causes peritonitis and sepsis, however, it is less commonly reported than non-perforated colorectal cancer. It is often associated with bowel edema and dilatation, which limits the indications for laparoscopic surgery.
Object: We retrospectively analyzed the treatment outcomes of all 57 patients with perforated colorectal cancer who underwent surgery at our hospital from January 2014 to April 2023 (Department of gastroenterological surgery and Emergency Medicine). Among of them, 35 cases were performed with open surgery (O) and 22 were laparoscopic surgery (L) (6 cases with transition to laparotomy).
Results: Regarding patient's background, the L group was younger (O: L = 78: 64 years, p = 0.04), but had similar gender, BMI, the rate of DIC, and ileus compared to the O group. Operative time was longer in the L group (179: 239 min, p = 0.001), but blood loss was less (190: 3 ml, $p < 0.001$), and perforation location, morphology, Hinchey classification, and degree of dissection were comparable. Tumor diameter (40: 53 mm), number of dissected lymph nodes (18: 19), radial margin, and final stage were comparable. The L group had less ventilator management for more than 3 days (p = 0.03), shorter postoperative hospital stays (27: 11.5 days, p = 0.001), and postoperative complications (CD $\geq$ Grade 3) tended to be lower (23: 5%, p = 0.06). Perioperative mortality was similar (8.6: 9%); long-term outcomes (except StageIV) showed similar recurrence rates (23: 25%) but higher cancer-related mortality in the group O (13 vs. 0%, p = 0.02).
Conclusions: Despite age bias, the results of laparoscopic surgery were relatively advantageous. It is necessary for further case accumulation and long-term observation.

P277

A Case of Necrotizing Soft Tissue Infection Following Mesh Infection from Perforated Diverticulitis

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Introduction: One of the most feared complications of diverticulitis is perforation Commonly, when perforation occurs, it happens in the peritoneal cavity; rarely, diverticulitis may perforate into the retroperitoneum or extra-peritoneal tissues. This case report describes a case of diverticulitis perforating through previous abdominal wall mesh into the subcutaneous space, resulting in necrotizing soft tissue infection.
Case Report: The patient we discuss was a 71-year-old male who presented with 2 weeks of abdominal pain. On admission, his CT demonstrated extensive subcutaneous gas over the abdomen and pelvis, with tracking to the right chest, as well as colon thickening and communication to the anterior abdominal wall. He was found to have perforated sigmoid diverticulitis and phlegmon involving previously placed sublay umbilical hernia mesh.
Discussion: We hypothesize the etiology of this necrotizing soft tissue infection was via the sublay umbilical hernia mesh which created a pathway for spread of the intra-abdominal infection to extra-peritoneal tissues. Few other case reports describe perforated diverticulitis causing extra-peritoneal emphysema or infection. The etiologies and mechanisms described suggest gas-forming bacteria and/or air-pressure gradient as the source of gas dissection along tissue planes.
Conclusion: Our case represents a rare complication of perforated diverticulitis and rare etiology for necrotizing soft tissue infection. Among other case reports of complicated diverticulitis, our patient is unique in that the communication between the intra-abdominal infection to the subcutaneous tissue was suspected to be via pre-existing umbilical hernia mesh.





P278

Successful Endoscopic Closure of Persistent Sinus Tract Using X Tack Endo Stitch Following Iatrogenic Rectal Perforation

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Background: A sinus cavity is a possible sequela of a chronic posterior rectocutaneous fistula resulting from a leak following repair of a rectal injury. In cases where open repair is not immediately feasible due to a recent major resection or other factors, endoscopic interventions can be considered as a possible alternative. This case study presents the viability of endoscopic closure, specifically, the use of the X tack Endo Stitch, in treating a persistent draining sinus tract.

Abstract: The patient developed a chronic fistula following repair of rectal perforation and loop ileostomy creation during en bloc resection of sacrococcygeal chordoma with a complex rotational flap closure to his gluteal area. Despite proctectomy repair, the patient developed a persistent draining fistula tract to the skin. He was treated for an abscess with the placement of Jackson-Pratt (JP) surgical drains. Conventional open repair was deemed a high-risk procedure due to the relative recency of the major resection. As an alternative, endoscopic closure using the X Tack Endo Stitch was chosen, resulting in successful sinus tract closure. Follow-up examination, including a contrast study and endoscopy, confirmed the absence of leakage and showed a healed sinus tract. Subsequently, the patient underwent planned ileostomy closure, and at 10 months post-closure, he reports improved well-being, no drainage, and regular bowel movements.

Conclusion: The successful endoscopic treatment of the persistent draining fistula tract using the X Tack Endo Stitch demonstrates the practicability and effectiveness of this minimally invasive approach. Endoscopic interventions, especially using the X Tack Endo Stitch, offer a valuable option for managing persistent fistula tracts in cases where open repair may not be immediately feasible.

Image 1 Contrast enema prior to repair of fistula

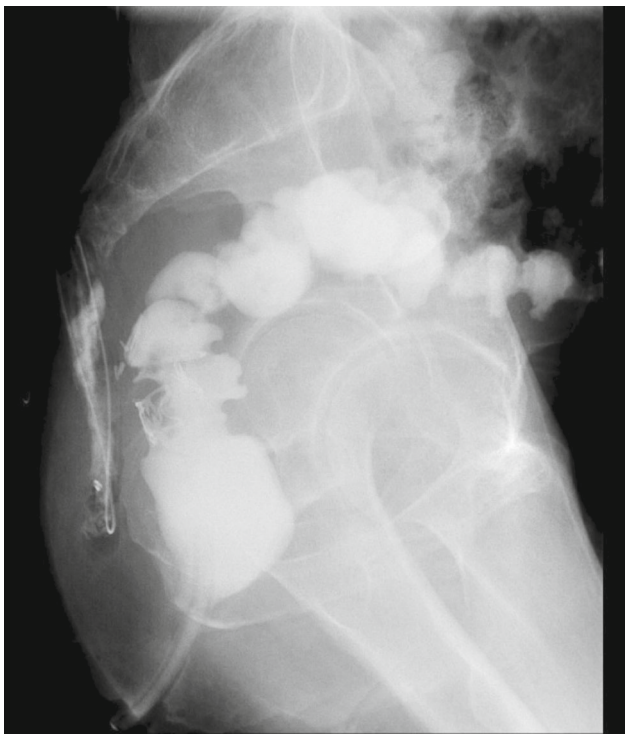
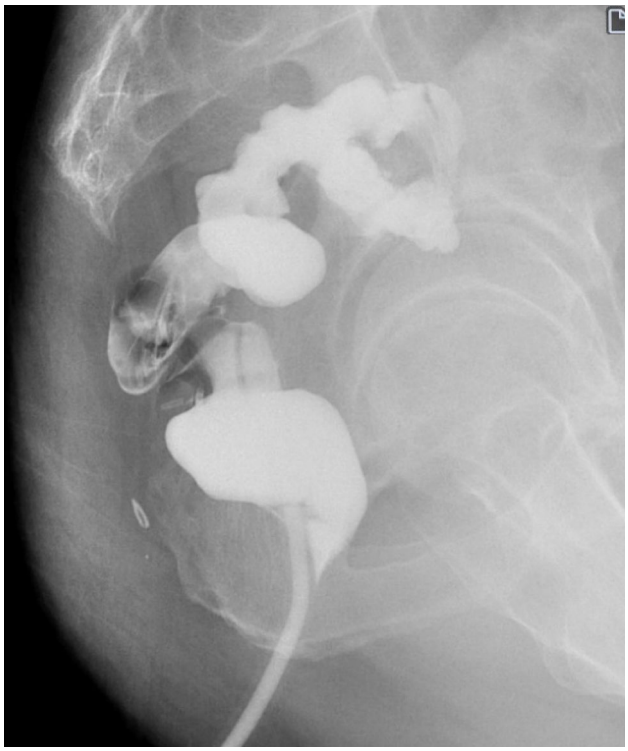


Image 2 Contrast enema following repair of fistula



P279

Reviving Transvaginal Colon Specimen Extraction: A Single Surgeon's Experience Enhanced by Newer MIS Techniques

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Introduction: The concept of Natural Orifice Specimen Extraction (NOSE) involves utilizing transanal or transvaginal routes as alternatives to creating an additional incision for specimen extraction. Transvaginal extraction is particularly beneficial in cases of combined gynecological resections, allowing for the extraction of large specimens and improved pain control by reducing the number of incisions and length of hospital stay.
Methods: We conducted retrospective review of colon resection data at our hospital from 2017 to 2023, during which robotic colon resections with intra-corporeal anastomosis were initiated. Between 2019 and 2023, every female patient undergoing left-sided colon resection was consented for transvaginal extraction. Vaginal preparation was performed at the start of the procedure. Both benign and malignant specimens were extracted via the vagina, and a wound protector was used for specimen extraction in cases of known malignancy. Data was reviewed retrospectively after obtaining IRB approval.
Results: During the period from 2017 to 2023, we performed 30 transvaginal extractions of colectomy specimens. The average patient age was 58 (range 24-86), with 14 of the 30 patients also undergoing Total Abdominal Hysterectomy (TAH) and Bilateral Salpingo-Oophorectomy (BSO) as well. The average BMI was 28 (range 21-50). The average length of stay was 2.8 days, and 26% of these patients were discharged on the same day following the colectomy procedure. Bowel function returned on an average of postoperative day #1. There were no Surgical Site Infections (SSIs), colovaginal fistulas, or vaginal suture line breakdowns or anastomotic leaks. Patients had a total of four robotic port sites as incisions. There were no complications reported within 30 days post-surgery. 93% of these cases were left sided resections (sigmoid resection, Low anterior resections), 1 right colectomy and 1 total colectomy, all with intra-corporeal anastomosis, and 14 of these anastomoses were fully handsewn. 50% of these cases were for malingnant indications.
Conclusions: Transvaginal extraction, especially for left-sided resections, is technically sensible due to the nature of the operation. Advances in Minimally Invasive Surgery (MIS) and the use of barbed sutures have facilitated the revival of this traditional technique. By eliminating the need for an additional specimen extraction site, achieving same-day discharge has been possible, along with reduced narcotic usage.

P280

Colorectal Cancer After Solid Organ Transplantation: Is an Update to Screening Guidelines Warranted?

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Introduction: Organ transplantation (OT) occurs in a complex, co-morbid population with unique challenges that impact their participation in preventative healthcare. Current colorectal screening parameters include adjusted schedules for familial history of cancer and polyposis syndromes. However, there is no protocol for adjusting surveillance patterns for patients after OT. Our aim is to demonstrate the incidence of colorectal cancer after OT and whether their adherence to screening is altered after OT.
Methods: We conducted a retrospective, observational, single center study that included all patients with colon, rectal and anal cancer diagnoses following solid OT, during a 6-year time frame. Data was collected from retrospective chart review, including demographics, medical and surgical history.
Results: From 2017-2023, 28 transplant recipients were diagnosed with colon, rectal or anal cancer. Seven patients were excluded from study analysis due to unavailable endoscopy data. Of the remaining 21 patients, 67% were male (33% female) and 62% caucasian (19% black and 19% hispanic). The average age of malignant diagnosis was 67 years (median of 58 years). The average time from transplant to malignancy was 11 years, with a median of 9 years. All patients underwent pre-transplant colonoscopy. On review of post-transplant colonoscopy surveillance, 48% were compliant with a minimum of q10 year colonoscopy screening after organ transplantation, and half of these patients were screened more aggressively (q2-5 years) based on personal history of IBD or polyps.
Risk factors outside of transplant immunosuppression included obesity and diabetes (52%), inflammatory bowel disease (14%), genetic disease (19%), and radiation exposure (9%). Transplant history included 2 hearts (9%), 10 kidneys (48%) and 9 livers (43%), with 29% of these patients reporting history of multiple organ transplants. Cancer history included 13 colon cancers (62%), 4 rectal cancers (19%) and 4 anal cancers (19%), with 52% presenting symptomatic and 52% diagnosed with locally advanced or metastatic disease.
Conclusion: Transplant recipients are a complex and co-morbid population at risk of non-adherence to routine risk colonoscopy surveillance for colorectal and anal cancer. Owing to any number of factors, including their immune suppression and their chronic disease, they may face increased risk of malignancy. Given most cancers were diagnosed within a decade of transplant, colorectal cancer screening

should be prioritized within this population. Additionally, the proportion of patients presenting with symptomatic or advanced disease within this population, should suggest need for adjusted colorectal cancer screening intervals.

P281

Intraoperative Organ Recognition Model Using AI in Minimal Invasive Colorectal Surgery

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Aims: Advances in endoscopic equipment have made it possible to provide magnified, high-resolution images, but they do not assist the surgeon's recognition. AI technology has developed dramatically in recent years and we believe AI can assist surgeon's organ recognition and improve the safety and quality of surgery. The aim of this study is to examine the usefulness of the AI models.
Methods: We developed AI recognition model for loose connective tissue fibers (LCTFs), nerves, pancreas and ureter in laparoscopic or robotic colorectal surgery based on video clips of gastric cancer, colorectal cancer, and hernia surgery. The performance of the AI model was assessed through quantitative and qualitative studies.
Results: It was possible to recognize LCTFs, nerves, pancreas and ureter in real-time (delay: 0.13 s, analysis speed: 30 frames/second). The Intersection-Over-Union (IOU) and Dice index for the LCTFs, nerves, pancreas and ureter were 0.35/0.52, 0.33/0.45, 0.53/0.69 and 0.43/0.59, respectively. The usefulness was evaluated by 25 surgeons using a questionnaire. Out of 10 points, it received a high score of 8.9 for usefulness and 8.4 for future potential.
Conclusion: We developed intraoperative organ recognition model using AI in minimal invasive colorectal surgery. This AI models could support surgeon recognition and make colorectal surgery safer.

P282

A Case of Spontaneous Splenic Rupture After a Right Hemicolectomy

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Introduction: Spontaneous or non-traumatic splenic rupture is rare. The incidence is considered unknown although one study suggested in cases of splenic rupture approximately 3.2% are spontaneous, with a mortality of around 12%. Although the cause of non-traumatic splenic rupture can be idiopathic, pathological and iatrogenic causes have been demonstrated. Severe splenomegaly is the most common cause with etiologies including infections (e.g., mononucleosis), leukemia, inflammatory causes, medications (e.g., anticoagulation) and iatrogenic causes.
Presentation of Case: This case report presents a 66-year-old female with a three-day history of worsening right upper quadrant pain, and subsequent identification of a ruptured appendicitis. On a pathological exam, goblet cell adenocarcinoma of the appendix was found. To ensure proper, clear margins a right hemicolectomy with ileocolic anastomosis was performed. During her postoperative course she developed atrial fibrillation, and was placed on heparin. She was diagnosed with coronary artery disease, and systolic heart failure. At this time, she was transitioned to Apixaban. Three days after her cardiac catheterization and twelve days after hemicolectomy, she developed left shoulder pain, diaphoresis and hypotension. A CT demonstrated a large splenic hematoma with rupture and hemoperitoneum. The patient was taken for emergent laparotomy and splenectomy. Subsequent hospital stay was uncomplicated with discharge to a long-term acute care center.
Discussion: Spontaneous splenic rupture is rare, and has been associated with a few things. Other than idiopathic origins, severe splenomegaly is the most common cause. Hematological causes like lymphoma have been shown. She did have leukocytosis with neutrophilia throughout her stay. Anticoagulation with heparin and Apixaban near the time of spontaneous rupture was also significant, which has been associated with rupture. Iatrogenic causes are most often associated with endoscopic procedures. However, this patient's recent history of laparotomy and right hemicolectomy with anastomosis could be a plausible cause of atraumatic rupture, due to the tension on the splenocolic flexure and ligament and manipulation of the colon.
Conclusion: In summation the cause of spontaneous splenic rupture could be multifactorial. This patient had a complex history of goblet cell adenocarcinoma causing rupture of the appendix, atrial fibrillation with anticoagulation and hemicolectomy. Inflammation, anticoagulation and iatrogenic causes may have played a role in the rupture of this patient's spleen. Analysis of a definitive etiology is limited due to the complexity of care given. More research needs to be done in regards to the effects of apixaban and spontaneous splenic rupture.

P283

Advanced Hemorrhoids: Control vs. Cure

Dr. P. B Patel; Shiv Shraddha Nursing Home

Background: The persistence of confusion surrounding the etiological mechanisms of hemorrhoid development and the principles guiding its therapeutic management is partly attributable to unsubstantiated beliefs, historical narratives, and unverified theories.
Clinical practice guidelines, grounded in the most robust available evidence, serve as informative decision-making tools that prioritize inclusivity over prescription by offering a spectrum of options.

The expanding array of methods, modifications, personalized approaches, and nomenclature has compounded the complexity of selecting an appropriate hemorrhoidal treatment.
Objective: Visual imagery's exceptional capacity to convey intricate and multifaceted concepts transcends linguistic barriers, facilitates the dissemination of guidance, and encapsulates common insights concisely and universally.
The goal is to use visuals to express available knowledge in different contexts.
Methods: A comprehensive review of all available guidelines and guideline references was conducted, and informative charts were meticulously prepared to present clinically significant data.
Results: The presentation includes the following charts:
Comparative Analysis of Control vs. Cure
- Risk of Complications and Operator Dependability Comparison
- Fibrosis Comparison
- Precision Comparison
- Adequacy Comparison
- Lifetime Cost Calculator
- Comparative Analysis of Various Hemorrhoid Treatment Methods

Conclusion: This presentation is a beta version, and it is neither final nor perfect. Its purpose is to initiate fresh discussions and research initiatives worldwide, addressing the intricate landscape of advanced hemorrhoid treatment options.

P284

A Case of a Large Rectal Schwannoma Undergoing Laparoscopic Low Anterior Resection with Transanal Approach

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A 42-year-old man with no subjective symptoms underwent a screening colonoscopy that revealed a submucosal tumor in the lower rectum 8 cm from the anal verge. CT scan showed a large 6.5 cm mass in the lower rectum. After transrectal ultrasound-guided fine needle aspiration biopsy, the diagnosis of schwannoma was made. Laparoscopic low anterior resection with a transanal approach was performed for that tumor to achieve anorectal preservation. The patient had an uncomplicated postoperative course. For a large rectal tumor in the pelvis, a transanal approach was used to achieve a good surgical field for resection.

P286

Diffuse Gastrointestinal Metastasis of Lobular Carcinoma of the Breast

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Breast cancer is one of the leading cancer diagnoses in the United States and results in the second highest incidence of oncologic mortality in women. Breast cancer typically metastasizes to lungs, liver, bone, brain, and rarely the gastrointestinal (GI) tract. Breast cancer that metastasizes to the GI tract is typically lobular carcinoma with hormone receptor positivity. This case discusses a 57 year old female who presented with ER (+), PR (+), and Her-2 (-) pT1 N2 (stage IIIA) lobular breast carcinoma initially. After surgical resection and chemotherapy, the patient presented 11 years after breast cancer diagnosis with nonspecific abdominal symptoms. Further endoscopic workup showed malignant appearing lesions in her colon which were biopsy negative. Because of concern for a malignant process, the patient was offered a right colectomy. Intra-operatively, patient was found to have gastric outlet obstruction due to pyloric mass and a fibrotic right colon. Patient underwent an extended right colectomy and distal gastrectomy with Roux-en-Y reconstruction. Final pathology of right colon and pylorus were significant for invasive lobular breast carcinoma with lymph nodes that were ER (+), PR (-), and Her-2 equivocal. This case demonstrates key factors for metastatic lobular breast carcinoma including presentation in GI tract, delayed presentation, hormone receptor positivity, and potential for benign biopsy. Furthermore, due to previous hormone therapy treatments, some patient can have a change in hormone receptor positivity in metastatic breast cancer such as this patient. This patient also shows that endoscopic biopsies can be benign because of tumor deposition within the submucosa and muscularis propria. Thus, diligent workup and intervention is necessary in any patient with a previous oncologic history and concern for recurrent disease. Overall, this case demonstrates the requirement of thorough workup for patients with oncologic history and the rare trend of hormone receptor positive lobular breast carcinoma metastasizing in the GI tract.

P288

Sphincter Preservation Surgery Treatment of Rectal Cancer. Our Own Experience

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Background: Ideal treatment of rectal cancer includes controlling the cancer; minimizing trauma, morbidity, and mortality; and avoiding a colostomy with preservation of adequate function. Total mesorectal excision (TME) is the gold standard for oncologic resection in rectal cancers but in obese, laparoscopic approach can be hampered by poor visibility, inadequate retraction, and distal margin delineation. Sphincter preservation surgery (SPS) in the low pelvis has deterred surgeons because of its extreme dif?culty and the challenge in obtaining adequate distal as well as circumferential margins.
Aims: To assess the surgical and long-term oncological outcomes of patients with rectal cancer who underwent SPS at National Center for Minimally Invasive Surgery in Havana, Cuba.
Methods: This study was a retrospective review of a prospective database of patients with rectal cancer that underwent SPS by transanal endoscopic microsurgery (TEM), low and ultralow laparoscopic anterior resection (LAR) and Transanal TME (taTME) from January 2012 and July 2023 at a tertiary referral university-affiliated center specializing in endoscopic and laparoscopic surgery. All the patients underwent total mesorectal excision in laparoscopic group. The technology of TEM was used in endoscopic group and for taTME.
Results: 392 patients underwent SPS via 4 techniques: TEM (n = 111), low LAR (n = 183), ultralow LAR (n = 85) and taTME (n = 13). In the TEM group the overall incidence of morbidity was 8,1% (9/111). The recurrence rate was 7,4% in T1, 7,1% in T2 (after chemoradiotherapy) and 2,4% in T3 (after chemoradiotherapy with complete clinical response). Overall estimated 5-year survival was 97,7% and the disease-free survival rate was 96,4%. In the laparoscopic group the major morbidity rate was 9,6% and 1,8% of mortality. The 5-year disease-free survival was 84,6% and 5-year overall survival 82,8%.
Conclusion: Our experience has shown that performing minimally invasive surgical approach with sphincter preservation to treat rectal cancer appears to be an oncologically safe and effective procedure.

P289

Proximity Is not Proof of Pathology

Claire Wunker, MD, MSc; Jennifer Keller, MD; Grace Montenegro, MD; Saint Louis University

Introduction: In patients with a history of multiple cancers, the discovery of new soft tissue masses can be challenging to diagnose and treat. We present a patient with a history of lobular breast cancer, developed rectal adenocarcinoma, and then presented with a mass at the edge of her intergluteal cleft that was pathologically more consistent with her breast primary than the more proximal rectal cancer.
Case Presentation: Our patient is a 57-year-old female who was diagnosed with invasive lobular carcinoma of her right breast on screening mammography six years prior. She underwent bilateral mastectomies and adjuvant chemotherapy. Two years later, she had a local recurrence treated with resection, radiation and anastrozole. Screening colonoscopy in 2022 revealed an ulcerated mass in the anal canal. Biopsy confirmed moderately differentiated invasive

adenocarcinoma with intact mismatch repair genes. After staging demonstrated a locally advanced rectal cancer involving the sphincter complex, she was presented at multidisciplinary tumor board which recommended total neoadjuvant therapy. Restaging workup demonstrated clinical complete response with negative biopsy. The patient opted for a watch-and-wait protocol. Two weeks prior to her first scheduled surveillance she presented to clinic complaining of painful nodules in the left buttock along her intergluteal cleft. A rectal mass was appreciated on DRE. PET scan showed FDG avidity at left gluteal nodules (Fig. 1a), left inguinal lymph node, and anal canal mass (Fig. 1b). Subsequent excisional biopsy of the gluteal mass and fine needle aspiration of the inguinal lymph node revealed adenocarcinoma that was CK7, CK20, and diffuse GATA3 positive with rare CDX2 positivity. This staining profile is more consistent with breast, skin, or adnexal cancers than a colorectal origin.

Discussion: Local soft tissue metastases in breast cancer occur although distant soft tissue metastases are rare. Soft tissue metastases in rectal adenocarcinoma have also been rarely described. In this case, we present a soft tissue metastasis in temporal and anatomical proximity to a rectal adenocarcinoma that was consistent with neither primary tumor. Instead, had more characteristics associated with a breast primary. Interestingly, the initial breast tumor was lobular cancer while this recurrence was more consistent histologically with ductal disease. Due to the proximity, it was initially assumed that this would be a soft tissue tumor or lymph node related to her rectal adenocarcinoma. This case shows the importance of immunohistochemical analysis of any previous cancer as this was more consistent with a breast metastasis.

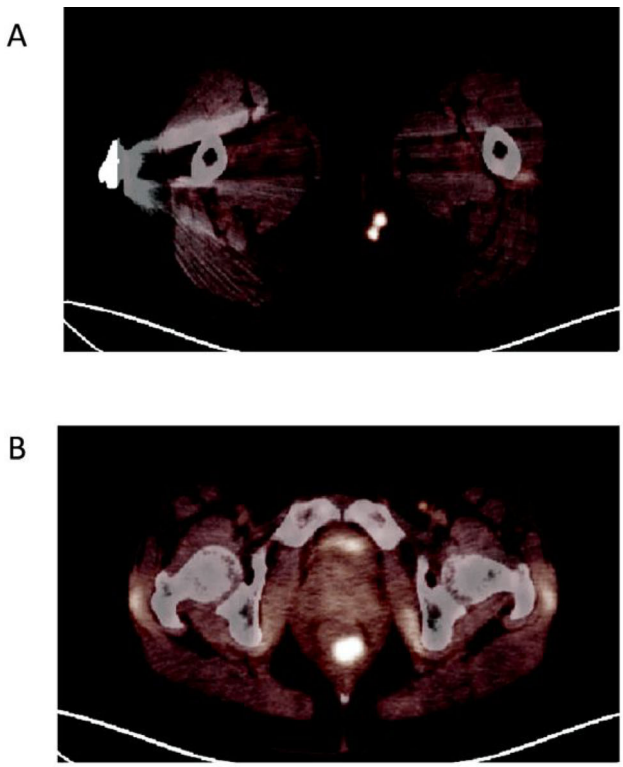


Figure 1 – PET scan showing FDG avidity in the left gluteal nodules (A), left inguinal lymph node (B), and anal canal mass (B)

P290

A Comparison of Outcomes of Laparoscopic and Open Surgery in Traumatic Colonic and Rectal Injuries

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Introduction: Laparoscopic surgery is being increasingly used for operative abdominal trauma. We aimed to study differences in outcomes of traumatic colonic and rectal injuries managed with laparoscopic versus open surgery within 1 day of presentation.

Methodology: Traumatic colonic and rectal injuries were identified in the NTDB for years 2013-2015 using ICD-9 codes. Subjects with missing data or cardiac arrest at time of arrival were excluded. Patients were divided into two groups based on utilization of laparoscopic or open colonic or rectal surgery within one day of presentation.

Data was collected for age, gender, race, injury severity score (ISS), pulse rate (HR), systolic blood pressure (SBP), respiratory rate (RR) and length of stay (LOS). Incidence was analyzed for acute kidney injury (AKI), acute respiratory distress syndrome (ARDS), deep vein thrombosis (DVT), pulmonary embolism (PE), pneumonia, organ space surgical site infection (SSI), deep SSI, severe sepsis, superficial SSI, unplanned intubation and unplanned return to OR.

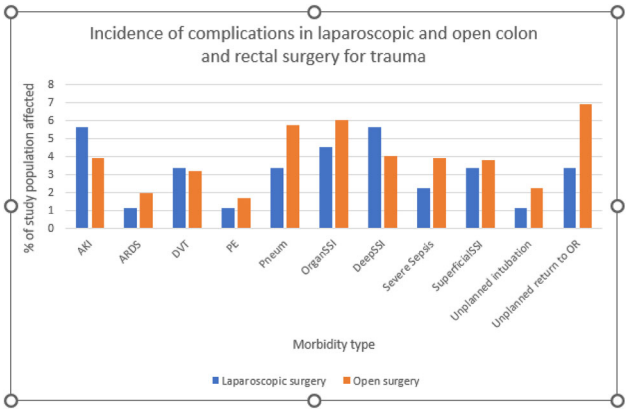
Statistical analysis was conducted using SPSS for windows. P-value < 0.05 was considered statistically significant.

Results: Of 2,598,467 patients, 8434 (0.32%) sustained a colonic or rectal injury. Mean age was 32.1 years. 87.8% were male. 89 patients (Group 1) underwent laparoscopic colonic/rectal surgery while 4796 (Group 2) underwent open operation.

Groups 1 and 2 were noted to be similar in terms of ISS (14.9 vs 16.3; p = 0.078), age (34.1 vs 31.5 years; p = 0.09), percentage of male patients (87.6% vs 88.1%; p = 0.90), pulse rate (95.7 vs 97.6; p = 0.46), SBP (119 vs 123 mmHg; p = 0.27) and RR (21.5 vs 20.4; p = 0.11) respectively.

No statistically significant differences were found in the incidence of AKI (5.6 vs 3.9%; p = 0.40), ARDS (1.1 vs 2.0%; p = 0.56), DVT (3.4 vs 3.2%; p = 0.91), PE (1.1 vs 1.7%; p = 0.69), pneumonia (3.4 vs 5.8%; p = 0.34), organ SSI (4.5 vs 6.0%; p = 0.55), deep SSI (5.6 vs 4.0%; p = 0.44), severe sepsis (2.2 vs 3.9%; p = 0.42), superficial SSI (3.4 vs 3.8%; p = 0.83), unplanned intubation (1.1 vs 2.2%; p = 0.48) and unplanned return to OR (3.4 vs 6.9%; p = 0.19) between groups 1 and 2 respectively.

LOS was 15.0 days for both groups.



Conclusion: Patients undergoing laparoscopic or open surgery for colonic or rectal trauma within one day of presentation show similar clinical outcomes and LOS despite similar ISS scores and demographic characteristics between the two groups. Laparoscopic colonic surgery appears to be a viable option in the appropriate setting for colonic and rectal trauma.

P291

Terminal Ileum Intubation During Screening Colonoscopy: What Is the Yield?

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Background: The use of routine intubation of the terminal ileum (TI) in asymptomatic patients undergoing screening colonoscopy is unclear. There currently exists conflicting data and a lack of standardized guidelines concerning TI intubation in this population, and therefore, our aim was to assess and analyze TI intubation in screening colonoscopies and determine the clinical and pathological yield.
Methods: Screening colonoscopies performed at a tertiary-level hospital system between July 2016 and September 2018 were queried from a prospectively maintained institutional colonoscopy database. Patients with history of inflammatory bowel disease, colorectal cancer or previous bowel resection were excluded. Examinations that had TI intubation were selected and analyzed. Main outcome measures included gross examination findings and pathological analysis of terminal ileal biopsies. Additionally, univariate analyses were conducted to compare patient demographics, scope times and quality of bowel preparation between the TI intubation group versus those who did not have TI intubation.
Results: A total of 25,493 screening colonoscopies were evaluated and 5,752 (22.5%) had TI intubation. In the TI intubation group, withdrawal times were significantly longer (10 vs. 9 min), bowel preparation quality was graded as better (98.5 vs. 94.8), and patients were younger (58.7 vs. 60 mean years old); all $p < 0.001$. A total of 100/5,752 colonoscopies had gross TI findings, in which biopsies were collected and underwent subsequent histopathological examination. Of these specimens, 40/100 patients had a biopsy-proven pathological finding and the other 60 revealed normal TI mucosa. 38/40 patients had acute or chronic enteritis of unknown significance, in which none went on to a diagnosis of inflammatory bowel disease at short-term follow-up. One patient had an inflammatory polyp and one patient had a well-differentiated neuroendocrine tumor. The overall gross pathological findings were 0.17% and pathologic abnormalities were diagnosed in only 0.6% of patients.
Conclusion: The findings of this study support the conclusion that routine TI intubation in asymptomatic patients undergoing screening colonoscopy is unwarranted.

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How to Prevent Anastomotic Leakage After Laparoscopic Colorectal Surgery? -A Method of Vessel Flow Observation Using the Near-Infrared Range (NIR) Imaging Device-

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Anastomotic leakage (AL) is one of the life-threatening complications in colorectal surgery. The causes of AL include oncologic, surgical procedural, and patient factors. Blood perfusion at the anastomotic site is considered an important factor in the prevention of AL. We have recently utilized indocyanine green (ICG) fluorescence observation with a near-infrared range (NIR) imaging system (ICG-FI) to assess bowel blood perfusion during laparoscopic colorectal surgery. We present our methods and results of blood flow confirmation using ICG-FI in laparoscopic rectal cancer surgery.

The Stryker 1588/1688AIM camera system was used for ICG-FI. After determining the dissection line, the mesenteric dissection should be parallel to the feeding vessels. The rapid injection of 5 ml of indocyanine green (ICG; 2.5 mg/ml) followed by 20 ml of normal saline was administered intravenously before anastomosis. The blood flow line was observed in NIR mode laparoscopically, and the fluorescence confirmed that the blood flow at the anastomotic site was enough. If the fluorescence was not obtained, additional bowel resection was planned in the good blood flow area.

Data was collected on 243 patients with rectal cancer at our institution from Jan 2018 to Dec 2021. ICG-FI was performed in 143 patients who were planned stapled anastomosis. The median time to fluorescence confirmation of the anastomotic site was 15 s (ranging from 5 to 80 s). After ICG-FI, additional bowel resection due to poor perfusion was required in 8 cases (5.6%). The AL rate was 8.4% (12/143 cases). Among the ICG-FI cohort, steroid use was a significant risk factor for AL, and anastomosis less than 5 cm from the anal verge was more likely to develop AL (av $>$ 5 cm 7.1% vs. $\leq$ 5 cm 10.3%). Conversely, robotic surgery and stoma creation may decrease the incidence of AL (Robot (+) 5,5% vs. (-)13.5%, Diverting stoma (+) 2.4% vs. (-) 10.9%).

Currently, it is difficult to prevent AL completely. However, AL can be reduced by visualizing blood perfusion with ICG-FI.

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Group A Streptococcus Bacteremia After Hemorrhoidectomy

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Introduction: Hemorrhoidectomy is a common colorectal procedure and is relatively low risk. Life-threatening complications such as bacteremia are uncommon and are typically due to gram negative organisms such as E. coli and Bacteroides. We present a case of Group A Streptococcus bacteremia following hemorrhoidectomy.
Presentation of Case: This is a case of a 60-year-old man who underwent elective 3 column hemorrhoidectomy (left lateral and right anterior/posterior). On post-op day 7, he re-presented following 48 h of chills and fever of 39 °C without leukocytosis. Chest x-ray was unremarkable. CT abdomen and pelvis with contrast showed a small amount of free fluid along the rectosigmoid colon and distal rectal wall thickening (Fig. 1). Incidental 3.0 × 3.6 cm hepatic lesion was also noted within segment 3 (Fig. 2). Blood cultures were obtained, IV ceftriaxone and metronidazole were initiated, and the patient was consented for anorectal examination under anesthesia with anoscopy. Intraoperatively, previous suture lines showed adequate hemostasis and no signs of infection, abscess, or necrosis. Infectious Disease switched the patient to vancomycin until blood cultures came back as pan susceptible Streptococcus Pyogenes. Ceftriaxone was re-initiated. Echocardiogram showed no signs of infectious endocarditis and liver MRI found the hepatic lesion to be consistent with benign hemangioma (Fig. 3). Blood cultures re-drawn on hospital day 3 and the patient was discharged with PICC line for 2 weeks of IV antibiotics.
Discussion: The most common complications following hemorrhoidectomy include bleeding, pain, and urinary retention. Bacteremia is an uncommon complication and has been reported to occur in up to 8% of cases. In cases of bacteremia following hemorrhoidectomy, the most common causative organisms include E. coli, B. fragilis, and S. aureus. Streptococcus pyogenes is an exceedingly rare causative organism in these patients and few cases have been reported in the

literature. In these patients, delayed presentation is common and can results in life-threatening sepsis, shock, and death. Given its rarity, thorough diagnostic work-up is necessary to rule-out more common sources and properly identify the source of infection. Our case demonstrates a quality outcome in a patient at high-risk of further complications related to their bacteremia.

Conclusion: Group A Strep bacteremia is a rare complication of hemorrhoidectomy with possible life-threatening complications. Surgeons should be aware of this possible sequela, as well as the work-up to rule out other sources of infection in this cohort of patients.



Figure 1. Nonspecific free fluid adjacent to the rectum

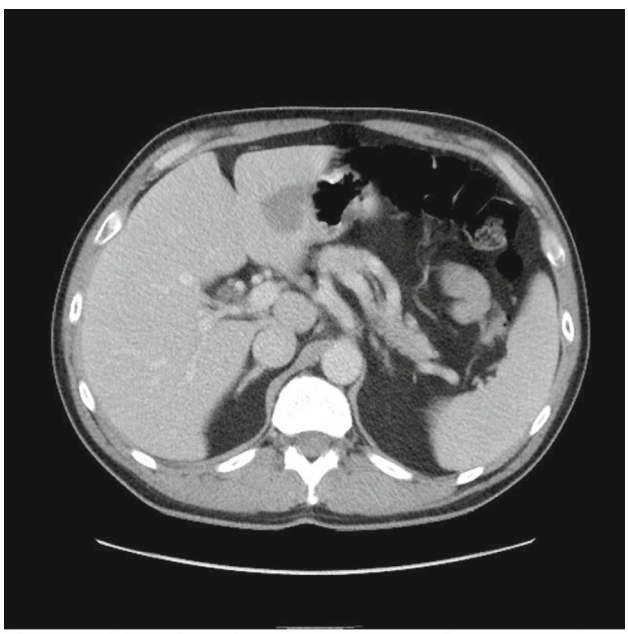


Figure 2. Incidental 3.0 x 3.6 cm hepatic lesion within segment 3

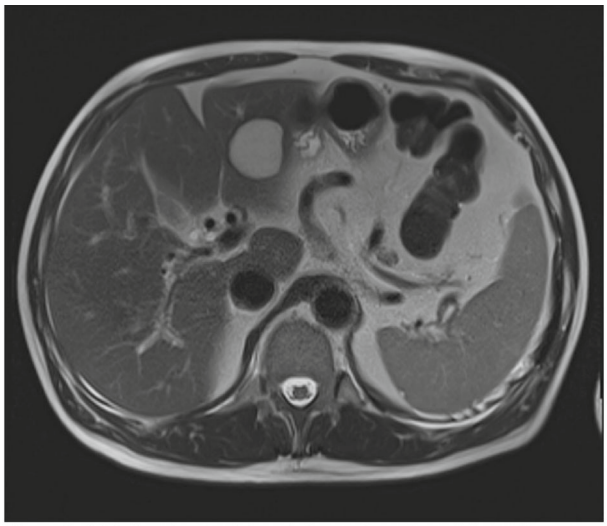


Figure 3. MRI showing peripheral discontinuous nodular enhancement with delayed fill-in consistent with benign hemangioma

P294

Recurrent Rectal Prolapse: Case Report and Review of the Literature

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Introduction: Primary rectal prolapse is well-known, and surgically treated with abdominal or perineal repair. Recurrent rectal prolapse is less studied and lacks management guidelines. Recurrence is reported to range from 15 to 58% as soon as one month from surgical repair. This case reports a patient with recurrent rectal prolapse on post-operative day two from Altemeier procedure and provides a review of the literature, highlighting the absence of specific recommendations for recurrence, particularly within one month of surgery.

Case Report: A 74-year-old female underwent perineal proctosigmoidectomy with levatorplasty and had 39- centimeters of sigmoid and rectum removed. The perineal approach was chosen given significant co-morbidities and the patient's inability to tolerate general anesthesia. On post-operative day two, the patient was straining repeatedly from the urge to urinate and defecate, causing the prolapse to recur. Manual reduction was successful and decision was made to place a foley catheter, allowing the prolapse to remain reduced. The foley catheter was later removed and she has not had a recurrence since removal, however, may need surgical management in the future should this happen.

Discussion: Primary rectal prolapse occurs when circumferential, full thickness rectal tissue protrudes through the anal canal. Risk factors include chronic constipation, pelvic floor weakness, a deep pouch of Douglas and prior sphincter damage. Reported incidence is 2.5 out of 100,000 in the general population. Symptoms include rectal discomfort, fecal incontinence, mucous discharge and bleeding. Operative techniques include abdominal and perineal approaches, which aim to reduce mobility of the rectum and sigmoid, and to increase support to the pelvic floor. Unlike the treatment for primary prolapse, there is no consensus for management of recurrent prolapse after surgical repair, particularly within the first month. The presence of a fresh anastomosis and associated inflammation provide unique

challenges to management within that period. The determining factor for surgical repair is thus patient dependent, providing further obstacles in creating a standardized algorithm.

Conclusion: Although management of primary rectal prolapse has been well studied to date, the treatment of recurrence is still controversial and without guidelines. Most rectal prolapse recurrence occurs at least one month after surgery. This is the first case report describing a recurrence as early as post-operative day two. In this case, a foley catheter was used to prevent excessive straining after manual reduction. For our patient, surgical planning is ongoing but will be based on the patient's individual co-morbidities and goals of care.

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Increased Incidence of Complicated Appendicitis in Patients with Neurodevelopmental Disabilities

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Introduction: Patients with disabilities face numerous challenges in healthcare and disparities related to disabled surgical patients has been understudied. The purpose of this study was to determine whether patients with neurodevelopmental disabilities present more often with complicated appendicitis than do patients without disabilities. Secondary outcomes include duration of symptoms prior to presentation, post-operative complications, and hospital length of stay (LOS).

Methods and Procedures: We conducted a retrospective review of patients under the age of 50 who presented for management of acute appendicitis between January 1, 2018 and December 31, 2021 to one of 11 acute care hospitals in the largest public hospital system in the United States. Patients with neurodevelopmental disabilities (NDD) were identified using ICD-10 codes for the most common diagnoses in this category. Patients with neurodevelopment disability were matched to those without in a 1:2 ratio based on age, gender, and race/ethnicity.

Results: There were 96 patients included in the study group and 192 patients in the control group, with an overall mean age of 10.6, 30.6% female. Of the 96 patients with neurodevelopmental disabilities, 28 (29%) were diagnosed with autism, 13 (14%) with developmental delay (DD), 33 (34%) with speech delay (SD), 13 (14%) with learning disabilities (LD), 12 (13%) with intellectual disability (ID) and 1 (1%) with cerebral palsy (CP). Based on operative and pathology reports, 48 (50%) of these patients had complicated appendicitis compared to 61 (31.8%) of those without NDD ($p = 0.003$). NDD patients also had a longer hospital LOS (5.5 days vs 3.3, $p = 0.002$), and greater incidence of post-operative complications (23.2% vs 8.9%, $p = 0.001$).

Conclusion: Patients with NDD presented significantly more often with complicated appendicitis than patients without disabilities, with an odds ratio of 2.15 ($p = 0.003$). These patients also had significantly longer hospital LOS, and significantly increased incidence of post-operative complications. These results point to a potential disparity that patients with disabilities may face when accessing surgical care.

P296

National Disparities in Minimally Invasive Surgery for Hepatic Tumors

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Background and Objective: For patients with hepatic tumors, several disparities have been shown to impact access to care, including surgery, and subsequently adversely affect long-term oncologic outcomes. The aim of this study was to investigate national disparities in access to minimally invasive surgery (MIS) across different demographic characteristics for patients with hepatic tumors.

Methods: The National Cancer Database (NCDB) was queried for patients diagnosed with Liver Tumors who underwent surgical resection through either open or MIS approach (robotic or laparoscopic), from January 2010 through December 2020. Patients who were offered a MIS but were converted during surgery, were analyzed in the MIS group since the primary goal was to determine disparities in access to MIS. Patients undergoing total hepatectomy for transplant were excluded. Univariate and Multivariate logistic regression analyses were performed to assess the relative impact of different factors on receiving MIS.

Results: The NCDB search identified 18779 patients. The initial surgical approach included 12953 (69%) patients in the Open group and 5826 (31%) in the MIS group [978 (17%) robotic and 4848 (83%) laparoscopic]. Of note, MIS for liver tumors increased from 19% in 2010 to 42% in 2020. Factors associated with receiving MIS included: higher education [OR 1.124 ($p = 0.011$)]. Factors associated with receiving an Open approach included: Black race (vs White) [OR 0.912 ($p = 0.046$) and urban/rural residence (vs metropolitan) [OR 0.811 ($p < 0.001$)]. There were no significant differences in the Odds of receiving MIS regarding age, sex, ethnicity (Hispanic vs non-Hispanic), Insurance type or Facility type. After Multivariate logistic regression analysis, Higher income was not associated with receiving MIS.

Conclusion: While the utilization of MIS is overall increasing in hepatic surgery, there are significant demographic and socioeconomics disparities in the utilization of it compared to the Open approach. The benefits of MIS should not be limited to specific socioeconomic cohorts of the population. Recognizing these disparities is a necessary first step in providing equal care.

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What it Takes to be Great: ChatGPT's Top 5 Descriptors of Great Surgeons by Race, Gender, and Sexual Orientation

Sandra R DiBrito, MD, PhD; Jessica Zaman, MD; Samantha Thomas, MD; Lindy Davis, MD; Timothy Ullmann, MD; Albany Medical College

Introduction: Implicit bias in academic surgery is pervasive and can manifest in subtle alterations in language, such as adjective choice, separating people into stereotypical groups. We hypothesized that the AI system known as ChatGPT could provide insight into existing implicit bias in its descriptions of surgeons of differing gender, race, and sexual orientation.
Methods: ChatGPT is "trained" by human users, mainly through accessing large volumes of available text. Therefore, the software can "learn" biases through content it is exposed to on a large scale. To assess for bias in descriptions of surgeons, we queried ChatGPT about "the top 5 descriptors of great [X] surgeons" of differing gender, race, and sexual orientation.
Results: While all "great surgeons" were "skilled," the remaining adjectives differed depending on demographics (Figure). The "great female surgeon", "great gay male surgeon" and "great gay female surgeon" all share a set of descriptors: skilled, compassionate, diligent, innovative, and empathetic. "Great black male surgeons", "great black gay male surgeon[s]" and "great black gay female surgeon[s]" were exceptional, resilient, trailblazing, and inspirational in addition to being skilled. "Great black female surgeons" are uniquely tenacious.
Conclusion: In using AI, we have shown how intersectionality can impact the definition of greatness for surgeons and can see biases laid out algorithmically. These findings suggest the reality of entrenched biases that many of us already feel on a daily basis and can serve as food for thought for leaders in the field trying to mitigate these biases.

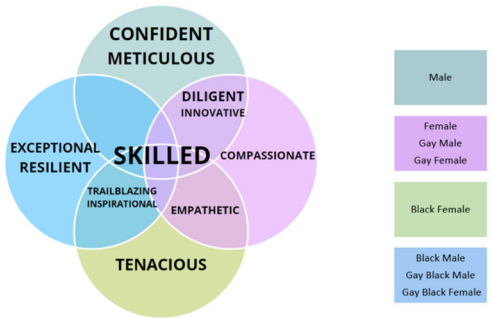


Figure. This Venn diagram demonstrates the overlapping descriptors for each phenotypic group of surgeons as generated by ChatGPT when querying "the top 5 descriptors for great [X] surgeons" for different race, gender, and sexual orientation groups.

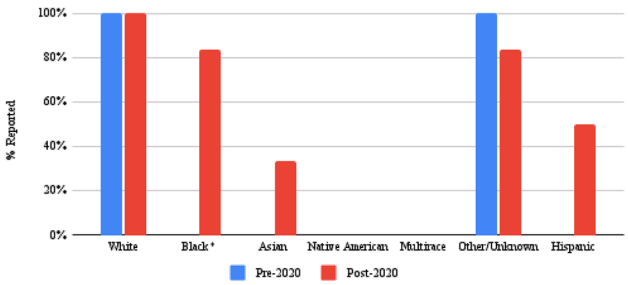
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Unmasking Healthcare Disparities: The Underreporting of Race, Gender, and Ethnicity Data in Medical Research

Amber Chen-Goodspeed, MD[1]; Victoria Ende, MD[1]; Shahenda Khedr[1]; Steven Chao, MD[2]; [1]New York-Presbyterian/Queens; [2]New York-Presbyterian/Weill Cornell

Intro: Currently, a standard for reporting race and ethnicity in research articles has not been mandated across medical journals. This presents a significant barrier to studying disparities in patient outcomes. To our knowledge, the prevalence of reporting race and ethnicity across high-impact surgical journals has not been well-characterized. Our study investigates whether medical research articles have been practicing equity, diversity, and inclusion through adequate reporting of race and ethnicity in recent years.
Methods: Pubmed was queried for all clinical outcomes articles published between June 2018 and June 2023 in *Surgical Endoscopy*. Basic science, translational studies, and international studies were excluded. Articles were reviewed for publication year, research modality, and whether gender, race, or ethnicity were reported. Basic analyses utilizing t-tests were performed in excel.
Results: Of the 478 *Surgical Endoscopy* papers reviewed on PubMed published within the last 5 years, 43 met inclusion criteria. Of these 43, only 8 studies included quantitative race or ethnicity data within the demographic data/patient characteristics, of these 8 reported "white", 5 reported "black", 2 reported "asian", 6 reported "other". In comparing pre-April 2020 and post-April 2020 race reporting within the studies that reported race data, there was a significant difference in the inclusion of "black" as a race within the demographic data when comparing these two time periods ($p = 0.03$) (Fig. 1). All publications that included race/ethnicity included gender, however, only 24% of papers that reported gender also published race/ethnicity data. No significant difference was found between the region or state of the institution associated with the primary author and the rate at which race/ethnicity/gender were reported in their publications.
Discussion: Less than one-quarter of United States-based RCT, prospective, and retrospective studies published in Surgical Endoscopy over the last 5 years reported race or ethnicity data within their papers. We did note a significant increase in the inclusion of "Black" within race reporting when comparing papers published before March 2020 and those published after March 2020. Minorities continue to be underrepresented in reported patient populations in *Surgical Endoscopy.*

Figure 1: Categorized Race Reporting in Percentiles Pre- and Post-2020



P300

Evaluating the Utility of Virtual Reality Programs in Surgical Resident Training: A Systematic Review

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Objective: The near ubiquitous use of minimally invasive surgical modalities has catalyzed incorporation of these methods into the surgical resident training curriculum. Some institutions have opted to introduce virtual reality (VR) and simulator programs into their training milieu in order to provide trainees with a safe practice environment. Given the lack of both a standardized VR training curriculum and related assessment, it is difficult to evaluate the potential efficacy for resident skill acquisition and education. This study aims to examine the literature analyzing VR interventions' impact on resident education.

Methods: We performed a comprehensive search according to PRISMA (Preferred Reporting Items For Systematic Reviews and Meta-Analyses) guidelines, utilizing the PubMed and EMBASE electronic databases spanning English-language articles from 1993 to September 2023, using broad MeSH terms in PubMed. Studies examining the effect of VR/simulation interventions on surgery residents' education, encompassing minimally-invasive surgical or endoscopic procedures, were included. Primary outcomes included objective or expert assessments of number of attempts and time to successful completion of operative tasks, economy of motion, mental distress, and performance quality. Two independent reviewers evaluated studies using Moore's Expanded Outcomes Framework, and a third reviewer resolved rating discrepancies.

Results: Our search yielded 619 publications, 29 of which met inclusion criteria: 17 randomized control trials, 9 prospective cohort studies, 2 retrospective cohort studies, 1 prospective observational study. A total of 863 residents were included, 343 general surgery, 335 orthopedic surgery, 40 gynecologic surgery, 73 ophthalmology, 24 urology, 10 vascular surgery, 6 otolaryngology, and 32 unspecified. 11/29 (38%) studies achieved a Level 5 rating, which in this context indicates improved performance in the operating room, 17/29 (58%) were rated as Level 4, indicating competence in the educational environment (i.e. simulation lab). 1/29 (3%) was rated as Level 1, indicating only participation. Among studies only evaluating general surgery residents, 3/12 (25%) achieved a Level 5 rating, 8/12 (67%) achieved a Level 4 rating, and 1/12 (8%) a Level 1 rating.

Conclusions: Surgical trainees are expected to safely master minimally invasive techniques within a limited training period; there has been a notable uptrend in virtual reality/simulation programs to augment surgical education across subspecialties. This systematic review of studies examining the impact of these interventions on surgical resident education demonstrates that virtual reality/simulation programs can significantly improve residents' performance both in this controlled educational environment as well as the operating room.

P301

Objective, Procedure-Specific Assessment (OPSA) Minimally-Invasive Inguinal Hernia Repair (MI-IHR): Expanded Use to Document Procedural Safety and Granting Autonomy

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Introduction: Current surgical video-based assessments (VBA), such as the global objective assessment of laparoscopic skills (GOALS), focus on determining global skill levels (e.g., instrument handling) as opposed to task-based safety or competency. We expanded the use of a validated procedure specific VBA to 43 cases MIS inguinal hernia repair (standard lap and robotic) to support its use in awarding individual autonomy based upon competence, consistent with the new ACS program for entrustable professional activities (EPA).

Methods and Procedures: Thirty videos were assessed from a video repository, plus 13 videos identified on YouTube. All were de-identified, randomized, and uploaded to a proprietary SaaS-based software platform used for VBA. Seven tasks (port placement; elevation of peritoneal flap; exposure; reducing the sac; dissection of myopectineal orifice; mesh insertion; mesh fixation) were assessed on a three-point scale: 1 = Poor (unsafe/inadequate); 2 = Adequate (safe/adequate); 3 = Excellent (safe/expert). We also assessed global skills (GOALS for standard lap and global evaluative assessment of robotics skills (GEARS) for robotic cases) as well as global case difficulty (GCD). Six board-certified surgeons experienced in MI-IHR (mean practice duration: 16.3 years), completed the OPSA, GOALS/GEARS and the global case difficulty (GCD) for each video. Inter-rater reliability was measured by Gwet's AC2, a weighted measure that adjusts for scales with a high probability of random agreement. Analysis of the inter-rater reliability was conducted on a collapsed dichotomous scoring rubric of "poor—unsafe" vs. "adequate/excellent—safe."

Results: 43 videos were assessed by 6 surgeons for a total of 258 assessments

	GCD	MI-IHR OPSA (Laparoscopic)	MI-IHR OPSA (Robotic)	GOALS	GEARS
Total Agreement	1.9	96%	99%	64%	51%
Scale	1 – easy 2 – average 3 – difficult	1 – poor 2 – acceptable 3 – excellent	1 – poor 2 – acceptable 3 – excellent	5-point scale with anchoring at 1,3,5	5-point scale with anchoring at 1,3,5
Interpretation	Case difficulty average	Excellent IRR	Excellent IRR	Good IRR	Moderate IRR

* IRR = inter-rater reliability

VBA results with the GCD, MI-IHR OPSA, GOALS, and GEARS presented above as a mean of total agreement. GEARS and GOALS are 5-point scales (1—5, lowest to highest score, respectively) and measure generic skills.

Conclusions: This study documents that the MI-IHR OPSA has a high percentage of agreement regarding safety/adequacy among raters, further solidifying that it is a valid measure of a surgeon's safe conduct in MI-IHR and may be used to help determine surgeon competency and granting autonomy in MI-IHR.

P302

Comparing the Performance of Experts and Novices in a Virtual Reality Endoscopic Retrograde Cholangiopancreatography (ERCP) Simulator

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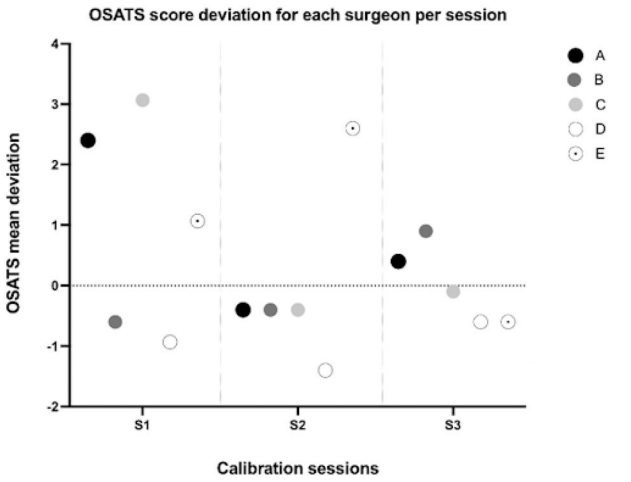
Background: There is a lack of evidence regarding the effectiveness of virtual simulators to acquire hands-on exposure to Endoscopic Retrograde Cholangiopancreatography (ERCP). The aim of the present study was to assess the outcome and construct validity of virtual ERCP when training on the GI Mentor II simulator.
Methods: Seven experienced endoscopists were compared with 31 novices. After a short introduction, they were requested to carry out three virtual ERCP procedures: removing a common bile duct stone, taking brush cytology from a hilar stenosis, and treating a cystic leakage with a bile duct stent. For each task, total time for task completion, time required to view the papilla, total irradiation time, time to deep cannulation, time to define diagnosis, time to complete sphincterotomy, and time to complete the respective intervention were measured. Bile duct cannulation, correct diagnosis, sphincterotomy and time to complete intervention were independently assessed by an assessor blinded to the performing endoscopist.
Results: Time required to visualize the papilla and to cannulate deeply when removing bile duct stone was significantly shorter for the experts (both $p < 0.05$). Time to visualize the papilla, cannulate deeply, reach diagnosis, complete sphincterotomy and complete intervention was significantly shorter for the experts when managing cystic leakage (all $p < 0.05$). In diagnosing and brush cytology from a hilar stenosis the experts needed less time for deep cannulation of the bile duct ($p = 0.077$).
Conclusion: The performance differed between experts and novices, especially in the management of cystic leakage. This corroborates the construct validity of the simulator used.

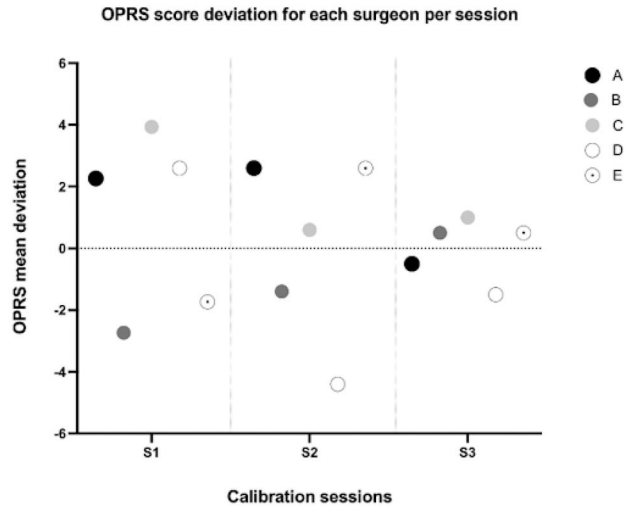
P303

Towards Consensus: Enhancing Reliability in Surgical Video Assessment

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Introduction: Video-based assessment is emerging as a relevant tool in surgical education, furthermore, the impact of feedback on real surgical videos is currently being investigated. To achieve internal and external validity for these interventions, not only established surgical guidelines are needed, but also a reliable application of available assessment tools by involved teachers. We aim to propose a stepwise calibration process that seeks reliability and uniformity regarding laparoscopic cholecystectomy assessment based on videos.
Methods and Procedures: This study occurs in the context of a nationwide research project that aims to assess the effect of deferred feedback on laparoscopic cholecystectomies (LC) among residents (FONDECYT Regular 2022; Grant No. 1221490, Chile). A prospective cohort study was proposed. General surgeons were recruited as participants for the calibration process. Surgeons attended a primary training in which the methodology was proposed. Subsequently, they rated a series of video performances using a global rating scale (modified OSATS) and an operative performance rating system (provided by the American Board of Surgery for LC). Discussion meetings were held between specific groups of LC videos to discuss the application of assessment tools, feedback delivery and obtain consensus regarding these topics. Session means and deviations from the mean were registered for each evaluator's assessment. Lastly, an evaluator perception survey assessed the calibration process.
Results: Five general surgeons were recruited. The calibration process comprised three sessions, each involving discussion of 1-3 cholecystectomy videos (6 assessments). In the initial session, deviations from the group mean for OSATS and OPRS scores ranged from -0.93 to 3.06 and -2.73 to 3.92 respectively, showing substantial variability among evaluators. As the calibration progressed, session two witnessed a significant reduction in deviations, a trend that persisted into the third session with OSATS and OPRS deviations ranging from 0.6 to 0.9 and -1.5 to 1 respectively, reflecting a convergence of evaluator‘s criteria and consensus. The panel of evaluators uniformly described the process as useful and effective.
Conclusions: The changes in OSATS and OPRS scores deviation of the surgeons panel illustrate an enhancement in evaluator consensus over successive calibration sessions. Six videos and three discussion sessions were needed to attain an acceptable level of consensus. This process was rated as useful by the entire panel of experts. A bigger sample size along with more videos may provide data to obtain statistical correlation and reliability among our surgeons.





P304

Laparoscopic Appendectomy Learning Curve for a Single Surgical Team in Senegal: A Cumulative Sum Analysis of Operative Time

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Introduction: Appendectomy is often one of the initial procedures performed using laparoscopy by newly formed surgical teams. To analyze its implementation and improvement, Cumulative Sum (CUSUM) analysis is a valuable tool for objectively studying the learning curve (LC) and detecting significant changes in operative time. However, there is limited research evaluating the LC of laparoscopic techniques in low- and middle-income countries (LMICs). The objective of this study is to evaluate the LC for laparoscopic appendectomy within a single institution in Senegal.

Patients and Methods: This single-center prospective study was conducted from May 1, 2018, to August 31, 2023. It included patients who underwent laparoscopic appendectomy at a tertiary care institution in West Africa. The AAST classification was used to describe the severity of appendicitis. Parameters studied included age, sex, operating time, conversion rate, and postoperative outcomes. To assess the LC, the operative times for each procedure were analyzed chronologically. The CUSUM method was used for quantitative assessment of the LC by calculating the running total of differences between individual data points and the mean of all data points.

Results: A total of 81 patients were included out of 153 laparoscopic surgeries performed (52.9%). The mean age was 26.7 years (11-70 years), with a sex ratio of 1.9. Per-operative severity according to AAST was Grade I (acutely inflamed appendix intact) in 75.4% (n = 61), Grade III (local contamination) in 7.4% (n = 6), Grade IV (peri-appendiceal phlegmon) in 6.1% (n = 5), and Grade V (generalized peritonitis) in 11.1% (n = 9). Conversion occurred in 5 cases (6.1%), driven by technical reasons in 2 cases (CO2 leakage and shortage), adhesions in 1 case, non-visualized appendix in 1 case, and enterotomy in 1 case. The average operative time was 76.8 min (30-180 min). The average length of hospital stay was 2.7 days, with a range of 1 to 13 days. Morbidity was observed in 3.7% (n = 3), including trocar site infections (n = 1), cecal fistula (n = 1), and postoperative peritonitis (n = 1). There were no deaths. The CUSUM analysis of the LC for operative time showed that a steady operative time was achieved after 28 procedures, with reduction in operative length thereafter.

Conclusion: The CUSUM analysis demonstrated that the LC at a single institution in a LMIC was surmounted after 28 cases. This analysis should be expanded to other laparoscopic procedures and individualized by surgeon in our low-resource setting to contribute to better surgical performance and patient outcomes.

P305

Validity Evidence for the Use of ENDO Mentor Suite for the Fundamentals of Endoscopic Surgery Skills Examination

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Background: The Fundamentals of Endoscopic Surgery (FES) examination is an assessment of the knowledge and foundational skills required to perform safe endoscopic surgery. The skills portion of the FES exam was originally developed on the Simbionix GI Mentor simulator (GIM). Simbionix has since developed a comprehensive simulator, ENDO Mentor Suite (ES), which combines multiple simulation technologies. The purpose of this study was to assess the relationship to other variables (ROV) validity evidence for the ES compared to GIM.

Methods: Twenty-three general surgery residents, fellows, and attendings were randomized into two groups. Groups were matched in PGY level, upper and lower endoscopy experience, glove size, gender, and hand dominance. Each group completed the skills test on both simulators. G1 (n = 11) completed the FES test on the GIM, followed by the ES. G2 (n = 12) tested first on ES, followed by GIM. Scores were calculated by a standardized computer-based algorithm which is identical between the two simulators.

Results: All participants achieved a passing score. First simulator total FES scores were similar between groups (G1 81 $\pm$ 12 vs G2 85 $\pm$ 10, p = 0.4). Similarly, were no significant differences between the two groups in first simulator component task scores (navigation,

loop reduction, retroflexion, mucosal inspection, and tool targeting). On second simulator testing, G2 outperformed G1 (93 ± 9 vs 84 ± 9, p = 0.02). This total score difference on the second simulator was accounted for by statistically discernible differences on the loop reduction (G2 98 ± 25 vs G1 68 ± 24, p = 0.005) and mucosal inspection (G2 90 ± 18 vs G1 69 ± 16, p = 0.005) tasks. Given the disparity in total and task scores on the second simulator trial, the loop reduction and mucosal inspection were independently assessed on both simulation platforms by five experienced surgical endoscopists. These tasks were unanimously considered to perform similarly with respect to difficulty and domain of competency between the GIM and ES.

Conclusion: Comparison of first simulator FES skills test performances supports the ROV validity evidence of the ENDO Suite Mentor simulator for the skills portion of the FES examination. Variability in total scores, loop reduction scores, and mucosal inspection scores on second simulator performance is likely attributable to fatigue or waning motivation given the expert assessment of the tasks performing equally on each platform. The FES program will continue to prospectively monitor participant performance data to look for discrepancies between these platforms on these tasks.

P306

The Impact of Confidence Levels on Self-assessment and Skill Improvement Among Surgical Residents in Simulation Training

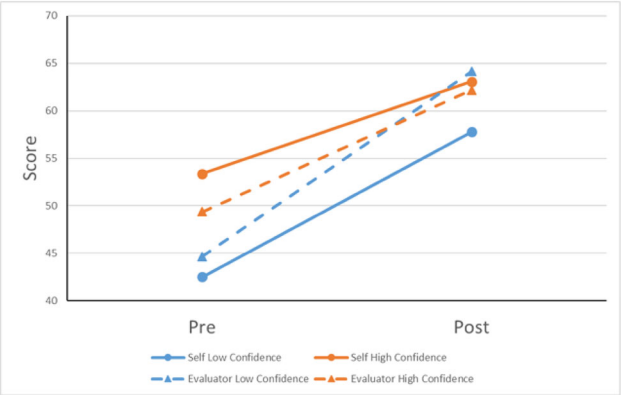
Shun Ishii, MD; Kristine Kuchta, MS; Stephanie Joseph, MD, MPH; Simon Che, MD; Derrius Anderson, MD; Jean-Christophe Rwigema, MD; H Mason Hedberg, MD, MS; Michael B. Ujiki, MD, FACS; NorthShore University Healthsystem, Department of Surgery

Introduction: In the general process of skill acquisition, excessive confidence in one's abilities is commonly believed to impair self-assessment capabilities and hinder skill improvement. However, in the field of surgical education, the relationship between the confidence level in one's skills, self-assessment ability, and the degree of skill improvement remains unclear. We hypothesized that surgical residents with strong confidence in their skills tend to overestimate themselves compared to surgical residents with weak confidence, and furthermore, their rate of skill improvement is lower compared to those with weak confidence.

Methods and Procedures: A laparoscopic cholecystectomy simulation module using a virtual reality (VR) laparoscopic simulator (LapMentor lllTM; Simbionix, Cleveland, OH) was performed by 30 PGY2-3 general surgery residents before (pre-test) and after (post-test) a skills curriculum for one month at a single institution. Their performance were assessed by themselves and by a single trained evaluator using the validated Global Operative Assessment of Laparoscopic Skills (GOALS) form, the Objective Structured Assessment of Technical Skills (OSATS) form, and a LC-specific simulation assessment form (LC-SIM). The residents also answered confidence survey (total score is 40) before taking pre-test and answers were blinded to the evaluator. We divided the residents into two groups based on their pre-test confidence score. Comparisons were made using the Wilcoxon rank-sum test.

Results: The median pre-test confidence score was 31. 14 residents were categorized into the low confidence (≤ 30) group and 16 residents were categorized into the high confidence (> 30) group. For demographics and experience, there were no significant differences between two groups. In the pre-test, the high confidence group scored their own performance significantly higher than the low confidence group (Total score 75; 42.5 ± 9.5 vs 53.4 ± 8.4; p = 0.002). In the post-test as well, the high confidence group assessed their own performance significantly higher than the low confidence group (57.8 ± 7.2 vs 63.1 ± 5.4; p = 0.019). In the pre-test and post-test, there were no significant differences in scores evaluated by evaluator between the two groups. In terms of score improvement from pre-test to post-test by evaluator, the high confidence group had significantly lower improvement than the low confidence group (19.5 ± 8.3 vs 12.8 ± 9.2; p = 0.027).

Conclusions: Confident surgical residents may tend to rate their own performance higher than less confident residents, despite relatively similar objective performance. The overconfident group may underappreciate room for improvement. Identifying these tendencies in a simulated setting before a skills curriculum may potentially aid in optimizing coaching styles in the operating room.



P307

Perceptions of Resident Autonomy: A Comparison Between Resident and Faculty with Objective Robotic Console Data

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Introduction: Residents frequently underestimate the autonomy they receive in operations while attendings overestimate this. The data collected on robotic dual console systems provide an objective measure of operative autonomy and helps elucidate gaps in perception by the attending surgeon and trainee.

Methods and Procedures: Six common operations completed with robotic assistance were studied to compare resident perception, attending perception, and reality of resident operative autonomy. At the conclusion of a case, both the attending and resident submitted surveys reporting their perception of the percentage of the case completed by the resident. Real percentages were extracted from the robotic timeline delineating which surgeon controlled the robot throughout the case on a dual console system. Gender differences in these responses were measured.

Results: Six attendings and nineteen residents, seven of which were female, participated in the study. 222 surveys, 154 unique cases, and 68 per protocol cases were included. Attendings overestimated autonomy while residents accurately estimated autonomy compared to the robot. When comparing female resident and attending perceptions, there was no significant difference, whereas male residents perceived completing significantly less of a case than their attendings perceived.

Magnitude and direction of percentages compare the first to the second subject in each column. Statistical significance was set at $p < 0.05$

	Resident vs. Robot		Attending vs. Robot		Resident vs. Attending	
	Difference % (95% CI)	p	Difference % (95% CI)	p	Difference % (95% CI)	p
Overall	1.6 (-1.8 to 4.9)	0.357	7.1 (3.8 to 10.5)	< .001	-5.6 (2.2 to 8.9)	0.001
By Resident Gender						
Male	-0.9 (-5.0 to 3.2)	0.660	7.5 (3.4 to 11.6)	< .001	-8.4 (-12.5 to -4.3)	< .001
Female	6.1 (0.6 to 11.6)	0.031	6.5 (0.9 to 12.0)	0.022	-0.4 (-5.9 to 5.2)	0.894

Conclusions: This study suggests attendings overestimated the degree of autonomy they provided residents. Gender differences among residents exist in perceptions of autonomy.

P308

Systematic Review on the Use of Fresh Frozen Cadavers in Procedural Skill Training of Medical Students

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Background: Cadavers are used in teaching medical students' anatomy across the country. Programs have been piloted in research studies to allow not only the use of cadavers for anatomical teaching, but also for surgical skills training. These studies have shown improved confidence, knowledge, and skill in the surgical setting. However, there has yet to be a comprehensive review and analysis of the literature to identify similar findings and future directions of the use of cadavers in bettering medical student education.
Objective: To review and compile the literature to date on the use of lightly embalmed or fresh frozen cadavers in medical student education by conducting a systematic review of reviews. This will allow description of the existing findings, limitations, and provide recommendations for incorporating cadavers in teaching surgical skills to medical students.
Methods: The PubMed, JAMA, and Google Scholar databases were searched for studies on the use of lightly embalmed/fresh frozen cadavers in medical student education, specifically in hands-on, procedural skills.
Results: The original search identified 31 reviews. This included the use of fresh frozen cadaver in residency programs and medical schools. 16 studies were used as the review solely focused on medical student education. Overall, the literature indicates that the use of fresh frozen cadaver in teaching or preparing for any procedure increases confidence, skill, and student knowledge.
Conclusion: This review of the literature serves to provide an overview of the data published on the use of lightly embalmed/fresh frozen cadavers for surgical skills training in medical school. By reviewing this content, limitations of the included studies were found and addressed. Clinical implications of this data were explored and the accessibility to fresh frozen cadavers. Implications for further research were identified to further progress the data collection process and hypothesized conclusions.

P309

Can a High-Fidelity Robotic Surgery Curriculum Enhance Resident Operative Autonomy?

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Background: To enhance trainees' general robotic technical skill and ability to complete a composite task, we designed and implemented an advanced robotic surgery skills lab curriculum including sutured enterotomy and stapled anastomosis on porcine intestine. The curriculum was delivered in an asynchronous fashion, allowing trainees from any specialty to practice independently with a proctor. We investigated whether curriculum completion and curriculum performance correlate to trainee intraoperative autonomy as assessed by trainee individual console time (ICT).
Methods: PGY4-5 general surgery residents, PGY5 urology residents, urogynecology fellows, and colorectal surgery fellows completed the curriculum 10/2022-2/2023. Two trained evaluators scored skill videos recorded during the curriculum using the Global Evaluative Assessment of Robotic Skills (GEARS) assessment tool and provided feedback. We extracted ICT for all cases performed by these residents on the dual-console Da Vinci robotic surgical system 7/2022-6/2023 (AY2023), and for a training level-matched comparison cohort 7/2021-6/2022 (AY2022). A Mann-Whitney test was performed to compare ICT before and after curriculum completion, and between the two cohorts for the entire year and for the last four months of the year. Pearson's correlation test was used to determine correlation between GEARS and ICT.
Results: 13 trainees (five PGY5 and two PGY4 general surgery residents, three urology residents, two urogynecology fellows, and one colorectal fellow) completed the curriculum and recorded a total of 21 skill videos, with GEARS scores ranging 13-29. These trainees performed 492 pre-curriculum and 477 post-curriculum cases in AY2023. The comparison cohort of trainees performed 888 cases in AY2022. GEARS score in the curriculum was moderately correlated to ICT pre- and post-curriculum ($r = 0.58$, $r = 0.40$). Post-curriculum ICT was significantly higher (mean 45.2% vs. 40.1%, $p = 0.001$) for the AY2023 cohort, but ICT was not significantly different between the cohorts for the entire year (mean 40.6% vs. 42.6%, $p = 0.14$) or last 4 months of the year (mean 43.3% vs. 44.1%, $p = 0.64$).
Conclusions: Our findings suggest that a simulated robotic surgery curriculum can allow surgical trainees to practice robotic skills safely and independently, and may enhance operative autonomy. In particular, a high-fidelity curriculum allowing practice of composite skills may be beneficial across surgical specialties (general surgery, urology, gynecology). Study limitations include confounding by natural training progression, small trainee sample size, and small effect of the intervention on overall ICT. Future work will focus on improving trainee performance through curriculum feedback and utilizing simulated skill performance to advocate for trainee intraoperative autonomy.

P310

Basic Surgical Skills Training from the Aspiring Surgeon's Home: A Validation Study

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Introduction: There is a growing utility for simulation-based training in surgery which necessitates the development of affordable, functional, and validated simulators. The aim of this study was to evaluate the effectiveness of the Inovus Medical Basic Surgical Skills (BSS) Simulator in improving basic surgical skills in junior trainees. The BSS Simulator is a novel, high-fidelity, portable training base which allows for the performance of basic surgical skills such as knot tying, incision, suturing and minor operative procedures.
Methods and Procedures: This was a pilot randomized controlled trial (RCT) which involved junior trainees who have yet to complete a basic surgical skill course. All participants initially completed a series of basic surgical skills tasks which involved various suturing and knot tying techniques and were evaluated on three parameters: an objective scoring tool, time taken to complete task and participant self-assessment questionnaire. Participants were then randomized to either receive the BSS Simulator (intervention) or nothing (control). The former continued further training at home. Participants were brought back after a week to be reassessed on their skills. These methods allowed for assessment of construct, content, and face validity.
Results: The pilot cohort consisted of 9 total trainees, with 3 participants allocated randomly to each of the 3 arms. The intervention arm had an average increase in overall score of 11.76% in simple interrupted suturing, 22.22% in vertical mattress suturing and 21.42% in horizontal mattress suturing. The control group which had no home intervention had an increase of 22.22% in simple interrupted sutures, 20% in vertical mattress sutures and 0% in horizontal mattress sutures. In terms of changes in time taken to perform the task, there was a decrease of 44 s and 59 s in the intervention arm when it came vertical and horizontal mattress suturing respectively. The control group demonstrated a decrease of 9 and 35 s in vertical and horizontal mattress suturing respectively. The intervention arm additionally demonstrated higher percentage increases across all individual criteria compared with the control arm.
Conclusion: The preliminary results from the pilot cohort are extremely promising for the effectiveness of the BSS simulator in improving basic surgical skills quality and decreasing time taken to perform tasks whilst learning from home. Furthermore, the study demonstrated positive construct, content, and face validity for the BSS simulator. The future aim is to increase the power of the study through recruitment of more trainees.

P311

Building Sustainable Surgical Capacity, A Case Study of Low-Cost Laparoscopy Training Simulation Program

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Keywords: Laparoscopic appendectomy, Surgical simulation, Self-assessments
Background: The research objective was to employ an affordable training module to educate surgical professionals in laparoscopy. The hypothesis was that the participants could attain functional technical proficiency through this training. (1)
Methods: In this study, an ongoing, cost-effective, and simplified online training model was utilized to instruct a cohort of eight surgeons who lacked prior laparoscopy experience. These surgeons completed a four-month training program using the ALL-SAFE online module for laparoscopic appendectomy. The training's effectiveness was assessed based on two key metrics: operative hours and post-operative hospitalization duration.
Results: The study enrolled a total of 8 trainees. Among them, three trainees completed the study and performed a total of 18 laparoscopic appendectomies, with an average operative time of 67.1 min. The overall hospital days for the post op patients was 1.3 days.
Conclusions: It is possible to teach basic laparoscopic skills using a cost-effective and simple training option in resource-limited settings. This approach can be successful if there is a strong focus on providing adequate follow-up and mentorship to trainees. By introducing new technologies to the surgical community while ensuring acceptable patient outcomes, laparoscopic training can be effectively implemented even in resource-constrained environments.

P312

A Comparison of Trainee Cognitive Load During Robotic and Laparoscopic Tasks

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Introduction: Elevated Cognitive Load (CL) can significantly impede surgical skill acquisition and performance with implications for learning and patient safety, respectively. Robotic surgery has been suggested to be easier to perform than laparoscopy but their effect on trainee CL has not previously been compared. We hypothesized that cognitive load of trainees would be lower during robotic surgery compared with laparoscopy and increase with rising task difficulty.
Methods: We conducted a cross-over randomized study in which novice participants were randomly assigned to perform a basic (peg transfer) and an advanced (tension suturing) task laparoscopically and robotically. Cognitive load was assessed objectively using objective metrics such as Electroencephalogram (EEG), heart rate variability (HRV), and spare attention capacity measured using a visuospatial secondary task. Primary task performance was assessed based on time and errors, and secondary task performance was measured using response time and correct hit rates. EEG captured activities of alpha and theta waves, and HRV was determined by the change in average HR and beat-to-beat variations. Data underwent normality assessment and were compared using paired t-tests within groups. Pearson correlation was used to compare the relationship between performance and objective metrics.
Results: Six junior surgery residents with limited prior laparoscopic and robotic experience participated in the study. During advanced skills tasks, participants achieved lower task scores ($p = 0.012$), and reduced secondary task hit rates ($p < 0.001$) in both platforms. HRV was comparable between platforms and task difficulty. Compared with robotic surgery, participants exhibited higher activation of theta waves in EEG leads F7 (Mean Difference (MD) = 0.29 ± 0.022 Hz, $p = 0.035$), and F8 (MD = 0.58 ± 0.003 Hz, $p = 0.001$), corresponding to the premotor cortex area while performing the advanced laparoscopic task. Furthermore, heightened activity of lead F8 was found to be negatively correlated with primary task score ($r = -0.604$, $p = 0.038$) and secondary task hit rates ($r = -0.689$, $p = 0.013$).
Conclusion: Significant increases of theta waves in the premotor cortex area were detected during advanced laparoscopic tasks suggesting increased cognitive load. Cognitive load did not increase appreciably with robotic surgery which may have implications for learning and safety. Additional work may help clarify whether objective detection of cognitive load can be used to monitor surgical skill acquisition and performance.

P313

Simple, Annotated, Video-based Instruction Augments General Surgery Residents' Robotic Surgical Skills and Satisfaction Compared to Traditional Rote Practice

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Introduction: Teaching residents to operate safely with the robot presents unique challenges due in part to the physical distance between the trainee and the surgeon. Consistent practice on the console facilitates skill, however the availability of expert surgeons to coach residents can be a limited resource. The addition of an instructional video may increase the effectiveness of individual practice.
Methods: Twenty-two general surgery residents (PGY 1-5) were randomly assigned to either watch an annotated instructional video on knot-tying or a sham video. They performed the task twice before and twice after watching the video and their performances were scored with the Global Evaluative Assessment of Robotic Skills (GEARS) scale. The two scores before and after the intervention were averaged for comparison. Surveys were also conducted before and after the intervention.
Results: Among the 22 residents who performed the task, the mean post-graduate year level was 2.5 (SD 1.56), with a previous median number of 6 bedside cases (range 0-50), 0 console cases (range 0-25), and 4 total hours on the simulator (range 0-100). The GEARS scores of residents who received the instructional video trended toward improvement by an average of 3.6 points (SD 5.2), compared to the 2.5 point improvement among those who viewed the sham video (SD 4.6, $p = 0.67$). Similarly, the time to complete the exercise trended toward improvement, with a reduction of 39 s (SD 56) for the intervention group, compared to the 32 s reduction in the sham video group (SD 114, $p = 0.87$). Residents who viewed the instructional video found the intervention more helpful (1-5 scale), than those who viewed the sham video (mean 4.0 vs 3.1, SD 0.83 vs 1.3, $p = 0.11$).
Conclusions: The addition of an annotated instructional video to a standardized robotic surgery training curriculum improves performance of a task beyond practicing alone. General surgery residents report a higher level of satisfaction when receiving coaching, even when being delivered passively.

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The Influence of Musical Experience and Immersion on Laparoscopic Surgical Skill Performance: An Original Investigation

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Introduction: The surgical skills that surgeons must perfect require a high level of fine motor and spatial dexterity. Regardless of the initial skillset an individual brings to surgical training, mastering surgical skills requires long hours of practice and improvement. As the needs and curricula of surgical residencies evolve, recent studies have focused on identifying factors that may be related to faster and higher quality surgical skill acquisition, such as experience with playing video games, sports, and instruments. The aim of this study was to elucidate the relationship between instrumental musical experience and laparoscopic surgical skill performance.
Methods and Procedures: The Top Gun team hosted the Top Gun Shootout (TGS) exhibit as part of the 2023 SAGES Learning Center at the annual meeting in Montreal, Canada. All meeting attendees were eligible to participate. Participants first answered several questions regarding their personal instrumental musical experience via QR code technology. These questions included the type and duration of instrumental music experience. Instruments were classified into six classes: Keyboard, String, Woodwind, Brass, Percussion, and Zither. Patients then rotated through the following three skills stations: Fundamentals of Laparoscopic Surgery (FLS) Peg Transfer, Bean Drop (BD), and Timed Intracorporeal Suturing (TIS). Participants received a score for each station based on level of performance. These task scores were used to calculate the participants' Total Top Gun Score (TTGS). Descriptive statistics as well as non-parametric analyses and Spearman's correlations were calculated when appropriate to determine any associations between musical experience and laparoscopic surgical skill performance.
Results: 57 individuals participated in the study. 31 (54.4%) of the participants indicated that they played at least one musical instrument, and five of these individuals played more than one instrument. String was the most common class of instrument (N = 14), followed by percussion (N = 13). There was a statistically significant positive correlation between number of instruments played and score on the BD task ($r = 0.423$, $P = .018$) but not for FLS and TIS. There was no statistically significant difference or correlation in FLS, BD, TIS, or TTGS scores between individuals that played an instrument and those that did not ($P > 0.05$). There was also no statistically significant difference or correlation in scores within the group that played instruments based on instrument type ($P > 0.05$).
Conclusions: Experience playing musical instruments did not confer an advantage in surgical skills tested in the present study. In future studies, inclusion of additional skill stations could improve our understanding of how specific instrumental music competencies impact surgical skill performance.

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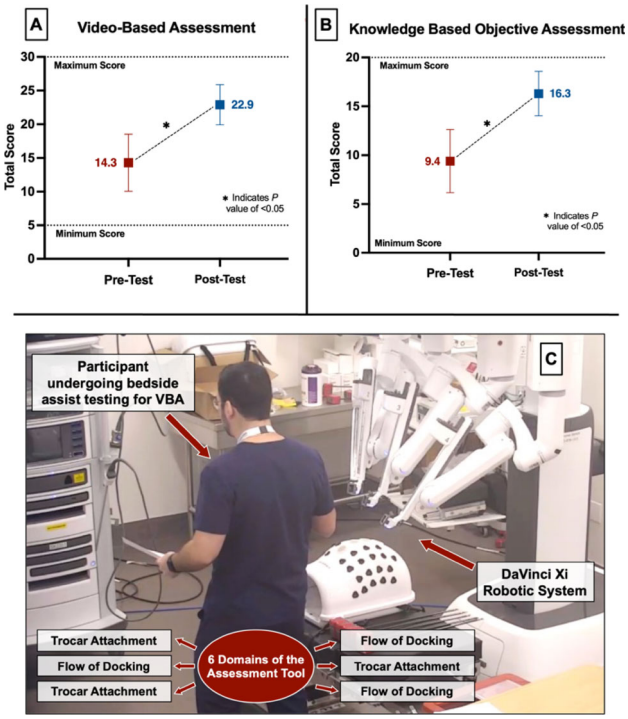
Video-Based Assessment of Robotic Bedside Assistant Performance

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Introduction: With the increased adoption of robotic surgery, optimal patient outcomes are contingent upon the collaboration, competence, and proficiency of surgical teams. The bedside assistant has an increasingly autonomous role, performing critical aspects of the operation that can directly influence patient outcomes. This study evaluates the effectiveness of a dedicated robotic bedside assist course using a novel video-based assessment (VBA) tool.
Methods: General surgery interns received a 2-h training on robotic bedside assistance. Before and after the training, participants were asked to dock the robot and set up the endoscopic instruments. Video recordings of their performance were evaluated using a newly established grading criteria, with detailed narratives for every domain. Similarly, participants were also evaluated using a 20-item multiple-choice knowledge test on the console and bedside assistance. Figure 1C depicts the setup in which participant's video recordings were evaluated.
Results: 20 general surgery interns participated in the study, 55% were female (n = 11), and 45% were White (n = 9). Most participants regarded this course as "vital" for their training (n = 15, 75%) and the majority reported high confidence levels with their bedside assist skills after the training (n = 15, 75%). When evaluating video recording of

trainees, the mean performance score (min 5, max 30) increased from 14.3 to 22.9 ($p < 0.001$). Similarly, there was a notable improvement in their performance on the 20 multiple-choice questions from an average of 9.4 correct answers to 16.3 ($p < 0.001$). Figure 1A/1B depict the performance scores before and after the course.

Conclusion: The robotic bedside assist course significantly improved both the theoretical knowledge and practical bedside assist skills of intern residents. This study demonstrates the effectiveness of this course and reports the initial validity of a novel VBA tool to evaluate bedside assist performance.



P316

A Novel Bench-Top Model for Robotic Skills Acquisition in Surgical Training

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Introduction: While Fundamentals of Laparoscopic Surgery is required for all US surgical trainees, there is no universally adopted robotic surgery assessment. Most programs use virtual reality (VR) simulators for training and case numbers to determine robotic proficiency. However, VR at the current stage lacks face validity as it is difficult to reproduce operating features in a simulated environment. In this study, we evaluated trainee comfort, satisfaction, and speed with a robotic bench-top model and VR simulation (SimNow, Intuitive Surgical, Sunnyvale, CA).

Methods and Procedures: Robotic trainees at multiple institutions were studied. Robotic bench-top models were designed to mimic skills on the Da Vinci SimNow program. Skills included suturing, puzzle piece cutting (Fig. 1A), railroad hand-to-hand transfer (Fig. 1B), and knot-tying (Fig. 1C). Participants completed pre-study questionnaires indicating the number of robotic cases performed, hours of training/simulation completed, and resident comfort with robotic skills using a Likert scale from 1-5. Trainees were randomized based on level of training into bench-top model or VR training groups. Each underwent benchmark assessment, practice with either SimNow or bench-top model, and final assessment followed immediately by the post-study questionnaire (Fig. 2). Baseline and final assessment times were recorded in seconds.

Results: Of 24 participants, 13 practiced on the bench-top model and 11 on the simulator. There were no significant differences in baseline comfort with robotic skills. All trainees reported significantly more comfort with most robotic skills after training (Likert scale 1-5: camera motion 3.2 ± 1.5 vs. 4.3 ± 0.6,$p < 0.01$, hand-to-hand transfer 3.0 ± 1.4 vs. 4.1 ± 0.7,$p < 0.01$, knot-tying 2.4 ± 1.1 vs 3.1 ± 1.2,$p = 0.02$, forehand suturing 2.8 ± 1.2 vs. 3.2 ± 1.0,$p = 0.1$, backhand suturing 2.4 ± 1.1 vs. 3.1 ± 1.1,$p = 0.02$, cutting 2.8 ± 1.3 vs. 3.8 ± 1.0,$p < 0.01$, dissection 2.6 ± 1.2 vs. 3.5 ± 0.9,$p < 0.01$). Satisfaction rating averaged 4.63 ± 0.77(scale 1-5). Regardless of training group, completion times for each task before and after training were, respectively 214.2 ± 95.5 vs. 178.8 ± 58.2($p = 0.01$) for ring roller coaster, 380.5 ± 145.5 vs. 294.4 ± 105.7($p < 0.01$) for puzzle piece cutting, 342.3 ± 156.0 vs. 292.6 ± 127.0($p = 0.08$) for railroad suturing, 320.5 ± 127.5 vs. 268.3 ± 98.4($p = 0.02$) for backhand suturing, and 162.6 ± 118.9 vs. 155.5 ± 122.1($p = 0.72$) for knot-tying. There were no significant differences in improvement times between bench-top and simulator training groups.

Conclusion: Robotic training curricula lead to increased confidence and speed but are still underdeveloped in most residency programs. This pilot demonstrated improvement of trainee's task completion times in a limited subset of operators, further research will be aimed at integration of such model in our system-wide robotic training curriculum and its impact on clinical skills. More studies are necessary to determine the optimal breakdown between bench-top and VR training.

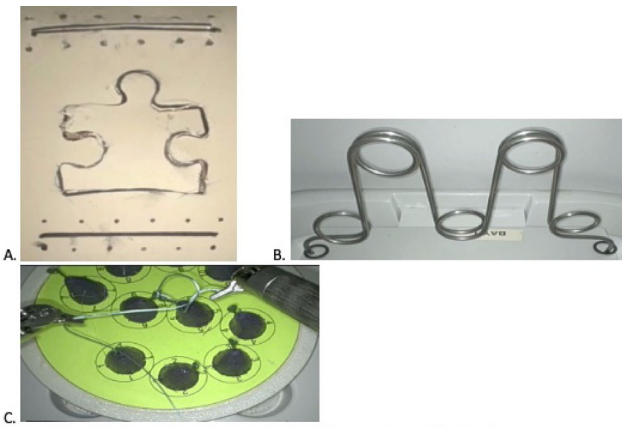


Figure 1. A—Suturing and puzzle piece, B-Ring roller coaster, C—Knot-tying.

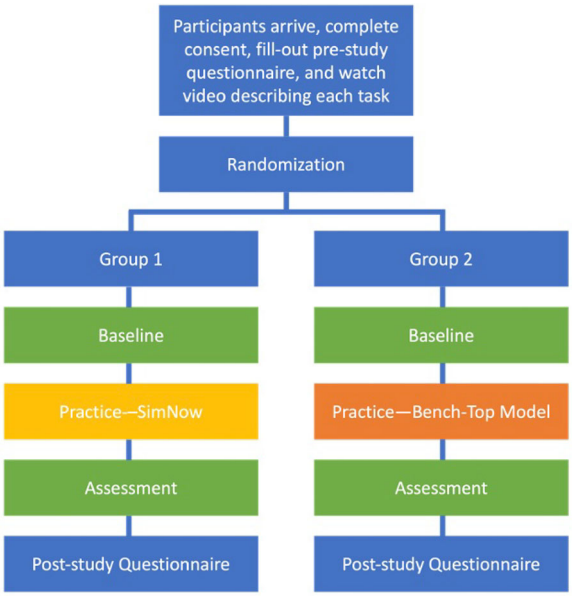


Figure 2. Methods for randomization, training, and assessment.

P317

Assessing Mental Workload and Skill Acquisition in Advanced Laparoscopic Training: Implications for Surgical Education and Stress Reduction

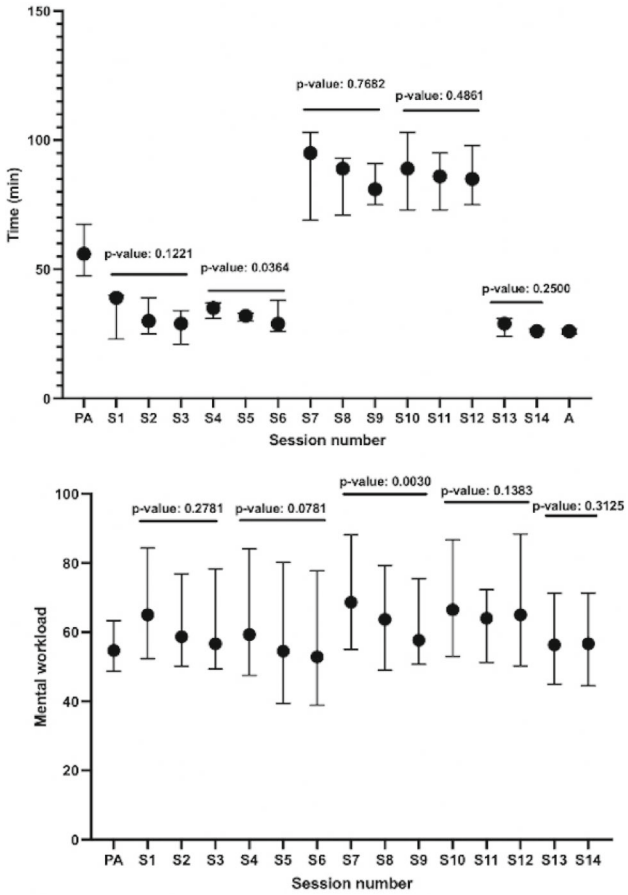
Rafael Selman Álvarez, MD; Enrique Cruz Mackenna, MD; Úrsula Figueroa Fernández, MD; Julián Varas Cohen, MD, MSc; Cristián Jarry Trujillo, MD, MSc; Pontificia Universidad Católica de Chile

Introduction: Acquiring proficiency in a new procedure involves cognitive and motor skills. Learning curves provide insights into skill development process, using validated scales and procedural time in clinical and simulated settings. As these metrics reflect cognitive processes, they may correlate with mental workload. To our knowledge, limited literature explores the use of mental workload as an indicator of skill acquisition in surgical training. We aim to measure and describe mental workload during advanced laparoscopic skill acquisition in a simulated environment.

Methods and Procedures: A quasi-experimental design was used. Trainees which underwent the "Advanced Laparoscopy Course" (ALC) from our Simulation Center during the first semester of 2023 were recruited. The ALC aims to provide proficiency in performing an intracorporeal manual jejuno-jejunostomy, using ex-vivo tissue. It comprises 16 practical stations, grouped into skill groups of progressive difficulty. Skill development follows a constructivist manner adding new tasks every 3 sessions: 1-3 Fixation sutures. 4-6 Performing enterotomies. 7-9 The latter including posterior wall confection. 10-14 Performing the whole anastomosis. Pre-assessment (Session PA) and final assessment were evaluated using a Global Rating Scale (GRS; max. 25 points), a Specific Rating Scale (SRS; max. 20 points) and procedural time. For sessions 1 through 14, only operative time was registered. The NASA-TLX tool was applied from pre-assessment to session 14. Descriptive statistics are shown and non-parametric statistics were used for analysis.

Results: Ten participants completed the course during the first semester of 2023. The median mental workload (MW) for the whole course was 62 points (IQR 8.29) (out of 100) for the group. An increase in MW was identified in sessions where new skills were introduced (sessions 1-7-10). Furthermore, sessions that trained the same skill, showed a trend to decrease in both operative time and workload. Session 7 in which trainees reported the highest mental workload, there was a significant decrease in this parameter (p-value = 0.003) when comparing equivalent sessions (session 7-8-9). No other statistically significant differences or correlations were found.

Conclusion: Our study revealed that encountering new skills increased mental workload, while repetition of the same skill reduced operative time and workload, demonstrating the benefits of practice. Notably, the session with the highest mental workload showed a significant reduction, indicating adaptability. A larger sample size may clarify procedural time, scores, and mental workload relations. These findings highlight the interplay of cognition, skill acquisition, and performance, informing innovative learning tracking and stress reduction in surgery.



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Can Practicing on a Model and Reviewing Videos with Structured Objective and Subjective Feedback Improve Residents' Midline Laparotomy Fascia Closure?

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Introduction: Traditionally, the closure of the fascial layer of abdominal laparotomy incisions is taught in the operative setting without specific simulation training, using 1 cm tissue bites placed 1 cm apart. However, the STITCH trial (Deerenberg E, 2015) suggests that smaller bites may lead to fewer incisional hernias and better outcomes, emphasizing a 4:1 suture-to-wound length ratio. Notably, postoperative wound dehiscence in laparotomies can lead to increased mortality, readmissions, and costs. This project aims to enhance surgical residents' techniques for closing midline laparotomy incisions. We hypothesize that a simulated training module, complemented by constructive feedback, will consistently achieve the ideal 4:1 suture-to-wound ratio.
Methods: We first assessed the current technique, then trained residents using a simulated abdominal wall, followed by an evaluation of the operative technique post-training. Pre-intervention data was collected during laparotomy closures, capturing metrics such as laparotomy length, suture length, and the suture-to-wound ratio. This anonymized data was cataloged by resident year. Residents then underwent didactic education on abdominal wall closure and hands-on training with our simulation model. Subsequently, we videotaped and evaluated the residents' closures. They received both objective and subjective feedback based on these evaluations. Objective measures included bite depth, distance between bites, suture tension, knot quality, and the suture-to-wound ratio, with a goal of at least 4:1. A subjective evaluation of the videotaped closures was performed based on a modified Operative Performance Rating System, specifically general criteria for open ventral hernia repair, that included instrument handling and needle orientation, respect to tissue, time and motion, operation flow and overall performance, grading a 1 to 5 scale. Post-intervention measurements were similarly obtained.
Results: Anonymous 34 pre-intervention measurements revealed an average suture-to-wound ratio of 3.9:1. Breakdown by year varied, with PGY4 residents coming closest to the desired 4:1 ratio. Specific year ratios were: PGY1 at 3.7:1, PGY2 at 2.6:1, PGY3 at 2.8:1, PGY4 at 4.5:1, and PGY5 at 2.6:1. A questionnaire assessed residents' opinions on the training's impact on their skills. The majority found the model training beneficial and valued both the subjective and objective feedback. Most reviewed their videotaped closure and adjusted based on the feedback received. Post-intervention measurements showed improvement in suture-to-wound ratio for different PGY levels.
Conclusion: Post-intervention measurements showed improvement in suture-to-wound ratio for different PGY levels. The majority of residents found that practicing on the model, combined with the feedback on their videotaped closures, improved their abdominal wall closure techniques.

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Development of Robotic Surgery Curriculum at an Academic Surgical Training Program Using a Blended Learning Model

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Introduction: There has been rapid adoption of robotic surgery across an increasingly broad range of surgical procedures. However, there is currently no standardized robotic surgery training curriculum for general surgery residents at our academic surgical training program. The aim of this study was to survey current residents regarding their robotic surgery experience and use the results to inform the development of a blended learning robotic curriculum.
Methods and Procedures: All general surgery residents in our program from 2022-2023 were surveyed to assess their utilization of the robotic simulator, their approximate robotic experience at each PGY level, and their self-reported comfort operating robotically. The results were used to inform the development of a robotic curriculum, based in a Skill-Driven Blended Learning (BL) Model framework. Based on the principles of BL, the curriculum design included 1) a scheduled group learning plan, 2) instructor-led overview, 3) synchronous learning labs, and 4) providing continuous support.
Results: A total of 28 residents completed the survey (response rate 26%); 13 junior residents (PGY1-PGY2, 46.4%) and 15 senior residents (PGY3-PGY5, 53.5%). The majority of residents (53.5%) reported using the robotic simulator "a few times" in the past year, however 37.5% reported never having used the simulator. Most junior residents (50.0%) reported not being at the console for any of the robotic surgeries they participated in. Most senior residents (33.3%) were at the console for 10-20 robotic cases and reported performing 10-25% of the operation when at the console (33.3%). The majority of junior residents reported they were not at all comfortable with their robotic skills (69.2%), while most senior residents felt somewhat comfortable (46.7%). Only one resident said they felt very comfortable with their robotic surgery skills (3.5%). These data were utilized as a needs assessment to develop our robotic surgery curriculum, implemented in the 2023-2024 academic year. Using the BL framework, we developed scheduled group learning during intern bootcamp to familiarize all interns with the console and bedside assist roles, quarterly tissue-based bootcamps for senior residents, one-on-one instructor-led simulation teaching, and a simulation curriculum for residents to complete independently.
Conclusions: The general surgery residents in our academic training program reported limited structured exposure to robotic surgery simulation and training, leading to limited confidence in their own robotic surgery skills. Utilizing the BL framework, we developed a robotic surgery curriculum to address these resident needs. Ongoing investigations are in progress to determine the impact of this intervention.

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Assessing the Digital Shift: A Tool for Evaluating Video-Based Feedback Quality.

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Introduction: In the current digital landscape, quality feedback during video-based assessments is pivotal for effective student learning. However, to date non has been developed. This research aimed to devise a new tool for assessing the quality of feedback provided by trainers in such digital settings.
Methods and Procedures: A scoping review identified the prevalent tools for assessing feedback quality and their evaluated dimensions and items, culminating in a 10-item preliminary digital-specific tool (Table 1). After that, 100 feedback inputs samples from our platform for simulated laparoscopic training using video-based assessments were evaluated by four trained raters to test the tool's consistency and validity assessing Fleiss' Kappa and correlation between the items.
Results: Ten criteria for assessing feedback quality in a digital environment were assessed. Item 5 showcased the highest reliability, with almost perfect agreement ($\kappa = 0.811$, $p < 0.001$). Item 7 and 8 had moderate inter-rater reliability ($\kappa = 0.431$ and $\kappa = 0.619$, respectively, $p < 0.001$). Conversely, Item 1 and Item 2 had slight, statistically insignificant agreement, suggesting potential ambiguity. The remaining criteria (C3, C4, C6, C9, and C10) displayed varying degrees of agreement from slight to substantial, all underscored by significant p-values. In examining the ten criteria by correlation, items 1-5, 3-5, 3-7, 3-8, and 1-10, exhibited weak correlations (r = 0.13 or lower), emphasizing their differences when evaluating dimentions within the assessment.
Conclusions: The study illuminates the need for refining some feedback criteria to ensure consistent interpretation, while underscoring the strong reliability of others in video-based feedback assessments. Based on the findings, Item 5, 6, 7, 8, and 10 emerge as the most promising due to their combination of reliability and distinctiveness. Preliminary results suggest that the refined tool can offer a reliable measure for assessing feedback quality in the digital context.
Items

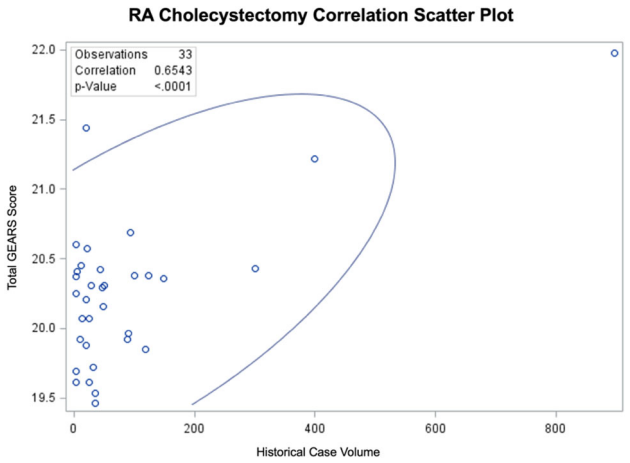
1. Feedback is formulated using non-judgmental and non-condescending language
2. Feedback is formulated taking into account expected learning outcomes
3. Feedback is based on direct observations of the performance
4. Provides specific information for the trained performance
5. Reinforces what was well done
6. Identifies and explains the gap to achieve the expected performance
7. Feedback provides constructive information, based on how to improve
8. Gives precise and concrete suggestions for improvement
9. Concludes with an action plan for the purpose of modifying or reinforcing observed performance
10. It links feedback with future learning outcomes or performance

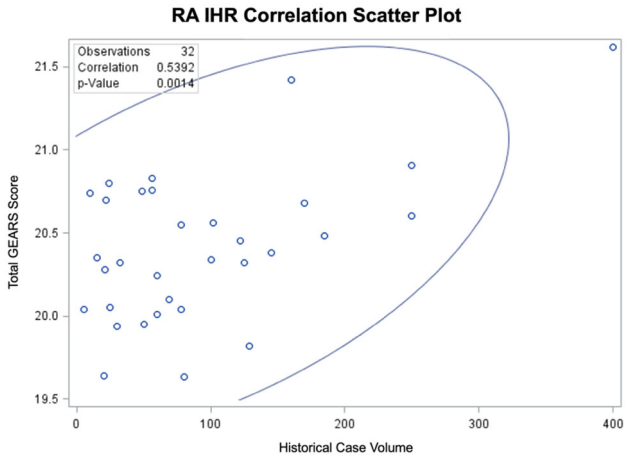
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Proficiency-Based Benchmarks in Commonly Performed Robotic General Surgery Procedures: A Video-Based Model for Establishing Competency

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Introduction: Robotic-assisted surgery has increased in prevalence, particularly in general surgery. However, the number of cases required to achieve adequate proficiency in robotic surgery and the training metrics that correlate best with proficiency remain unclear. We sought to better define proficiency-based benchmarks in robotic-assisted (RA) cholecystectomies and inguinal hernia repairs (IHR) using Crowd-Sourced Assessment of Technical Skill (C-SATS), a company that markets its ability evaluate surgical competency.
Methods: Multi-institutional, cross-sectional study in which 48 surgeons (senior residents, fellows and practicing physicians) submitted representative videos of themselves performing a RA cholecystectomy and/or IHR that subsequently underwent a blinded review using the C-SATS platform, which utilizes the Global Evaluative Assessment of Robotic Skills (GEARS) rubric. Participating surgeons self-reported surgical case volume. Primary outcome was correlation of GEARS scores with historical procedure case volume. Secondary outcomes included construct validity of GEARS scores as an operative proficiency metric.
Results: Significant correlations were demonstrated between total GEARS scores and historical case volume for both RA cholecystectomy ($r = 0.65$, $p < 0.0001$) and IHR ($r = 0.54$, $p = 0.001$) amongst all performers (Fig. 1A/B); however, statistical significance was not achieved for correlations amongst resident/fellow physicians ($r = 0.39$, $p = 0.11$ for RA cholecystectomy; $r = 0.22$, $p = 0.49$ for IHR) or those with < 50 historical case volume ($r = 0.14$, $p = 0.55$ for RA cholecystectomy; $r = 0.21$, $p = 0.54$ for IHR). No difference in total GEARS scores was seen between resident/fellow and practicing physicians for either RA cholecystectomy (20.21 v 20.25, $p = 0.82$) or IHR (20.45 v 20.46, $p = 0.95$), nor between those with < 50 and ≥ 50 historical case volume in RA cholecystectomy (20.16 v 20.33, $p = 0.33$) and IHR (20.35 v 20.49, $p = 0.48$). GEARS scores by domain (bimanual dexterity, depth perception, efficiency, force sensitivity and robotic control) and surgical step (exposure of triangle of calot, clipping and division of cystic artery/duct, and dissection of gallbladder; mobilizing peritoneal flap, hernia sac dissection and mesh placement) were similar across both groups ($p > 0.05$).
Conclusion: C-SATS-derived GEARS scores correlated to overall surgeon historical case volume for RA cholecystectomy and IHR, but not amongst novice performers. This methodology was unable to differentiate between novice and expert performers calling into question its utility as an instrument to assess technical surgical skill.
Figure 1A/B Correlation between total GEARS scores and historical case volume of all surgeons performing RA cholecystectomy (A) and IHR (B), scatter plots with 95% prediction ellipses.





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Are We Diluting Surgical Training? A Perspective of the Impact of Robotics on Surgical Trainees

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Introduction: Over the past two decades, robotic platforms have been widely adopted in minimally invasive general surgery, with a subsequent decrease in laparoscopy. Studies examining the efficacy, utility, and value of the robotic platforms largely conclude that robotic surgery is non-inferior to traditional laparoscopy in terms of patient outcomes, but results in longer operative times and is more expensive, even when performed by very experienced, well established surgeons. However, there is a paucity of literature regarding the impact of the incorporation of robotic surgery on surgical trainees. This perspective piece aims to examine the impact of the growing utilization of robotic platforms in general surgical and bariatric procedures on surgical trainee experience, skill level, and comfort in performing general surgical and bariatric procedures following completion of training.
Methods and Procedures: We reviewed current literature in an attempt to discern whether there is persuasive evidence supporting large scale conversion from traditional laparoscopy to a robotic-based practice of minimally-invasive general surgical procedures in a training environment, where development of surgical technique is historically gained through delicate tissue handling with haptic feedback rather than relying on visual feedback alone. We discuss the perspectives of experts and trainees regarding the integration of robotic surgery into surgical training.
Results: With increased robotic caseloads during surgical training, residents and fellows necessarily sacrifice complex laparoscopic cases in order to serve as a bedside assistant or perform more basic robotic procedures in an attempt to overcome the learning curve of a new operative modality. While the number of robotic cases estimated to achieve competence varies widely, most estimates range between 50-100, and many residents report barriers in their transition from bedside assistant to console surgeon. Surgical skill, experience, or comfort of recent graduates in performing basic general surgical procedures are not assessed in the literature.
Conclusion(s): At present, there is not persuasive evidence to support the widespread conversion away from laparoscopy and toward robotics from clinical, financial, or trainee perspectives. Trainees may require significantly more operative cases during training to achieve appropriate operative autonomy with the addition of robotics due to stunted development in operative skill and technique owing to a reduced volume and complexity of open and laparoscopic cases in order to accommodate the robotic platform. Careful consideration must be given to how best to incorporate robotics in surgical training in order to allow for surgical proficiency within the current construct and confines of surgical training.

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Assessing Medicine and Surgical Residents' Knowledge and Perceptions of Obesity and Metabolic/Bariatric Surgery

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Background: Less than 1% of eligible patients are referred for metabolic/bariatric surgery (MBS). Attending physician barriers are well documented, but trainee knowledge and referral perceptions/behaviors are unknown. This study aims to characterize and compare the knowledge and attitudes towards MBS among medical and surgical residents.
Methods: An anonymous survey was created assessing experience, attitudes and knowledge of obesity and MBS. Survey was distributed to all medicine (MR) and surgery residents (SR) at a single academic institution. Responses were compared using chi square analyses, Pearsons's correlations and likelihood ratios.
Results: Forty-nine residents responded: 20 MR and 29 SR. SR residents were more likely to have > 1 didactic session on surgical management of obesity (26.3% MR vs 75.9% SR, $p = 0.001$). MR had greater opportunities for weight management discussions with patients (63.2% MR vs 20.7% SR, $p = 0.028$) and were more likely to recommend lifestyle modification (65.0% MR vs 34.5% SR, $p = 0.035$). Majority of residents knew the NIH eligibility criteria for MBS (68.4% MR vs 55.4%, $p = 0.36$) and acknowledged that MBS was effective (80.0% MR vs 86.2% SR, $p = 0.65$), benefits of surgery outweighed risks (60.0% MR vs 79.3% SR, $p = 0.32$) and major complications are rare (70.0% MR vs 75.9% SR, $p = 0.66$). Despite this, rates of MBS discussion (10.0% MR vs 3.4% SR, $p = 0.56$) and likelihood to refer to MBS (0% MR vs 3.4% SR, $p = 1.00$) were similarly low among both specialties. When given patient scenarios, MBS referral rates for eligible patients without comorbidities were similar between groups regardless of patient age (referral rates for 35yo: 42.1% MR vs 58.6% SR, $p = 0.26$; for 60yo: 26.3% vs 48.3%,

p = 0.13). SR were more likely to refer patients with comorbidities (36.8% MR vs 86.2% SR, $p < 0.001$). SR were also more comfortable with postoperative care (15.0% MR vs 51.7% SR, p = 0.009) and complication recognition (55.0% MR vs 10.3% SR, $p < 0.001$). Finally, majority of both groups felt residency provided inadequate training for obesity management (68.4% MR vs 55.2% SR, p = 0.504), and many desired additional training on MBS outcomes and referral processes (84.2% MR vs 48.3% SR, p = 0.019).

Conclusion: Despite acknowledging the efficacy and safety of MBS, likelihood to refer was low for both surgical and medical trainees. This disconnect may be in part due to the inadequacy of obesity management training perceived by both groups. Efforts are necessary (and desired) to build formal obesity and obesity management training into medical and surgical residency curricula.

P324

Student vs. Resident Instructor Effectiveness in Teaching Basic Laparoscopy Tasks

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Introduction: This study is designed to assess if medical students can teach basic laparoscopic skills to their peers as adequately as surgical residents and if early exposure to laparoscopic skills training can promote interest in surgical careers. As students have more access to their peers than they do to residents, using peer instructors can provide students with more opportunities for guided practice and promote the development of peer-led curriculums.

Methods and Procedures: Medical school students from all class years were recruited via email to participate in laparoscopic simulation workshops, blinded to the status of their instructors.

All participants watched an introductory video on laparoscopic techniques after which they completed a pre-study questionnaire incorporating demographics, interest in pursuing a surgical specialty, and previous exposure to laparoscopy. Student instructors practiced laparoscopic techniques independently until they could complete tasks within the maximum time limit as defined by Fundamentals of Laparoscopic Surgery (FLS) standards. Instructors were given open-ended guidelines to demonstrate and teach laparoscopy skills. Participants then underwent two 30-min sessions, one for practicing peg transfers and another for precision cutting, led by either the student instructors or surgical residents. After the practice session, participants were taken to a testing room and assessed according to the FLS standards. A post-study survey was given to assess changes in their interest in pursuing a surgical specialty, the helpfulness of the instructor, and their perceived mastery of the skills.

All participants were assigned a random number and data was de-identified. Primary measured outcomes included time to completion for laparoscopic precision cutting and peg transfer. Additional measured variables included exceeding the maximum time limit in both exercises, dropping pegs, and cutting outside of 5 mm in both groups. Statistical comparisons made between both groups were performed using Wilcoxon signed rank tests and Student t-test, with a significance level of $p \leq 0.05$.

Results: A total of 16 students participated in the resident-led workshop and 13 students participated in the student-led workshop. Our study demonstrated no statistically significant differences between each cohort concerning task completion time, penalties, or accuracy of cutting. Participants in the student-led group showed negligible change in interest in pursuing surgery while the resident-led group demonstrated spurred interest among participants to pursue surgery (p = 0.0152).

Conclusions(s): This study suggests that student-led laparoscopic skills workshops are equally effective in teaching basic laparoscopic skills when compared to resident-led; however, resident-led workshops raised interest in surgical specialties.

P325

Home Program Surgery Match Trends by Medical School Campus Site

Ashley C Qualls; William B Fox; University of Illinois College of Medicine, Rockford

Introduction: Match Day is a national day recognized by physicians across the country because it is the day that fourth year medical students find out what residency program that they will continue their medical career at. Trends from previous studies on the surgery match show that students have a small advantage at their home program. This is because physicians and residents at the program have a longer amount of time to get to know the applying student. This study analyzes whether this trend is shown within a program that has multiple campus sites and affiliated residency programs.

Methods: The official website of the University of Illinois College of Medicine at Chicago/Peoria/Rockford was used to tabulate and compare surgery residency match data from 2013-2023. Surgery match rates were then compared by campus. Averages were then calculated for each campus on surgery match rates, surgery match rates to home program in general, and surgery match rates to home program within the same city as medical school attended. An ANOVA was tabulated on each of these categories to determine statistical significance.

Results: The trend in data showed that students at the Chicago campus were found to have a higher average number of surgery matches to home residency program. The data also showed applicants from the Chicago campus having a higher number of average applicants matching at their home program within the city they attended medical school. Analysis of the data showed that there was statistical significance showing that applicants have a better chance at matching at their home program of all students matching a surgery residency and statistical significance of the number of students matching a surgery residency at their home program, within the same city that they attended medical school.

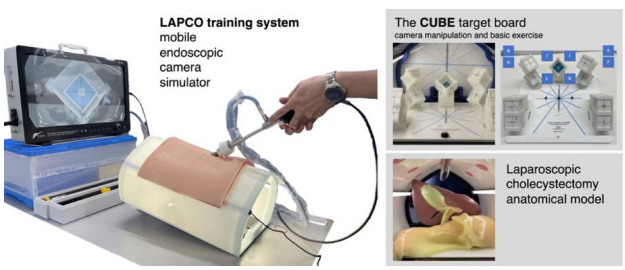
Conclusion: Match data is important in helping applicants best prepare and strategize for residency interviews and away rotations. This data supports the widely accepted trend that other studies have proven; one has the best chance at matching within their home program for a surgery residency. This data also shows that one has the best chance at matching to their home program in the city that they attended medical school in. This data represents a unique subset of medical schools that have multiple campuses with multiple affiliated residency programs.This research is helpful in providing data for students on the surgery residency application cycle.

P326

Novel Camera Navigation Training: A Prospective Study on Clinical Engineers National Training in Japan

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Background: In response to work hour restrictions for physicians and surgeons, the amended Japan Medical Care Act will be in effect on April 2024. For act enforcement, areas of task sharing and task shifting were explored. After exhaustive discussions by stakeholders, the law regarding clinical engineers (CEs) in Japan was amended. Under one of the amended provisions, CEs are able to operate an endoscopic scope (e.g., laparoscopic or thoracoscopic scope) in practice after completing the government-accredited formal curricula. We aimed to develop a combination of didactic and hands-on sessions to teach basic camera navigation skills and explore whether this training enhanced the skills of CEs.
Materials and Methods: This prospective observational study was conducted in Japan, involving CEs who participated in any of the first five scope operator training sessions, each session consisting of 10-h e-learning didactic lectures, followed by 5-h structured simulation training. The didactics include modules on fundamental surgical anatomy and common surgical procedures across various surgical specialties, in addition to fundamentals of endoscopic surgery. During the in-person simulation training, the CE participants were initially briefed on the basic instructions of an endoscopic camera system using a LAPRO simulation system. Following the initial briefing, participants were taught angled scope operation skills using a novel target board and practiced on a laparoscopic cholecystectomy anatomical model with a LAPRO system. Basic camera navigation skills were measured pre- and post-training using the board task. Scores were calculated based on time (allotted time 300 s) and errors. Data are expressed as mean ± standard deviation (95% confidence interval) or number (%).
Results: The average number of participants per session was 107 (range 75-134). Of 533 CEs (age 43.5 ± 9.1) who completed the entire curricula, 477 (89.5%) participants had no prior experience with operating a scope. The mean scores improved significantly from 164 ± 69.5 (158.0, 169.8) to 192 ± 54.1 (187.2, 196.4), $p < 0.01$. Although the improvements were observed regardless of scope experience, about a quarter of the participants exhibited no improvement in their scores. Only one participant could not complete the task within the allotted time (pre-training, n = 6).
Conclusion: This study indicates that the didactics and hands-on training using a newly developed simulation training system improved camera navigation skills regardless of clinical experience. The course can be used for the curricula for teaching basic camera navigation skills to surgical trainees.



P327

Objective, Procedure-Specific Assessment of Minimally Invasive Inguinal Hernia Repair Found on YouTube to Assess Procedural Safety as a Discriminator For Posting

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Introduction: Surgical videos posted on YouTube are highly variable in quality and technical skills, making them unreliable for training. Skill evaluation of these videos classically relies on global skills assessments such as the objective, structured assessment of technical skills (OSATS). Our goal was to use a validated objective, procedure-specific assessment (OPSA) to document the safe completion of minimally invasive inguinal hernia repair (MI-HR) tasks posted on YouTube as a qualifier for posting on YouTube for training purposes.
Methods and Procedures: 13 complete MI-IHR videos identified via a search on YouTube were de-identified and uploaded to a proprietary SaaS-based software platform for video-based assessment (VBA). Six board-certified surgeons experienced in MI-IHR completed the validated 3-point OPSA (1-Poor (unsafe/inadequate); 2-Adequate (safe/adequate); 3-Excellent (safe/expert)), and the validated Global Case Difficulty (GCD) assessment (1-easy; 2-average; 3-hard). Global Assessment of Surgical Skills (GASS – same scale as OPSA) and GEARS or GOALS scores (5-point scales) were captured as global skill comparators. There were varying levels of case difficulty, anatomy, and laterality. The primary analysis was total agreement — the ratio of raters that agreed on case safety — based upon each OPSA task being assessed as either safe (score ≥ 2) or unsafe (score < 2).
Results:

78 YouTube video reviews were analyzed.

Video No.	GCD (mean)	OPSA Score (mean)	≥ 1 unsafe task rating	GASS Score (mean)	GEARS Score (mean)	GOALS Score (mean)
1	2.0	2.6	No	2.7	4.1	
2	2.0	2.6	No	2.7		4.5
3	2.7	2.8	No	2.8	4.2	
4	1.5	2.7	No	2.7	4.2	
5	1.7	2.8	No	2.7	4.2	
6	2.5	2.6	No	2.8		4.7
7	1.5	2.7	No	2.6		4.6
8	1.7	2.7	No	2.7		4.8
9	2.3	2.6	No	2.4		4.5
10	2.0	2.8	No	2.7	4.4	
11	1.5	2.6	Yes	2.6		4.7
12	2.0	2.3	Yes	2.4		4.4
13	1.9	1.9	Yes	2.1		4.2
Summary	**1.9**	**2.6**	**3/13**	**2.6**	**4.2**	**4.6**

Total agreement between raters concluding the procedure was safe vs. unsafe based on the OPSA was high (97.4%%). GASS & GOALS global skill score means were ≥ 2.4 and ≥ 4.4, respectively, for the 3 cases having ≥ 1 unsafe task documented.
Conclusions: Using the OPSA to document procedural safety in YouTube MI-IHR videos found 23% had ≥ 1 procedural task rated as unsafe despite having global skill scores ≥ 4.1. The 3 videos found to have unsafe procedural tasks had high global skill scores, suggesting competency-based safety assessment may more reliably determine the appropriateness of MI-IHR videos for posting.

P328

Predictors of Robotic Inguinal Hernia Intraoperative Efficiency

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Introduction: Real-time predictors of operative time are critical to monitor and improve the efficiency of robotic inguinal hernia (RIH) cases involving intraoperative teaching. We hypothesize that automated objective measures that reflect the operating surgeon/resident's intraoperative control of the robotic console can predict RIH operative efficiency, defined as time spent performing RIH step-specific movements.

Method: We annotated 519 functional surgical steps from 92 anonymous RIH cases performed on the dual console Da Vinci Surgical Robotic system with resident participation between 7/2020 and 6/2022 at our center. Eight objective performance indicators (OPIs), automated measurements captured by an Intuitive Data Recorder (IDR), were utilized. Independent variables included five OPIs reflecting console-control behaviors; outcome variables were three RIH step-specific time measures, including surgical step duration, instrument active time, and the wrist joint active time. Descriptive statistical analysis and a boosted tree algorithm were applied.

Results: Approximately 30.4% (28/92) RIH cases were bilateral hernias and 20.7% (19/92) had adhesions; 42.8% (222/519) steps were completed by resident and surgeon together. "Camera control" (i.e., number of camera control activations) was the strongest predictor of all three RIH intraoperative efficiency measures: surgical step duration, instrument active time, and instrument wrist joint active time (Fig. 1). It was also the strongest predictor of these three efficiency measures in each of the five critical RIH steps: Creation of Peritoneal Incision (total predictor effect range 0.83-0.85), Flap Exploration & Exposure of Myopectineal Orifice (0.69-0.80), Reduction of Sac (0.36-0.48), Mesh Placement (0.80-0.88), and Closure of peritoneum (0.64).

Conclusions: Our study suggests that camera control is the strongest predictor of intraoperative efficiency of RIH with resident involvement. These preliminary results provide useful information for the future development of real-time RIH intraoperative efficiency monitoring systems and interventions to optimize resident training in RIH cases and patient care quality improvement at academic medical centers. Future studies are needed to explore further and validate these findings.

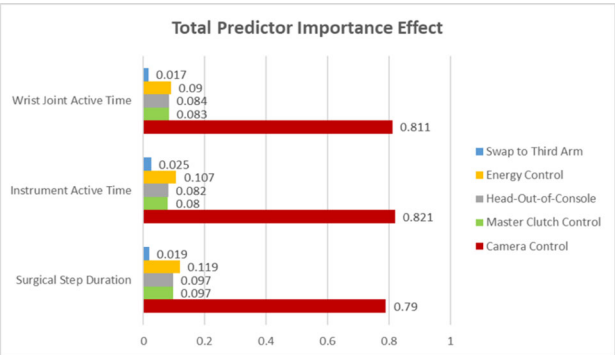


Figure 1. Predictor Importance. Note: Camera Control=Number of times the camera motion was activated by the operating surgeon (attending/resident); Master Clutch Control=Number of clutches a surgeon performed; Head-Out-of-Console=Number of times a surgeon removes their head from the surgical console; Energy Control= Number of energy activations; Swap to Third Arm= Number of swapping to 3rd robotic arm.

P329

Creation of a Sustainable, Asynchronous, and Decentralized Laparoscopic Simulation Laboratory in Dar es Salaam, Tanzania.

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Introduction: Laparoscopy has transformed surgical care in high-income countries; however, limitations in physical and human resources have hindered access to laparoscopy in many low-income countries. In Tanzania, a barrier to a broader adoption of laparoscopy is access to simulation-based training opportunities.

Methods: We established a laparoscopic simulation program at Muhimbili University (MUHAS) based on a three-pillar framework; hardware, training curriculum, and teacher network. To assess the implementation, we gathered training data (trainees, hours of training, feedback inputs) and compared pre- and post-training OSATS scores and task completion times for all course graduates.

Results: Since November 2022, a simulation lab has been implemented with 4 endotrainers and coordinated by a lab manager. The training curriculum and feedback has been provided via a mobile-based platform by a local trainer. To date, 39 physicians have conducted 1,421 h of training and been provided with 3,369 individual pieces of feedback. Thus far, 20 students have graduated from the course and it has been integrated into the surgical residency at MUHAS. Task completion time significantly improved in all trained exercises. Median OSATS score for a simple intracorporeal suture went from 14 during the pre-assessment to 22 after graduation (P value < 0.001).

Conclusion: We describe the successful and sustainable implementation of an asynchronous decentralized laparoscopic simulation laboratory in Dar es Salaam, Tanzania. This lab provides a model that could be expanded in the region to create a powerful community of laparoscopic simulation centers and educators and would help to address the inequity in training opportunities for laparoscopic techniques among surgeons in East Africa.

Pre and post-assessment task time among graduates of the simulation course

Task	Pre-assessment Median (IQR)	Post-assessment Median (IQR)	P value
Bean drop	107 (67, 142)	23 (20, 24)	< 0.001
Running the chord	75 (29, 125)	24 (22,26)	< 0.001
Block move	79 (51, 105)	14 (13, 16)	< 0.001
Transfer of objects	334 (263, 418)	53 (52, 54)	< 0.001
Cutting of Gauze	221 (190, 271)	78 (73, 83)	< 0.001
Inturrupted suture	190 (127, 274)	78 (72, 85)	< 0.001
Continous suture	729 (554, 1,091)	249 (229, 260)	< 0.001

P330

Visual Arts-Based Interventions in Surgical Education: A Systematic Review

Rhea Jangra, BHSc; Isis Lunsky, BHSc; Boris Zevin, MD, PhD; Peter Szasz, MD, PhD; Queen's University

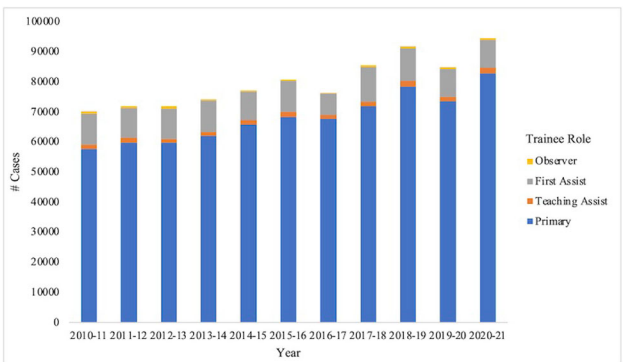
Introduction: Surgical education is a dynamic field that continually seeks innovative teaching methods to enhance trainee skills and knowledge. In recent years, visual arts-based interventions have gained attention as a potential educational tool, but this has yet to be assessed in a comprehensive and systematic manner. Consequently, this systematic review aims to explore the effectiveness of visual arts-based interventions in surgical education, shedding light on their impact on knowledge acquisition and technical skill development.
Methods & Procedures: A systematic review was conducted using MEDLINE (1946 to July 2023), EMBASE (1947 to July 2023), Web of Science (inception to July 2023), and Preprint Citation Index (inception to July 2023). Bibliographic references were reviewed for additional studies. Studies were included if they utilized a visual-arts based educational intervention and reported on technical skill or knowledge acquisition amongst any level of medical learner. The quality of the publications was assessed using the Medical Education Research Study Quality Instrument (MERSQI) scale.
Results: Of the 7072 studies identified, 23 were ultimately included in this review. The selected reports encompassed one (or more) diverse visual arts-based interventions, including anatomy drawing (9), clay modeling (13), cross suturing (1) and paper manipulation (1). The majority of studies evaluated these interventions amongst medical students (14), although several focused on various levels of trainees including residents and physicians (10). Common outcomes assessed included knowledge of anatomy (16) and familiarity with surgical procedures (3). All included studies demonstrate participant satisfaction with the artistic intervention(s), an improvement in anatomy knowledge, surgical skills and/or learner understanding and confidence with surgical procedures. The median MERSQI score of included studies was 9.5.
Conclusions: This systematic review underscores the potential of visual arts-based interventions as a valuable tool in surgical education, associated with improved learner outcomes, enhanced knowledge acquisition, and improved technical skill development. Despite intervention and outcome heterogeneity, these findings suggest arts-based interventions have the potential to enhance future surgical training. The growing number of recent studies reflects increasing interest in arts-based surgical education. Future research should include high-quality randomized control trials to directly compare these interventions to traditional surgical teaching methods, and explore their long-term impacts.

P331

Has the Robotic Surgery Era Impacted the Minimally Invasive Surgery Fellowship Trainee's Operative Role?

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Introduction: Robotic surgery has experienced exponential growth in the past decade. Few studies have evaluated the impact of robotic surgery on trainees' operative roles and level of case involvement. The learning curve and lack of widespread utilization of the dual console may have an impact on the trainee's operative experience. The purpose of our study was to examine recent trends in trainee reported operative roles and whether this has been impacted by increased robotic utilization.
Methods: De-identified case log data from the Fellowship Council from 2010-2021 was evaluated. The percentage of cases logged by the fellow as the primary surgeon, teaching assist, first assist, or observer were assessed and compared over time. Case logs were further stratified by approach (robotic, laparoscopic, open, or endoscopic) and trends in the trainees' operative role were evaluated for each approach.
Results: The total number of cases logged increased from 70138 in 2010 to 94412 in 2021. The percent of all cases where the trainee was the primary surgeon had a slight increase from 82.0% (57526/70138) in 2010 to 87.5% (82633/94412) in 2021. There was a slight decrease in the percentage of first assist [14.9% (10432/70138) to 9.8% (9241/94412)] and observer [1.1% (747/70138) to 0.55% (521/94412)] cases over the same time period. The overall percentage of teaching assist cases remained relatively stable from 2010 – 2021 [2.0% (1433/70138) to 2.1% (2017/94412)] (Figure). The number of robotic cases logged by trainees increased from 1127 to 16081. The percent of robotic cases where the trainee was the primary surgeon increased from 49.1% (553/1127) to 86.4% (13889/16081) and the percentage of robotic teaching cases increased from 0.09% (1/1127) to 0.85% (137/16081) during the study period. The percentage of robotic first assist [38.9% (438/1127) to 11.6% (1869/16081)] and observer [12.0% (135/1127) to 1.16% (186/16081)] cases dropped from 2010—2021. Laparoscopic primary cases increased slightly from 80.3% (36079/44954) to 85.7% (38890/45356) and the percent of laparoscopic teaching cases increased slightly from 2.1% (924/44954) to 2.7% (1221/45356).
Conclusions: There has been relatively little impact on the trainees' reported level of case involvement during the era of robotic surgery. The largest magnitude of change has been seen within robotic cases, but the trend has been toward more trainee as primary surgeon and teaching assist cases. The trainee experience and reported level of autonomy remains very robust and this does not appear to have been dramatically impacted by increased robotic utilization.

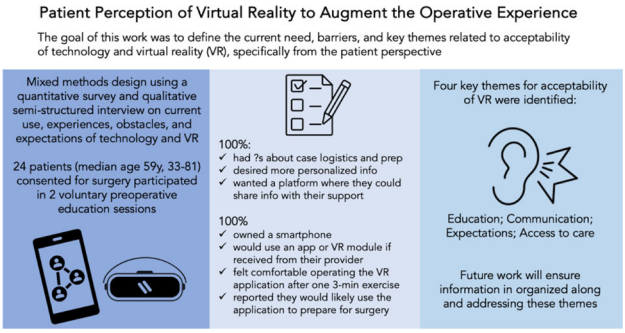


P332

Patient Perception of Virtual Reality to Augment the Operative Experience

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Introduction: Virtual reality(VR) has growing applications in surgical education. The same multidimensional learning benefits may extend to patients preparing for surgery. VR could bridge communication gaps between the patient and surgical team, ultimately improving the patient experience. However little research has evaluated the acceptability of VR by patients. Our goal was identify drivers of and barriers to adoption of VR by patients undergoing colorectal surgery.
Methods: Patients consented for elective colorectal surgery were recruited for an optional pre-operative education session. A mixed-method approach was employed to understand patient priorities in using technology throughout the surgical experience. This consisted of 1) a quantitative survey on current use, experience, and acceptability and 2) a qualitative semi-structured interview of experiences and expectations of technology and VR, specifically. The main outcome measure was to define the current need, barriers, and key themes related to acceptability of VR from the patient perspective.
Results: 24 patients participated (median age 59 [range, 33-81); 54% female). All had signed informed consent for their procedure, but 100% had questions about the logistics of the procedure and preparation. 50% already sought more information about their hospital or surgery online. 100% owned a smartphone; 23/24(95.8%) reported they were comfortable operating and navigating the smartphone for casual use. 100% desired a way to have more information in a personalized form and to have a better way to share information with their support. No patients owned an VR headset, but two(8.5%) previously used VR for social applications. 100% reported would use an app or VR module if recommended or received from their provider. The majority(n = 16, 66.7%) were not comfortable downloading or buying equipment without their surgeon's advisement. Initially, 7(29.2%) patients had concerns of being able to effectively use VR. After one 3-min exercise, 100% felt comfortable operating the VR application and 100% reported they would likely use the application to prepare for surgery. From the interviews, four key themes for acceptability were identified: education; communication; expectations; and access to care.
Conclusions: Surgery is a journey, not a point in time. Patients need more information and desire alternative formats to prepare themselves and their support for surgery. At all ages, they are open to technology to augment their journey. These results help inform the surgical team about major obstacles faced by the patients during their surgical experience and their perspectives. VR can be used to optimize healthcare delivery and the patient experience.



P333

Education of Allied Health Professions for Endoscopic Surgery

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Background and Objectives: The endoscope surgery highly depends on the medical equipment in comparison with a conventional open surgery. Many technicians assisted surgeon with the operation of medical equipment since the start of endoscope surgery in1990. Situation and problems in the education of allied health professions for Endoscopic and Robotic Surgery were investigated in this study.
Materials and Methods: The clinical engineer (CE) is the Japanese national qualification. CE's scope of business was defined by law as the life support system operation and maintenance such as cardiopulmonary bypass and artificial kidney. The education curriculum of CE includes medicine, engineering and medical electronic devices. Therefore, from the beginning of endoscope surgery, CE cooperated with surgeons including power supply equipment management of operating room. A change and the problem of the clinical engineer education curriculum were reviewed from the viewpoint of endoscope surgery.
Results: The principles and methods of operation of basic medical devices such as electrocautery, ultrasonic aspirator, surgical laser, microwave coagulator and endoscope had been educated as the undergraduate education of CEs since before the 1990s. As to medical devices for endoscopic surgery such as ultrasonic coagulation cutting device, electronic videoendoscope, training on the latest equipment was carried out in the hospital as post-graduate education. The 2007 revision of the national regulations added ultrasound coagulator, ablation devices and an endoscopic surgical operation system. In the 2022 revision, robotics surgery system was officially added. CE were allowed to manipulate endoscopic devices themselves during operation, and their clinical training were also extended. Under the latest regulation, total education hours for undergraduate CE increased by 9% to 1136 h. In particular, clinical training at the hospital increased by 75%, from 180 to 315 h.
Conclusion: Involvement of CEs in endoscopic surgery is also useful in improving the efficiency and workload of surgeons. However medical device manufacturers are required to solve problems such as computer malfunction during robotic surgery and complexity of sterilizing and washing reusable parts of surgical robot that cannot be solved by CE alone.

P334

Making the Invisible Visible: A Window into the Mind of the Laparoscopic Trainee

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Introduction: The purpose of this study was to develop a series of laparoscopic surgery schemata (LSS) to describe the specific competencies (knowledge, skills) embedded in simple procedures. Specifically, the LSS identifies the characteristics of operative performance that illustrate the integration of knowledge (e.g., anatomy, physiology, judgment), and execution of surgical techniques. This research is essential to develop innovative assessments and instructional methods to: 1) measure application of complex cognitive and psychomotor skills; 2) uncover the mental representations of surgeons in the operating room depending on expertise; and 3) generate a framework for teachers to provide feedback to learners during laparoscopic procedures.

Methods: The study emerged as part of the process of redesigning the Fundamentals of Laparoscopic Surgery (FLS) program. Employing a mixed methods approach we: 1) Engaged a diverse group of subject matter experts (SMEs) and education scientists (N = 33) in 3 research retreats to identify the 'essential competencies' underlying integration of cognitive and psychometric operative performance at a minimally qualified level. The participants engaged in activities such as analysis of video samples, and moderated discussions; 2) Collected a series of short (< 5 min) videos (N = 15) depicting essential aspects of operative performance at various levels (e.g., suturing, dissection, exposure); 3) Conducted think-aloud interviews with SMEs (N = 12) asking them to describe the characteristics of operative performance (good and bad) in the videos; and to verbalize suggestions they might offer to the surgeon. The transcribed data were analyzed using both inductive (tagging the 'essential competencies identified in Step 1), and deductive approaches (coding competencies identified as well as features of performance such as precision, accuracy, and efficiency).

Results: Data were synthesized across the multiple analytic approaches to generate the common patterns identified by experts (schemata). Bloom's knowledge, and Dave's psychomotor taxonomies were also used to complement the schemata, so they were tailored to learners at different levels of competence. The resulting expert schemata for a variety of procedures may facilitate the development of assessment tools and intraoperative instructional methods for laparoscopic procedures in a more holistic and practical way.

Conclusions: Integrating cognitive and psychomotor competencies is fundamental to safe laparoscopic surgery. Identifying the competencies underlying operative performance and judgment is essential to develop assessments that highlight learners' strengths and areas for improvement. Using schemata developed by experts may help to identify areas for improvement in novice learners.

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Surgery Education: There's an App for That?

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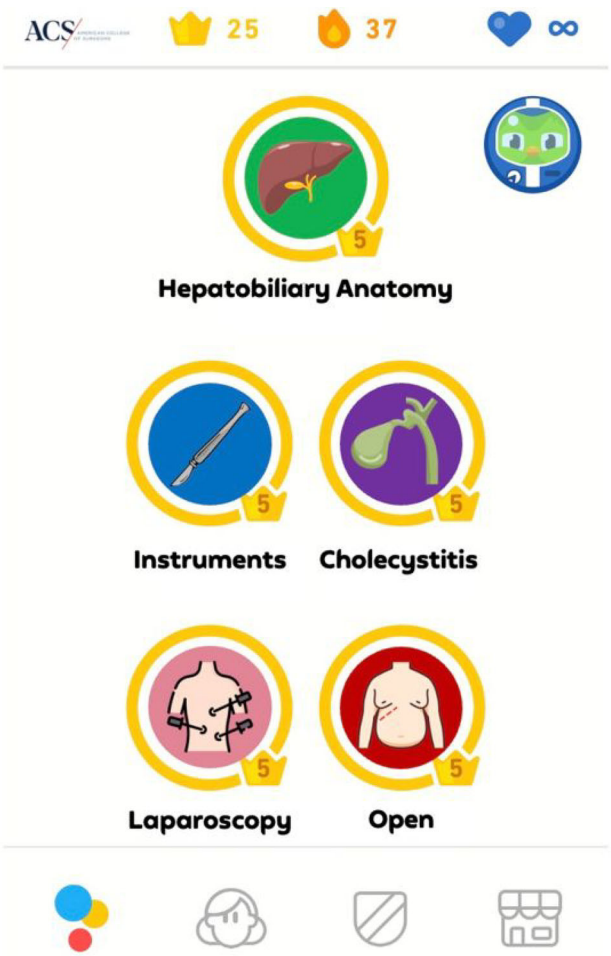
Introduction: Mobile applications (apps) can be effective e-learning tools in surgical education. In 2022, the American Board of Surgery (ABS) announced the transition to an entrustable professional activities (EPA) training model in which resident knowledge and operative skills are evaluated via an app. Since 98% of surgeons use smartphones and 52% use apps in clinical practice, harnessing apps to assess and guide surgical residents in EPA-based competency evaluations may be prudent. However, only 29% of surgical residents use apps for test preparation and building fund of knowledge. A potential concern that may limit the broader use of surgery education apps is their design or usability. Effective app design correlates with higher user engagement and improved learning outcomes. This study analyzes surgery education apps available on the iPhone Apple App Store using evidence-based design principles that have informed effective mobile e-learning in various settings and proposes suggestions to enhance user engagement.

Methods and Procedures: The iPhone Apple App Store was searched with keywords related to surgery education and yielded 440 results. Duplicate entries and apps with irrelevant content (e.g., dentistry, beauty, ASMR) or targeted at non-surgical audiences (e.g., patients, anesthesiologists) were excluded. 58 apps were assessed using 5 evidence-based principles adapted from the 1st edition of Mobile Learning: A Handbook for Developers, Educators, and Learners by Scott McQuiggan, Jamie McQuiggan, Jennifer Sabourin, and Lucy Kosturko.

Results: Most of the apps analyzed (76%) incorporated multimedia and adhered to the basic principles of mobile e-learning design. 59% of apps offered opportunities for feedback and assessment, and 64% allowed for personalization. Few apps integrated collaboration (15%) and gamification (28%) features such as badges, points, leaderboards, and rewards. Only 3% of apps were aligned with the ABS's EPA curriculum.

Conclusions: Surgery education apps available on the iPhone Apple App Store do not adequately reflect contemporary mobile e-learning design principles. Future apps should align with the ABS's EPA curriculum and include gamification and collaboration features to enhance user engagement and learning outcomes.

Figure 1 Mobile Surgery Education Application Prototype



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Evaluating the Quality of Online Resources for Patient Education on Robotic Esophagectomy

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Objective: In recent years, there has been a surge in the adoption of robotic surgical approaches, with multiple studies showing improved short- and long-term outcomes with robotic esophagectomy. As an increasing number of surgeons are offering robotic esophagectomy to their patients, it is important that patient education resources are assessed to ensure they are appropriate and well-informed about the different treatment modalities. YouTube is the most widely used video-sharing platform, with over 2.7 billion users worldwide. Our aim is to evaluate whether online content is a reliable source of patient education material for robotic esophagectomy.
Methods: In September 2023, a YouTube query was performed for the words: "Robotic-Assisted Minimally Invasive Esophagectomy." The videos were filtered by relevance, video format, and English language. The first 60 videos to appear were evaluated by two independent reviewers and scored using the DISCERN tool, which is an established tool for healthcare workers to judge consumer health information for patients regarding treatment options.
Results: Of the 60 videos reviewed, 48 (80%) were included in the study. The average DISCERN score for the videos was 1.3 ± 0.57 (SD), with a score > 3 being good for patient education and a score ≤ 3 being poor. Only one video scored higher than a 3. Of the 48 videos included, 28 (58%) were purely intraoperative demonstrations and 4 (8%) included case presentations. In 7 (15%) of the videos there was at least one other component of the treatment pathway/algorithm, but none offer a comprehensive explanation of the treatment approach. Videos were published by accounts in the USA (56%), Europe (12.5%), and Asia (22.9%). The metrics and reliability of the videos varied by publisher type, with the average DISCERN score being 1.2 for educational or publication-focused accounts, 1.8 for academic or hospital accounts, and 1.1 for individual surgeon accounts.
Conclusions: Overall, the content available on YouTube for education about robotic esophagectomy is better suited for surgical education rather than patient education. Surgeons are the evident intended audience for the vast majority of these videos, rendering any comparisons to other surgical modalities or mention of the global treatment pathway incidental to the purpose of the video. This underscores a significant opportunity to improve patient education resources for the betterment of shared decision making.

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Surgical Resident Performance on Virtual Reality Simulation Tasks with and Without Haptic Features

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Introduction: Virtual reality (VR) simulation for laparoscopic training is available either with or without force feedback features that reproduce a haptic "sense of touch" when instruments interact with virtual objects. Although this may increase fidelity, it is not known if this enhances potential performance or ability to learn skills. Our objective was to compare resident laparoscopy skills using identical VR task software platforms performed on haptic and nonhaptic laparoscopic surgical interfaces during formative training.
Methods: Ten residents (3 PGY-3, 4 PGY-2, 3 PGY-1) were assigned practice on six identical basic skills tasks on two laparoscopic simulators, one with and one without haptic features (LAP Mentor and LAP Mentor Express, respectively) as a component of basic skills training. Tasks required 2-handed coordination for instrument navigation, clip application, retraction and clip application, retraction and exposure, retraction and cutting, and electrosurgery. A minimum of 12 iterations were performed for each task on both simulators by all residents, alternating use of each at default difficulty settings. Performance was measured using time, economy, accuracy and task-specific measures. Iteration quartile means were determined and compared for the two platforms using paired t-tests. Progressive change in individual performance for the final 3 iterations were determined by repeated measures ANOVA and Tukey multiple comparisons.
Results: Small incremental changes in performance for the last 3 iterations of a single metric were observed for 2 tasks. Otherwise, no detectable ongoing changes in the last 3 interations were observed for any measures for any task. Economy of movement of both right (last 3 quartiles) and left (2nd and 4th quartiles) instruments was significantly better with haptics for the retraction and clipping task. Task performance time (1st, 3rd and 4th quartiles), avoidance of overstretch error (all quartiles), and accuracy (3rd and 4th quartiles) were significantly better with haptics for the retraction and cutting task.

Conclusion: Higher performance for accuracy, efficient instrument motion and avoidance of overstretch force on a haptic VR simulator platform compared to a nonhaptic platform were observed for tasks that require precise application of traction forces in conjunction with a surgical maneuver of the opposite hand. This suggests that sensory interpretation of haptic cues may an important component in performing some simulated laparoscopic exercises, although any effect on eventual acquisition of skill remains to be studied.

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Prolonged Use of Fully Covered Stents in Patients with Foregut Obstructions

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Introduction: Endoscopic therapy is a mainstay of management of benign esophageal and gastrointestinal strictures, with methods including balloon dilation, steroid injection, incisional stricturoplasty, and temporary stent placement. However, these short-term therapies involve risks including bleeding, perforation or the need for multiple endoscopic staged procedures. We present a series of patients for whom prolonged fully covered short stent (AXIOS TM) placement has provided symptomatic relief and an improved quality of life with minimal lifestyle disruption.
Methods and Procedures: We conducted a retrospective chart review of 8 patients who underwent endoscopic placement of an AXIOS stent for management of upper GI strictures from 1/2021 to 9/2023. Patients were surveilled at 6 weeks, 3-6 months, 12 months, and beyond with upper endoscopy and/or upper GI fluoroscopy. Patient-reported current diet, relative weight stability, pain score and overall satisfaction were assessed.
Results: A total of 8 patients were identified with prolonged or planned prolonged AXIOS stent placement. Four patients had stent placed for stricture at the gastrojejunal anastomosis after roux-en-y gastric bypass surgery. One patient had a stent placed at a stricture in the gastric conduit after esophagectomy for esophageal cancer. One patient had a stent placed at an esophagogastric anastomosis stricture after subtotal gastrectomy. One patient had a stent placed at a stricture in their vertical banded gastroplasty. One patient had undergone open roux-en-y gastric bypass in another country with mesh placed around the gastrojejunal anastomosis that eroded into the lumen 20 years later and required prolonged stent placement. Stent placement was followed for a range of 1 month to 24 months (median follow-up of 5 months). Patients reported an average of 4.6 on a Likert satisfaction scale (1 being very unsatisfied and 5 being extremely satisfied). No patients reported ongoing pain, and three patients reported weight regain or overall weight stability. Two patients were able to progress from prior full liquid or pureed diet to regular diet after stent, and one patient was able to progress to soft diet from prior liquid diet after stent. One patient experienced stent migration & passage without obstruction.
Conclusion: The prolonged use of a fully covered short (AXIOS TM) stent appears feasible in well selected patients for the management of foregut strictures and stenoses.

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Photodynamic Therapy for Esophageal Cancer

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Introduction: The purpose of this study was to determine the effectiveness and viability of photodynamic therapy (PDT) for patients with early cancer from Barrett's esophagus and dysplasia. Barrett's esophagus is a condition in which intestinal tissue replaces esophageal mucosa, sometimes developing into esophageal cancer. PDT is a local, FDA-approved treatment that utilizes a photosensitizing agent to kill cancer cells in a controlled, targeted method.
Methods: 9 consecutive patients were treated between 2020-2023. 8 patients presented with adenocarcinoma and 1 with squamous cell dysplasia. All patients received a photosensitizing agent and then 2-3 days later, were exposed to a laser that activated the agents to destroy the cancer cells. The patients had routine follow-up endoscopy for surveillance.
Results: 4 of the patients that received PDT were cancer-free without additional therapies. Other patients with either recurrent cancer or dysplasia underwent alternative treatments: esophagectomy, radiofrequency ablation, and chemoradiation. All patients are cancer-free as of their last follow-up with a mean survival of 100 weeks.
Conclusion: PDT is a viable, curative therapy for patients with early esophageal cancer. If cancer or dysplasia recurs, patients have other therapeutic options; therefore, PDT is an advantageous first-line treatment option for early esophageal cancer.

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Rarity in Spontaneity: A Case Report of Spontaneous Esophageal Perforation Managed by Both Non-Minimally Invasive and Minimally Invasive Techniques

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Background: Spontaneous Esophageal Perforation is a life-threatening condition that is traditionally managed with challenging open surgical procedures, associated with high morbidity and mortality rates. Minimally invasive endoscopic techniques have emerged as promising alternatives. This case report, adhering to SCARE guidelines, details the management of such a perforation using both open surgery and minimally invasive methods, in a tertiary government hospital.
Case Presentation: A 25-year-old Filipino male, ECOG 0, normal BMI, presented with a 2-month history of cough, accompanied with intermittent epigastric pain, dyspnea, fever (Tmax 38C), and retrosternal chest pain. Patient denied a history of vomiting, alcoholism, or potential iatrogenic causes.
Findings and Investigations: Diagnostic workup revealed a pleural effusion of the right thorax, requiring drainage via chest tube thoracostomy (CTT). Purulent output prompted medical management for empyema thoracis. Despite one week of CTT, output persisted.
Interventions and Outcome: Patient underwent video-assisted thoracoscopic surgery (VATS), which revealed food contents leakage and prompted a posterolateral thoracotomy with multiple pleural drains. Esophagoscopy (EGD) and fluoroscopy revealed a mid-thoracic esophageal perforation (approximately 2 cm). The patient received a tube jejunostomy for enteral feeding, and underwent minimally invasive Endoscopic Vacuum Assisted Closure (EVAC) or Endoluminal Vacuum Therapy (EVT). A sponge connected to a

nasogastric tube was endoscopically placed using a piggyback method with an overtube. The sponge was advanced to cover the perforated esophageal lumen. Negative pressure was then applied through the sponge using an external suction pump with a constant pressure of 120-125 mmHg.

The patient remained stable postoperatively, and underwent four endoscopic sponge exhanges, each spaced 3 to 5 days apart over the course of 20 days. Closure of the esophageal defect exceeded 50% during the first exchange and reached 90% by the fourth.

A Self Expanding Metal Stent (SEMS) was then endoscopically inserted into the lumen, and secured by endoscopic clips. The patient's diet was advanced to an oral diet after one day. He was discharged on post SEMS insertion day 3, for a total admission of two and a half months.

Follow-up two weeks later revealed cough cessation, decreased leukocytosis, a healthy weight gain of 4 kg, and complete closure of the esophageal defect. The pleural drain and jejunostomy tube were subsequently removed.

Relevance and Impact: This case highlights the efficacy of EVT as a minimally invasive method for treating esophageal wall defects. EVT offers rapid and targeted perforation closure, which could lead to improved patient outcomes, and reduced patient morbidity.

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Beyond the Ordinary: Presence Of Sarcina Ventriculi on Gastric Biopsies—A Case Series

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Introduction: Sarcina ventriculi (SV), a rare gram-positive bacterium has been associated with delayed gastric emptying. Severe GI outcomes, such as gastric ulcers with deformation and emphysematous gastritis, have been reported. Other published reports describe SV colonization of gastric mucosa in patients with minimal symptoms. Currently, there is no clear guidance on the necessity or optimal treatment approach for such patients. Further research is needed to establish management protocols.

Objective: To present three different cases in which the presence of SV was demonstrated on endoscopic biopsies in order to enhance awareness among clinicians and researchers.

Methods: Retrospective study of a patient database with a prospective component in progress.

Results:

Patient #1

A 61-year-old male presenting with an upper GI bleed with melena, hypotension and severe anemia was admitted. The initial EGD revealed significant benign antral ulcerations with antral deformation and intra-gastric food retention. Three months later, a follow-up EGD identified SV within the ulcer, prompting a 10-day course of oral ciprofloxacin and metronidazole. Follow-up EGD 1 year later demonstrated persistent antral deformation and beozars but no residual SV on multiple biospies.

Patient #2

A 68-year-old woman with a BMI of 55, intending to undergo bariatric surgery, presented with daily GERD symptoms. Preoperative EGD revealed mild antral gastritis and presence of SV on antral (but not corpus) biopsies. After multi-disciplinary discussion, a 10-day course of oral ciprofloxacin and metronidazole was initiated. Subsequent gastric emptying study confirmed gastroparesis (21% retention at 4H). A follow-up EGD at three months showed the absence of SV on multiple biospises.

Patient #3

A 46-year-old woman presented with chronic GERD and obstructive symptoms. A large paraesophageal hernia was subsequently diagnosed. Upon initial endoscopic evaluation no food retention was noted and gastric biopsies were unremarkable. Laparoscopic paraesophageal hernia (PEH) repair was performed. Postoperatively, mixed dysphagia symptoms developed. An EGD performed 2 months post PEH repair revealed a normal fundoplication with significant gastric food retention and presence of SV on gastric biopsies. She is currently undergoing further evaluation of her gastric emptying.

Conclusion: These three cases highlight different clinical scenarios in which gastric mucosal SV can be diagnosed. It is currently unclear whether this bacterium is a pathogen or commensal organism incidentally detected on endoscopic biopsies in the context of gastroparesis. Hence, it warrants further research to determine the optimal management of the colonization of gastric mucosa by SV.

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Time-out on T-fasteners: Case Report of Large Volume Pneumoperitoneum and Microperforation after PEG Placement

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Introduction: T-fasteners have been used for percutaneous gastrostomy tube placement to mitigate the risk of free perforation and assist with tube replacement after early tube dislodgement. Among the complications listed, there are relatively few complications associated with their use. This case report presents a patient who experienced microperforation induced by the T-fasteners which resulted in pneumoperitoneum peritonitis requiring operative intervention.

Discussion: In the literature, there are scattered studies focusing on the benefit of T-fasteners in mitigating risk of complications after tube dislodgement. One case report in 1997 describes perforation by retained T-fasteners 2 months after placement and three weeks after gastrostomy tube removal. The current case report is the first of our knowledge to describe microperforation secondary to T-fasteners within 7 days of gastrostomy tube placement.

Conclusion: This article highlights awareness of a rare complication of T-fasteners that has not yet been described in the literature.

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Outcomes After Per Oral Pyloroplasty Based on Gastroparesis Etiology

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Introduction: Per oral pyloromyotomy (POP) has been shown to improve symptoms and gastric emptying in patients with gastroparesis. There are three main etiologies of gastroparesis: diabetic, postsurgical (suspected to be due to vagal denervation), and idiopathic. Our aim was to compare outcomes after POP based on the etiology of gastroparesis.

Methods: This was a retrospective review of all patients that underwent POP between 2018 and 2023 at a single tertiary academic center by a single surgeon. Patient factors such as demographics, previous interventions, and preoperative symptoms were compared. Outcomes of interest included postoperative symptoms, complications, emergency department (ED) visits, readmissions, reinterventions, recurrence, and time (in months) to recurrence.

Continuous variables were compared using Wilcoxon rank sum test and categorical variables were compared using Chi-squared or Fisher's exact test.

Results: A total of 48 patients were included in the study of which 12 had diabetic, 23 had post-surgical, 11 had idiopathic, and 2 had unspecified gastroparesis. The overall median age was 56.5 with a female predominance (63%), 20 patients (42%) with BMI over 30, and 8 (17%) current smokers. Twenty-one patients (44%) had previous endoscopic intervention, 2 (4%) had prior surgical intervention, and 16 (33%) were on medications prior to POP. The median 4-h contents of the gastric emptying study was 52%. Patients had a median of 2 symptoms preoperatively, the most common being nausea (83%) and emesis (77%). There was no difference in patient and preoperative factors between patients with different etiologies. The median number of symptoms at first postoperative visit was 0 with most common symptoms remaining nausea (31%) and emesis (17%). One patient had an immediate complication in the idiopathic group. Seven (15%) patients had an ED visit within 30 days and 8 (17%) patients were readmitted. Fifteen (34%) patients had recurrence of symptoms over a median of 7 months with 6 (13%) patients having another endoscopic intervention and 3 (6%) patients having surgical intervention. There were no differences in outcomes between the groups.

Conclusions: In our limited cohort, there were no differences in preoperative factors or postoperative outcomes for patients undergoing POP for different etiologies of gastroparesis. There was no difference in recurrence rate or in duration until recurrence. Patients with different etiologies of gastroparesis benefit similarly from POP.

Table. Comparison of outcomes after per oral pyloromyotomy based on gastroparesis etiology

	Total	Diabetes	Post-Surgical	Idiopathic	Other	p-value
	N=48	N=12	N=23	N=11	N=2	
Postoperative Symptoms	0 (0-1)	.5 (0-2.5)	0 (0-1)	0 (0-1)	.5 (0-1)	0.37
Immediate Complication	1 (2%)	0 (0%)	0 (0%)	1 (9%)	0 (0%)	0.27
ED Visit	7 (15%)	0 (0%)	4 (17%)	3 (27%)	0 (0%)	0.3
Readmission	8 (17%)	0 (0%)	5 (22%)	3 (27%)	0 (0%)	0.24
Overall Complication	5 (10%)	1 (8%)	2 (9%)	2 (18%)	0 (0%)	0.76
Symptom Recurrence	15 (34%)	5 (45%)	8 (40%)	1 (9%)	1 (50%)	0.19
Time (months) to Recurrence	7 (1-12)	1 (1-7)	10 (4.5-30)	1 (1-1)	11 (11-11)	0.17
Repeat Medical Intervention	6 (13%)	4 (33%)	2 (9%)	0 (0%)	0 (0%)	0.11
Repeat Endoscopic Intervention	6 (13%)	1 (8%)	4 (17%)	0 (0%)	1 (50%)	0.18
Repeat Surgical Intervention	3 (6%)	1 (8%)	1 (4%)	1 (9%)	0 (0%)	1

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Clinical Outcomes for Endoscopic Submucosal Dissections in the Elderly

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Introduction: Despite the advances in technology with minimally invasive surgery and extensive research to prevent anastomotic leaks. The risk of colonic anastomotic leak is between 2- 7% and even up to 19-24%. Colectomies are not necessary for benign polyps, however, there are times that large benign polyps are unresectable using the standard colonoscopic techniques. Endoscopic Submucosal Dissection (ESD) and Combined Endoscopic Laparoscopic Surgery (CELS) have been shown to be an effective tool to avoid colectomies. We sought to determine the safety and efficacy of ESD performed in the elderly for a single institution experience.

Methods and Procedures: We performed an IRB approved retrospective review of the ESD's performed by three board certified colorectal surgeons in a hybrid academic/ private practice colorectal surgery group. We specifically analyzed patients older than 65 who were scheduled to undergo ESD from 2016 to 2022. We collected information regarding their comorbidities, frailty score, polyp information, success rate, complication rates, mortality rates, postoperative admissions, 30-day readmissions, 30-day ER visit rates, and more.

Results: Our analysis revealed that of 122 patients; 47.5% were female, 56.5% were older than 75, (the greatest being 100 years). 30.3% of patients had a BMI > 30. There was a 69.7% success rate with 73 completed ESDs & 16 cases requiring CELS. Polyp size comparing conversion rate IS significantly different with a P-value of 0.02. Mean Size of completed 20.77 mm. Mean Size of converted 31.64 mm. 32.6% of the successful cases had a high Charleson Comorbidity Index (CCI) score (5-13). The median length of the ESD procedure was 67 (range: 28-294) minutes (min) & CELS 124 (43-300) min. Eight cases out of the 89 had pathology that came back as adenocarcinoma and subsequently required further treatment. Of those successfully completed with ESD & CELS, there were no deaths, readmissions, or ER visits. There were no differences in outcomes between those younger or greater than 75.

Conclusions(s): In our practice we have found that ESD and CELS used to remove large colon polyps not amenable to standard colonoscopic removal techniques are safe and efficacious in patients older than 65.

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Symptom Duration Does Not Affect Outcomes in Per Oral Pyloromyotomy (POP)

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Background: Per Oral Pyloromyotomy (POP) is a relatively novel technique to address gastroparesis, however little is known about the efficacy of POP for patients with long standing gastroparesis. We hypothesize that patients with long standing symptoms of gastroparesis prior to intervention will have worse outcomes to POP than patients with symptoms for a short duration.

Methods: We conducted a retrospective analysis involving patients who underwent a POP procedure at a single institution by a single surgeon over a 5-year period (2018-2023). Inclusion criteria comprised patients with documented gastroparesis diagnosis who received POP treatment at our facility. Exclusion criteria encompassed individuals lacking data pertaining to gastroparesis diagnosis, the time frame before intervention, or those with missing pre- and post-operative symptoms. Patients were categorized into cohorts based on the duration of symptoms: < 1 year, 1-3 years, 4-10 years, and > 10 years. POP failure was defined as the necessity for repeat intervention or symptom recurrence. We compared demographic, preoperative, and post-operative outcomes across these cohorts. Additionally, multivariable logistic regression was employed to investigate the relationship between symptom duration and the response to POP.

Results: During the study period, 51 patients met inclusion criteria. 18 patients had symptoms for < 1 year, 19 patients had symptoms from 1-3 years, 8 patients had symptoms from 4- 10 years, and 6 patients had symptoms > 10 years. Patient demographics such as age

at surgery, sex, BMI, Charlson-Deyo-Comorbidity-Index, or being an active smoker did not differ amongst cohorts. Pre-operative HbA1c was not significantly different amongst the cohorts (p .76). There was no significant difference in underlying cause for gastroparesis among cohorts, which included diabetes, post-surgical, and idiopathic (p .22). There was also no difference in past surgeries, which included esophagectomy, paraesophageal hernia repair, and fundoplication (p .76). Similarly, there were no significant differences in terms of symptom recurrence (p .58) and time to recurrence (p .77). Multivariable logistic regression analysis determined gastroparesis symptoms greater than a decade did not result in increased odds of symptom recurrence post-POP based on underlying cause, prior interventions, or baseline HbA1c.

Conclusions: This data suggests that longer symptom duration is not associated with increased rates of POP failure.

		< 1 year	1-3 years	4-10 years	> 10 years	p-value
		N=18	N=19	N=8	N=6	
Age	<60	10 (59%)	11 (58%)	6 (75%)	4 (67%)	0.84
	>60	7 (41%)	8 (42%)	2 (25%)	2 (33%)	
Sex	Male	12 (67%)	13 (68%)	7 (88%)	2 (33%)	0.2
	Female	6 (33%)	6 (32%)	1 (12%)	4 (67%)	
BMI	<30	13 (72%)	10 (53%)	3 (38%)	5 (83%)	0.2
	>30	5 (28%)	9 (47%)	5 (62%)	1 (17%)	
Smoker	No	14 (82%)	16 (89%)	6 (86%)	4 (67%)	0.65
	Yes	3 (18%)	2 (11%)	1 (14%)	2 (33%)	
Preop HbA1c	<5.7	4 (24%)	4 (21%)	0 (0%)	2 (33%)	0.76
	5.7- 6.4	1 (6%)	1 (5%)	1 (14%)	0 (0%)	
	>6.5	12 (71%)	14 (74%)	6 (86%)	4 (67%)	
Cause	Diabetes	3 (17%)	5 (29%)	3 (50%)	0 (0%)	0.22
	Post-surgery	11 (61%)	8 (47%)	1 (17%)	3 (50%)	
	Idiopathic	4 (22%)	4 (24%)	1 (17%)	2 (33%)	
	Other	0 (0%)	0 (0%)	1 (17%)	1 (17%)	
Past Surgery	Esophagectomy	3 (27%)	3 (38%)	0 (0%)	2 (67%)	0.76
	PEH	3 (27%)	2 (25%)	1 (100%)	0 (0%)	
	Fundoplication	4 (36%)	3 (38%)	0 (0%)	1 (33%)	
	Other	1 (9%)	0 (0%)	0 (0%)	0 (0%)	
Symptom Recurrence	No	11 (69%)	9 (56%)	6 (86%)	4 (67%)	0.58
	Yes	5 (31%)	7 (44%)	1 (14%)	2 (33%)	
Recurrence Time (months)		11.2	13	0	6.5	0.77

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Single-center Outcomes with Endoscopic Suture Fixation of Esophageal Stents

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Introduction: In the age of advanced endoscopy, esophageal stents have become a mainstay in the management of esophageal disorders including perforations, leaks, and both malignant and benign strictures. However, the dynamic nature of the esophagus often leads to stent migration, resulting in repeat interventions and potential treatment failure. Endoscopic suture fixation has recently been utilized to secure esophageal stents to the esophageal wall to reduce the risk of stent migration, yet documented migration rates remain variable. We sought to evaluate clinical outcomes of patients at our institution who underwent endoscopic suture fixation.

Methods and Procedures: All patients who underwent esophageal covered self-expandable metal stent (CSEMS) placement with endoscopic suture fixation by the Apollo Overstitch suture fixation device between January 1, 2018, and May 17, 2023 were reviewed at a single tertiary care center. Baseline patient characteristics, procedural details, and clinical outcomes were assessed. Migration rates were assessed via imaging studies and follow up endoscopy. Technical success was measured as successful stent placement without immediate migration or identified complication. Clinical success was measured via a resolution of the patient's preprocedural indication for stent placement.

Results: Our study identified 135 patients who underwent esophageal stent placement. Of those, a total of 22 patients underwent CSEMS placement with suture fixation. Indications for these stent placements included malignant strictures (54.5%, 12/22), benign strictures (27.3%, 6/22), or esophageal perforations (18.2%, 4/22). Technical success of endoscopic placement and suture fixation was 100% and clinical success was achieved in 77.3% of patients. Stent migration occurred in 36.3% of patients, 50% of which were symptomatic in the form of dysphagia or pain. There were no adverse events associated with suture fixation in our series.

Conclusion: Endoscopic suture fixation of esophageal stents has been suggested as a safe and effective method of reducing migration rates. Our series supports the notion that this procedure is safe, with no identified complications and a 100% technical success rate. Our series also demonstrates a migration rate which is lower than the documented rates for non-fixated esophageal stents in the literature, further supporting its efficacy. Our experience adds to growing support for the consideration of endoscopic suture fixation at the time of stent placement.

P349

Elevated Preoperative Lower Esophageal Sphincter Pressure Predicts Improved Clinical Outcomes After Per Oral Esophageal Myotomy

Hamza Nasir Chatha, MD; Joshua L Lyons, MD; Christina S Boutros, DO; Saher-Zahra S Khan, MD; Patrick M Wieland, MD; Jamie R Benson, MD; Iris T Levine, BS; Katz Guy, MD; Jeffrey M Marks, MD; Department of Surgery, University Hospitals Cleveland Medical Center, 11100 Euclid Avenue, Lakeside 7, Cleveland, OH, 44106, USA

Background: Although per oral esophageal myotomy (POEM) has shown to be beneficial for treating achalasia, it can be difficult to predict who will have a long-lasting response. Over time, it has been shown that high lower esophageal sphincter pressures have led to poor postoperative symptom response to prior endoscopic therapies such as botox therapy and pneumatic dilation. This study was designed to evaluate if modern preoperative manometric data could predict the degree of response to therapy after POEM.

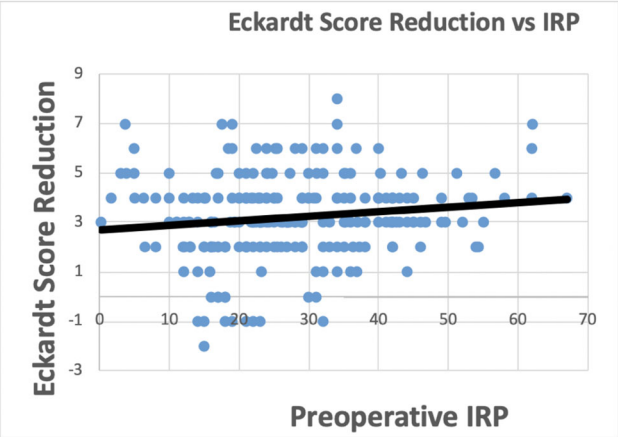
Methods: This was a retrospective study of 237 patients who underwent POEM at a single institution by a single surgeon over a period of 12 years (2011-2023) and had a high-resolution manometry performed preoperatively, and an Eckardt symptom score performed both preoperative and postoperatively. The achalasia type and integrated relaxation pressures (IRP) were tested for potential correlation with the need for further postoperative achalasia interventions and the degree of Eckardt score reduction using a linear regression model.

Results: The Achlasia type on preoperative manometry was not predictive for further postoperative interventions or degree of Eckardt score reduction ($p = 0.76$ and 0.43, respectively). A higher IRP was not predictive of the need for further postoperative interventions; however, it was predictive of a more significant reduction in postoperative Eckardt scores ($p = 0.03$), as shown by the nonzero regression slope.

Conclusion: In this study, achalasia type was not a predictive factor in the need for further interventions or the degree of symptom relief. Although IRP was not predictive of the need for additional interventions, a higher IRP did predict better symptomatic relief postoperatively. This result is opposite that of other endoscopic treatment modalities (Botox and pneumatic dilation). Therefore, patients with higher IRP on preoperative high-resolution manometry

would likely benefit from POEM, which provides significant symptomatic relief postoperatively.

Keywords: Integrated Relaxation Pressure (IRP), Achlasia, Manometry, Eckardt score, Per oral esophageal myotomy (POEM)



P350

Referral Patterns for Patients Undergoing Peroral Pyloromyotomy for Gastroparesis: A Retrospective Analysis

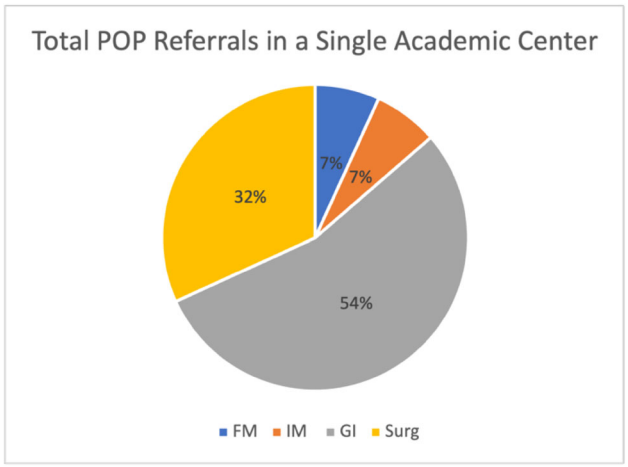
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Background: Peroral pyloromyotomy (POP) has emerged as a promising surgical intervention for refractory gastroparesis. This study aims to analyze the referral patterns for patients undergoing POP and explore the factors influencing the referral process.

Methods: We conducted a retrospective analysis of patients who underwent POP for gastroparesis at our institution between 2018—2023. Data were collected on patient demographics, symptom duration, previous treatments, and referral source. Patients were grouped by referral provider: Family Medicine (FM), Internal Medicine (IM), Gastroenterology (GI), and Surgery. Univariate analysis was performed to assess differences in patient characteristics based on referral provider.

Results: In total, there was 51 patients who underwent POP during our study period, 43 of which had referral information available. Across all four groups, there was no statistically significant difference between patient demographics, symptom duration, number of prior interventions, previous surgery, indication for POP, and symptom recurrence after POP. There were 54% of patients that were referred for POP from GI, 32% referred from another surgeon, 7% referred from FM, and 7% referred from IM (Fig. 1). Referral trends across the study period demonstrate significantly more referrals from GI and other surgeons.

Conclusion: Our study highlights the underutilization of referral for POP by primary care providers. Understanding the factors that influence referrals is essential to optimize patient outcomes. Identifying key variables associated with successful referrals can aid in early intervention and improve the timeliness of POP procedures for eligible patients. Further research is warranted to enhance our understanding of these referral dynamics and improve the overall management of gastroparesis.



P351

Comparison of Preoperative and Post Peroral Pyloromyotomy Symptoms Based on Severity of Preoperative Gastric Emptying Study

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Introduction: Gastroparesis can be a challenging disease to treat for patients and providers alike and peroral pyloromyotomy (POP) has been shown to be an effective method of treatment. This study sought to investigate the role of preprocedural gastric emptying study in predicting recurrence of symptoms after POP.

Methods: We conducted a retrospective review of 34 patients that underwent POP at a single academic institution by a single surgeon between 2018 and 2023. Patients were excluded from analysis if they did not have gastric emptying studies prior to POP or if there was no follow up after POP. Positive delayed gastric emptying is defined as $> 10\%$ retained tracer at 4 h. The positive results were divided into Grade 1 (mild): 11-20% retention at 4 h, Grade 2 (moderate): 21-35% retention at 4 h, Grade 3 (severe): 36-50% retention at 4 h, Grade 4 (very severe): $> 50\%$ retention at 4 h. Wilcoxon rank sum test for medians (with IQRs) and chi squared test with categorical/binary variables were used to assess post-POP symptom relief in our cohorts.

Results: A total of 34 patients were included in the final analysis of which 2 (5.4%) had Grade 1 delayed gastric emptying, 8 (23.5%) had Grade 2 delayed gastric emptying, 6 (17.6%) had Grade 3 delayed gastric emptying, and 21 (61.8%) had Grade 4 gastric emptying. Median age was 57 and BMI was 28.8. Between all cohorts, there was no statistically significant difference in preoperative, 1-month postoperative, and 6-month postoperative dysphagia, chest pain, GERD, inability to finish meals, fullness after eating, nausea, retching, emesis, bloating, weight loss, hematemesis, and odynophagia. There was a statistically significant difference in preoperative bloating ($p < 0.005$) between groups.

Conclusions: There was no significant difference between the severity of the delayed gastric emptying study and 1- and 6-month postoperative symptoms. All severities of delayed gastric emptying similarly respond to POP. This suggests that even those patients with severe, Grade 4 gastroparesis will still benefit from POP. Future study is needed amongst larger cohorts.

P352

Esophageal Length and Length to Patient Height Ratio Do Not Predict Symptom Reduction After POEM in Patients with Achalasia

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Background: Achalasia, characterized by the impairment of the lower esophageal sphincter function, is a debilitating esophageal motility disorder. Over time, achalasia patients often experience the development of esophageal elongation and tortuosity due to persistent obstruction at the lower esophageal sphincter (LES). The Per Oral Endoscopic Myotomy (POEM) procedure has emerged as a promising treatment option; however, factors influencing symptom resolution remain poorly understood. This study investigates whether esophageal length, a surrogate for disease duration and esophageal morphology, correlates with symptom reduction post-POEM. Additionally, we explore the potential significance of the ratio between esophageal length and patient height as an indicator of abnormal esophageal elongation as an indicator for symptom reduction post-POEM.
Methods: A retrospective analysis was conducted using the comprehensive POEM database, including 223 achalasia patients who underwent the procedure between 2011 and 2023. Patient records encompassed demographic information, pre-operative Eckardt Symptom Score, intraoperative esophageal length measurements, and post-operative Eckardt Symptom Score obtained during follow-up visits. Pearson correlation coefficients were employed to assess relationships between esophageal length and symptom reduction, as well as the ratio of esophageal length to patient height and symptom reduction.
Results: Our analysis revealed no significant correlation between esophageal length and symptom reduction post-POEM procedure (Pearson correlation coefficient = 0.101, p = 0.134). Furthermore, no statistically significant correlation was found between the ratio of esophageal length to patient height and symptom reduction (Pearson correlation coefficient = 0.041, p = 0.544).
Conclusion: This database analysis highlights that esophageal length, even when considered as a surrogate for the duration of illness and abnormal esophageal morphology, does not serve as a reliable predictor of symptom resolution post-POEM. These findings underscore the need for further research to identify more robust prognostic factors for the management of achalasia through the POEM procedure.

P353

Splenic Hematoma Following Colonoscopy in a Patient with a Remote History of the Same

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Introduction: We present a 68-year-old female who developed a subcapsular splenic hematoma following colonoscopy that was successfully managed conservatively. Interestingly, she sustained a similar splenic injury after a colonoscopy 14 years prior. More than one occurrence of colonoscopy-related splenic injury in a single patient has not been documented to our knowledge.
Case Description: A 68-year-old female presented twenty-four hours after an unremarkable screening colonoscopy complaining of left upper quadrant abdominal pain. Her medical history was significant for hypertension and a previous colonoscopy-related grade 2 splenic injury 14 years prior. Her previous splenic injury was managed conservatively, and she had undergone two unremarkable screening colonoscopies since that time. The two colonoscopies that resulted in splenic injury were performed by different endoscopists. Her recent procedure was notable for moderate looping that required external left lower abdominal pressure to intubate the cecum.
On presentation, her vital signs were within normal limits, and she was mildly tender in the left upper abdomen. Her initial hemoglobin was 12 g/dL and computed tomography revealed a grade 2 subcapsular splenic hematoma involving 40% of the splenic surface area. She was admitted for observation, monitored continuously, and her complete blood count was obtained every six hours. Her vital signs and hemoglobin remained unchanged while in the hospital and she was discharged the following day.
Discussion: The benefits of colonoscopy for cancer screening purposes outweigh the potential risks, with colonoscopy-related complications occurring in 2.01 per 1,000 exams. The rate of splenic injury following colonoscopy ranges from 0.20 to 0.34 per 10,000 procedures. This rare complication carries a 10% mortality rate.
Splenic injuries include subcapsular hematomas, laceration, and rupture. Subcapsular hematomas make up 63% of splenic injuries following colonoscopy. Abdominal pain is present in 87% of patients and 79% present within 24 h. While this patient's presentation was classic, her history makes this an interesting case. She was diagnosed with grade 2 splenic injury following a colonoscopy 14 years prior. Most traumatic splenic injuries show complete radiographic resolution at 6 weeks. We present a patient who has been diagnosed with this rare complication after two separate screening colonoscopies performed by different endoscopist.
Conclusion: Splenic injury is a rare but serious complication after colonoscopy. To our knowledge, this is the first report of recurrent splenic injury following screening colonoscopy.
Figure 1 Following recent colonoscopy.

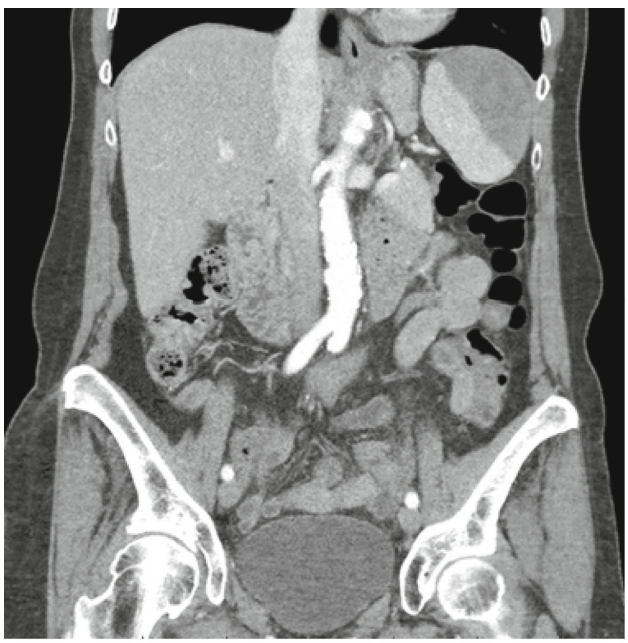
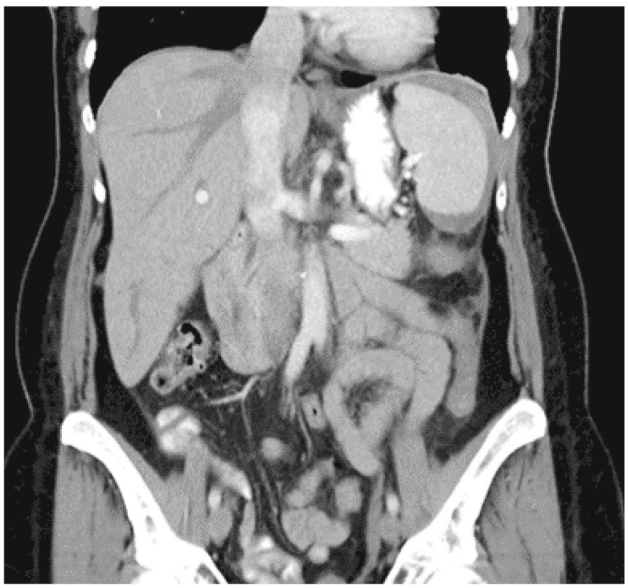


Fig 1. Following recent colonoscopy.

Figure 2 Following colonoscopy fourteen years prior.

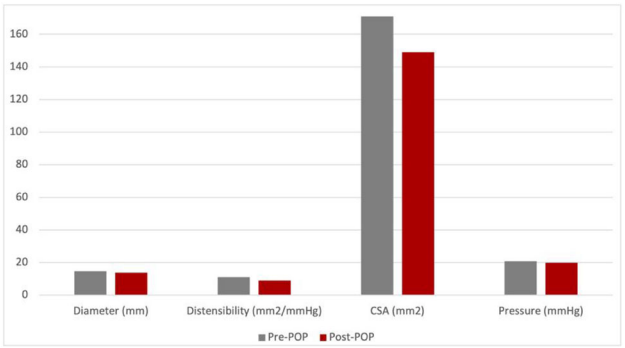


P354

Associations Between EndoFLIP Measurements and Success of Per Oral Pyloromyotomy for Gastroparesis

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Introduction: The objective of this study is to evaluate associations between changes in EndoFLIP measurements and changes in gastroparesis symptoms after endoscopic pyloromyotomy in a single-institution pilot study. Per oral pyloromyotomy (POP) is considered the first-line treatment for gastroparesis. EndoFLIP impedance planimetry system can be used to measure pyloric characteristics before and after POP, but it is unknown how changes in EndoFLIP measurements, specifically distensibility, diameter, cross-sectional area (CSA), and pressure, correlate with postoperative changes in gastroparesis symptoms, as measured by Gastroparesis Cardinal Symptom Index (GCSI) scores.
Methods and Procedures: Adult patients with gastroparesis who underwent POP between 2020-2023 were identified using our institution's foregut surgery database. Patients with both preoperative and postoperative GCSI scores were included. Preoperative GCSI scores were obtained prior to surgery. Postoperative GCSI scores were obtained at least three months after surgery. A decrease in GCSI score greater or equal to one was considered success after POP. EndoFLIP measurements were taken intraoperatively before and after POP and measured at 40 mL balloon filling. Spearman correlation coefficients were used to examine relationships between changes in GCSI and EndoFLIP measurements.
Results: We included 7 patients with gastroparesis who underwent POP in the study cohort. The median age was 58 years, and 6 patients (85.7%) were female. The most common etiology of gastroparesis was secondary to any prior foregut surgery (42.9%). The median follow-up time was 352 days (minimum 98 days; maximum 652 days). Median preoperative and postoperative GCSI scores were 3.4 (IQR 1.7) and 1.2 (IQR 1.4), respectively, corresponding to a median decrease of 2.6 (IQR 2.2). 6 out of 7 patients had a postoperative GCSI change greater than 1. Post-POP diameter, distensibility, and CSA decreased by 0.8 mm, 0.5 mm2/mmHg, and 9.0 mm2, respectively, while post-POP pressure increased by 2.0 mmHg (Fig. 1). In this limited series of patients, there were no associations between GCSI score changes and changes in EndoFLIP parameters.
Conclusions: In this single-institution pilot study, we did not find any associations between changes in EndoFLIP parameters and gastroparesis symptoms after POP. Further studies are indicated to identify the utility of EndoFLIP in per oral pyloromyotomy.
Figure 1 Median Pre- and Post-POP EndoFLIP Parameters



P355

Post-COVID 19 Achalasia: A New Etiology

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Achalasia is an esophageal motility disorder characterized by loss of myenteric plexus neurons in the distal esophagus and lower esophageal sphincter (LES). The etiology of achalasia is often unclear; however, viral immune response is a suspected inciting factor. This case presents a patient with acute-onset achalasia after COVID-19 infection. Within the context of COVID-19 infection, nearly 50% of patients present with gastrointestinal symptoms, however, achalasia remains an atypical presentation.
Introduction: Achalasia is an esophageal motility disorder characterized by loss of myenteric plexus neurons in the distal esophagus. The pathophysiology is driven by inflammation and degeneration of inhibitory neurons in the esophageal wall, leading to aperistalsis and failure of LES relaxation. Most patients have primary, or idiopathic, achalasia. A subset of patients develop secondary achalasia related to viral infection or esophageal carcinoma. A new correlation between COVID-19 and achalasia has been described in recent case reports.
Case Presentation: A 45-year-old male with no additional risk factors or prior history of dysphagia presented with COVID-19 infection and persistent dysphagia for one year that failed to resolve. Esophageal manometry revealed an LES pressure of 41 mmHg and peristalsis of 0 at the lower esophageal body. He underwent a robot-assisted Heller myotomy with Dor fundoplication. He recovered appropriately without postoperative complications.
Discussion: The prevalence of achalasia is 10 cases per 100,000 and incidence is 1 new case per 100,000. Patients present with dysphagia and regurgitation, and esophageal manometry reveals lack of peristalsis at the lower esophagus body and elevated LES pressure. Prior studies have described the SARS-COV-2 virus entering host cells via the angiotensin-converting enzyme 2 (ACE2) receptor, causing a cytokine inflammatory response. ACE2 receptors are found on various cell types including oral, nasal, pulmonary, renal, enterocytes and therefore, COVID-19 manifests within multiple organ systems, with

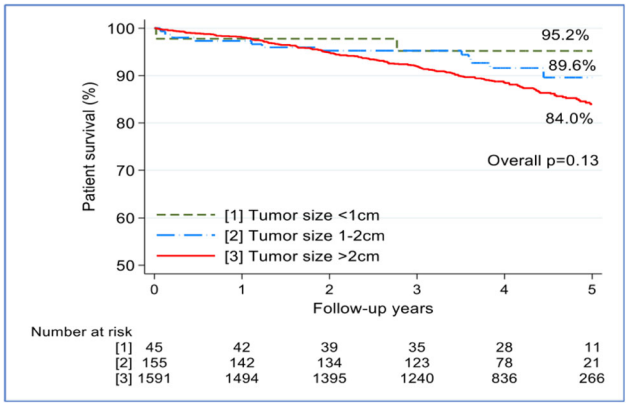
gastrointestinal symptoms being the most common. This response leads to gradual degradation of ganglion cells as a likely mechanism for post-COVID achalasia. A higher incidence of achalasia is reported in 2020-2021 compared to prior years, with up to 66% of newly diagnosed patients reporting prior COVID-19 infection.
Conclusion: This case provides a unique etiology for degeneration of ganglion cells in the lower esophageal sphincter precipitating acute-onset achalasia. The increased incidence of achalasia in the years following the COVID-19 pandemic should be further evaluated. This case adds to the growing body of evidence supporting COVID-19 as an inciting etiology of acute-onset achalasia.

P356

Prognosis of Resected Small Gastrointestinal Stromal Tumors

Rebecca E Wu, MD; Duc T Nguyen, MD, PhD; Edward Y Chan, MD; Ray Chihara, MD, PhD; Edward A Graviss, PhD, MPH, FIDSA; Min P Kim, MD; Houston Methodist Hospital

Background: Gastrointestinal stromal tumors (GIST) are mesenchymal tumors arising from interstitial cells of Cajal. Surgical resection is recommended for tumors > 5 cm or > 2 cm with high-risk features. At times during benign foregut surgery, < 2 cm GIST are encountered and resected. Current guidelines suggest small GIST can be monitored with surveillance. We aim to discover the prognosis of patients with resected small GIST (< 2 cm) and the benefit of resection.
Methods: A retrospective cohort analysis of all patients in the National Cancer Database with GIST tumors of the stomach from 2004 to 2020 was performed. Multivariable and Cox proportionate hazard modeling were utilized to determine the contribution of variables to patient mortality.
Results: 1,791 patients were included in the analysis. Few patients had < 1 cm tumors (2.5%, n = 45) and 1-2 cm tumors (8.6%, n = 155). Most of the patients with < 1 cm and 1-2 cm tumors had pathologic stage I cancer (97.8% and 94.8%, respectively), which was significantly different compared to patients with > 2 cm tumors (64.2%, $p < 0.001$). The Kaplan-Meier five-year survival was 95% for < 1 cm tumors, 89.6% for 1-2 cm tumors, and 84% for > 2 cm tumors; however, this was not statistically significant (p = 0.13). On multivariable analysis, mortality was associated with older age (HR 1.03, 95% CI 1.01, 1.05, $p < 0.001$), non-white race (HR 1.38, 95% CI 1.03, 1.85, p = 0.03), higher Carlson-Deyo Score (HR 2.48, 95% CI 1.77, 3.48, $p < 0.001$), positive margin (HR 1.68, 95% CI 1.07, 2.62, p = 0.02), or unknown margin status (HR 2.45, 95% CI 1.13, 5.28, p = 0.02).
Discussion: Small GIST are typically discovered at early pathologic stages and are associated with an overall good prognosis. However, there was no significant difference in overall survival of resected small GIST compared to patients with larger resected GIST. Patients with small, resected GIST tumors, especially those with high mortality risk factors, should continue to undergo surveillance.



P358

Optimizing Outcomes in Paraesophageal Hernia Repair: A Novel Critical View

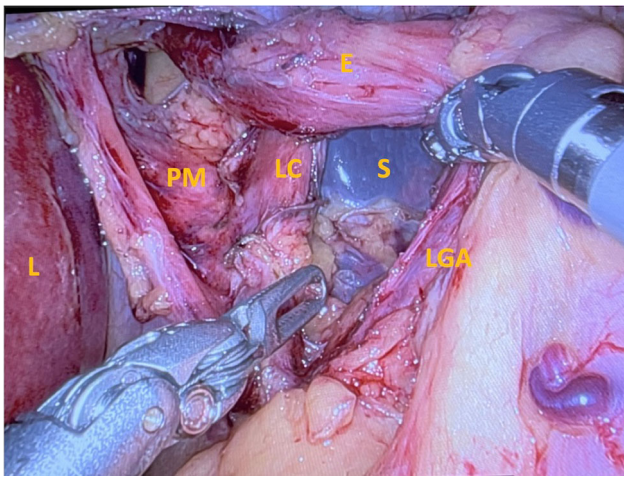
Zena Saleh, MD[1]; Vincent Verchio, MD[1]; Hansa Joshi, MD[1]; Yazid Ghanem, MD[1]; Mathew C Moccia, MD[1]; Austin M Lenart, BA[1]; Dominick M Scalia, BA[2]; Zachary A Ladd, BS[2]; Armaun D Rouhi, BA[3]; David D Shersher, MD, FACS[1]; [1]Department of Surgery, Cooper University Hospital; [2]Cooper Medical School of Rowan University; [3]Department of Surgery, Perelman School of Medicine, University of Pennsylvania

Introduction: The recurrence rate following paraesophageal hernia repair is high with reported rates of recurrence varying between 25 and 42%. We present a novel approach that relies on visualization of a critical view during paraesophageal hernia repair. Our study hypothesizes implementation of this critical view reduces recurrence and reoperation rates in paraesophageal hernia repair.
Methods and Procedures: This is an IRB approved retrospective cohort study performed at an academic tertiary center between 2015 and 2023 that evaluates operative outcomes of patients who underwent paraesophageal hernia repair using the critical view in comparison to patients who underwent standard repair. The critical view is described as full dissection of the posterior mediastinum, visualization of the left crus, left gastric artery, and distal esophagus while the spleen is in view in the background (see Fig. 1). Differences in baseline characteristics in each cohort were adjusted using entropy balancing. Multivariable logistic and linear regressions were used to evaluate the association between application of critical view and hernia recurrence, post operative complications, and reoperation.
Results: 184 patients met inclusion criteria of whom 96 patients underwent hernia repair using the critical view and 88 patients underwent standard hernia repair. Most commonly presented hernia type included type 3 paraesophageal hernias (39.3%) followed by type 1 (30.1%), type 4 (9.8%), and type 2 (2.7%). 53% of repairs were robotic, 34.2% laparoscopic, and 12.5% consisted of open repairs.

75% of cases consisted of a Dor, 22% included Nissen, and 6% included Belsey fundoplication. Postoperative complications (bleeding, pneumothorax, pneumonia, stricture, persistent dysphagia) were lower in patients with critical view utilization than patients with standard repair (10.4% vs 22.7%, p = .026). Patients who underwent repair with critical view had significantly lower hernia recurrence rates than patients who underwent standard repair (11.6% vs 22.7%, p = .045), even with greater outpatient followup duration (210 days vs 14 days, p < .001) and with risk adjusted scoring (AOR .37, p = .044). Reoperation rates in the patients with critical view were significantly lower than patients with standard repair (1% vs 10.2%, p = .006). Patients who underwent repair with a critical view had higher cessation ratesof antacid therapy postoperatively (37.5% vs 18.2%, p = .004).

Conclusion: We present a novel critical view technique that has resulted in favorable postoperative outcomes including a reduction in recurrence and reoperation in paraesophageal hernia repairs.

Figure 1 PM (Posterior Mediastinum), LC (Left Crus), E (Esophagus), S (Spleen), LGA (Left Gastric Artery)



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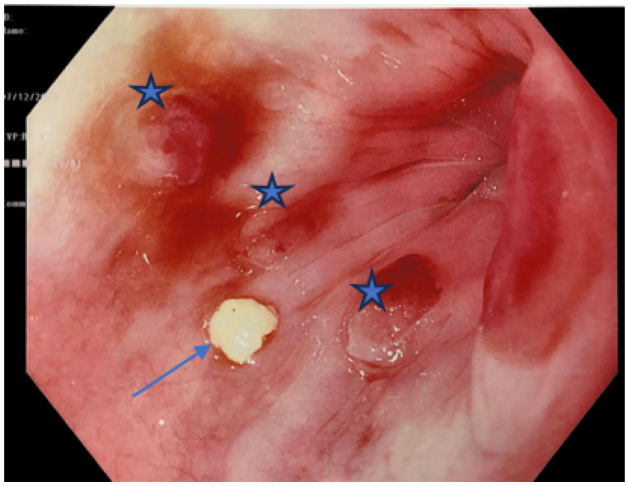
The Missing LINX: Case Report and Novel Grading System for the Management of Dysphagia in Patients with a LINX Device

Michael Shockley, MD[1]; Eliza Williamson[2]; Jonathan de Vries[2]; Luis Serrano, MD[1]; [1]UCF/HCA GME Consortium of Greater Orlando; [2]UCF College of Medicine

Introduction: Gastroesophageal reflux disease (GERD) is widely prevalent. Medical management has reduced the need for surgical intervention; however, surgery remains an option in medically refractory disease or those that have anatomic/mechanical components to their reflux disease. Fundoplication has been the surgical mainstay of augmenting the esophagogastric junction in recent years, but magnetic sphincter augmentation (MSA) using the LINX device is a surgical treatment option for GERD. Reconstruction using MSA is a balance between reflux prevention and development of dysphagia. LINX-related dysphagia is a common cause of morbidity as well as need for removal.

Presentation of Case: This case is a 77-year old female who elected to undergo removal of her LINX device due to recurrent, life-altering dysphagia. Endoscopy revealed distal esophageal narrowing with circumferential mucosal changes concerning for impending erosion of the LINX device (Image 1). The device was removed in a laparoscopic robotic-assisted fashion without intra- or postoperative complications. The hospital stay was one day consisting of an upper GI series with no esophageal leak or narrowing and tolerance of liquid diet. In subsequent follow-up, the patient endorsed relief of symptoms.

Image 1 Endoscopic Image. Mucosal changes associated with LINX beads (stars). Retained food consistent with distal esophageal narrowing (arrow)



Discussion: Dysphagia after LINX implantation is a common complication with erosion through the esophagus as the most feared complication. There are no clear guidelines for diagnosis, risk stratification, and treatment regarding LINX-related dysphagia. Guidelines to facilitate management of this clinical entity would prove beneficial to both physician and patients. We propose a classification and grading system with treatment guidelines based on previous evidence and review of current literature (Fig. 1).

Figure 1 Proposed LINX-related Dysphagia Classification and Treatment Guidelines.

Grade	Description	Findings	Treatment
I	Dysphagia without other concerning findings	None on upper gastrointestinal series, cross sectional imaging, or endoscopy	Conservative Lifestyle modification
II	Dysphagia with radiographic or endoscopic evidence of narrowing	Distal esophageal or esophagogastric junction narrowing/stenosis on upper gastrointestinal series, cross sectional imaging, or endoscopy	Pneumatic balloon dilation Serial imaging/endoscopy
III	Dysphagia with impending ulceration	Above and mucosal changes on upper endoscopy	Elective to urgent LINX device removal
IV	Ulceration or Perforation of LINX device	Esophageal perforation on upper gastrointestinal series or cross sectional imaging Visualization of metallic bead during upper endoscopy	Emergent LINX device removal and abdominal exploration

Conclusion: Dysphagia following LINX placement is a common postoperative complication. Management of these patients can be more complex than classical dysphagia, and there are not clear guidelines for diagnosis and treatment. We propose a LINX-related dysphagia classification and treatment guideline to assist in managing this disease process.

P360

Robotic vs. Laparoscopic Hiatal Hernia Repair: A Year in Review

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Introduction: Hiatal hernias (HH) have long been repaired laparoscopically with excellent outcomes. In recent years, robotic HH repair has increased in popularity. Studies have not demonstrated a clear benefit of one approach over the other. Our study compares post-operative symptom resolution following laparoscopic (LHR) and robotic (RHR) repair at a single quaternary academic center over one year. Secondary outcomes include peri-operative complications, operative time, hospital length of stay (LOS), recurrence, and re-admission.

Methods: Following IRB approval, we performed a retrospective review of patients who underwent LHR or RHR from January 1, 2022 to December 31, 2022. Inclusion criteria included patients with symptomatic HH. Patients younger than 18, emergent repair, and recurrent repair were excluded. 101 patients met criteria, 59 with LHR and 42 with RHR. 51 patients had a type 1 HH, 45 had a type 3 paraesophageal hernia (PEH), and 1 had a type 4 PEH. Post-op symptoms were obtained via a 14-point questionnaire at patients' 2-week follow-up visit. Outcomes were entered into a generalized linear model.

Results: After controlling for several factors, minimally invasive surgery modality did not significantly affect outcome. However, lower post-op symptom count, decreased operative time, and LOS, trended towards significance in favor of the RHR group.

Outcomes	LHR (mean)	RHR (mean)	OR [95% CI]	*p*
LOS	1.43 ± .97	1.21 ± .61	2.22 [.98–6.17]	0.096
Post-op symptom count	0.847 ± 1.01	0.64 ± 0.85	0.57 [0.28–1.02]	0.083
Procedure length (min)	121 ± 62.1	103 ± 36.5	0.99 [.09 + 1.00]	0.092

Outcomes	LHR	RHR	OR [95% CI]	*p*
30-day readmission	1.7%	5%	3.74 [0.20–104.5]	0.365
Intra-op complication	7.2%	2.3%	0.16 [0.01–1.55]	0.168
Post-op complication	3.5%	5%	1.29 [0.09–19.53]	0.847
HH recurrence	5.3%	2.4%	0.09 [0.00–1.36]	0.120

Conclusions: No significant statistical difference was found between laparoscopic and robotic HH repair at this institution. Self-reported post-op symptom improvement, decreased operative time, and shorter hospital LOS trended toward favoring robotics without reaching statistical significance. This supports use of both minimally invasive platforms as preferred by the operating surgeon.

P361

Collis Gastroplasty with Nissen Fundoplication as a Surgical Option for a Recurrent Large Paraesophageal Hernia

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Re-operative paraesophageal hernias provide a wide breadth of conundrums for surgeons, one of which is a short esophagus. Although the management of short esophagus may be controversial, an individual patient's anatomy may dictate management. With paraesophageal hernias recurrence rates ranging as high as 40-60%, it is important for surgeons to have a comprehensive armamentarium. Our case involves the robotic repair of a previously operated paraesophageal hernia, which required a Collis gastroplasty to obtain a tension-free repair while simultaneously evading higher mediastinal dissection that could have been detrimental to the patient. We detail a rarely reported operative approach to a recurrent large paraesophageal hernia that can be beneficial in select patients.

P362

The Surgical Cases of Esophageal Squamous Cell Carcinoma and Adenocarcinoma in Shanxi Changzhi Hospital in China: Demographics, Tumor Characteristics and Surgical Care

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Background: Esophageal squamous cell carcinoma (ESCC) and Adenocarcinoma (EAC) are the two most common histological types of esophageal cancer (EC) worldwide. Risk factors, tumor locations, and surgeries vary between EAC and ESCC. Geographically, Shanxi Changzhi in mid-north China has a substantially high EC incidence, yet limited patient data were reported given underdevelopment. This research aims to investigate the patient demographics and surgical care of EAC and ESCC in a regional Shanxi Changzhi hospital.

Method: Patient charts, surgical notes, and pathology reports were extracted from May to July 2023 for hospitalized EC patients. Patient age, gender, diagnoses, pathology, surgical treatment, and length of stay (LoS) were recorded. A random sample of surgical cases in July was observed to validate the surgical operation notes.

Results: A total of 35 ESCC and 83 EAC patients were admitted to surgical units of the hospital in the 3-month timeframe. All 83 (100%) EAC patients were admitted in Gastrology, 33 (94.3%) ESCC patients in Thoracic, and 2 (5.7%) in Gastrology. EAC has higher occurrences in males than ESCC (75.9% vs. 60.0%). Although median and mean ages were similar (EAC: median age = 66 and mean age = 65.98.2; ESCC: median age = 68 and mean age = 67.47.89), EAC patients have a higher proportion of young age groups (EAC: 20.48% in age $> 40 < 60$; ESCC: 11.43% in age $> 40 < 60$). Tumor locations were at esophagogastric junction in 81 (97.6%) of the EAC patients, in esophageal in 33 (94.3%) ESCC patients, and at esophagogastric junction of the 2 (5.7%) ESCC patients admitted to Gastrology. Among patients with confirmed TNM staging, the majority of them were in T3 or T4 stages with M0. Surgical care for ESCC patients admitted to Thoracic included chemotherapy infusion, thoracoscopic three-incision esophagectomy, or combined thoraco-laparoscopic three-incision radical esophagectomy; none of the 33 patients underwent open thoracic surgery. For EAC and ESCC patients admitted to Gastrology, surgical care included chemo- or other therapy infusion, laparoscopic radical proximal or total gastrectomy, or open radical proximal or total gastrectomy. Hospital LoS was associated with the type of surgical care.

Conclusion: EAC was disproportionately higher in males and younger age groups than ESCC in Shanxi Changzhi. Different tumor locations of ESCC and EAC resulted in different department admissions and different surgical care. The research sheds light on separating ESCC and EAC in EC reporting, calling for further patient surveys investigating lifestyle risk factors and coordination of care for EAC and ESCC patients in the region.

P363

Splenic Sparing Surgical Approach to Benign Splenic Cysts: Case Report and Review of Literature

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Introduction: Nonparasitic splenic cysts (NPSC) are rare benign lesions of the spleen often with unknown etiology. NPSC may be true cysts or pseudocysts that may develop after a traumatic event. No treatment guidelines exist for the management of NPSC and many variations of minimally invasive techniques have been reported to preserve the spleen. Techniques include partial splenectomy, cyst fenestration, cyst deroofing, marsupialization, and partial or total cystectomy.
Case Presentation: We present the case of a 36-year-old healthy male who presented with symptoms of abdominal fullness and flank discomfort. The patient had CT findings of an upper pole NPSC with magistral splenic arterial anatomy. The patient underwent an uncomplicated laparoscopic spleen preserving total cystectomy. The patient was discharged 48 h later and followed up at 6 weeks with no evidence of intraoperative or acute postoperative complications.
Systematic Review: A literature review was performed using PubMed, Ovid Embase, Web of Science and Mbase. Search criteria included English language studies published from 2000 to 2022, describing laparoscopic management of NPSC for human patients greater than 19 years of age. Search terms included laparoscopy, spleen, splenic, and cyst(s). Studies were screened to identify papers that described laparoscopic unroofing/ deroofing /partial cystectomy/ decapsulation/ marsupialization or fenestration of NPSC. We excluded those studies that described parasitic cysts, cysts in pregnant patients, acute traumatic injuries, open procedures, and total splenectomy. We screened 2567 studies and 327 of those were duplications. 124 underwent full-text assessment for eligibility. Of these we excluded 102 studies. Of the twenty-two included studies, there were twenty-eight cases described using minimally invasive spleen preserving surgery (SPS) techniques. Twenty-six cases were completed successfully with no intraoperative complication, two required conversion to open due to bleeding. The surgeon's ability to perform SPS was dependent on the cyst size, the peripheral location of the cyst in the splenic parenchyma and the vascular arterial pattern of the spleen.
Conclusion: Minimally invasive SPS techniques are a viable approach to management of benign uncomplicated NPSC. SPS approaches have the advantage of preserving splenic immune function and mitigating patient morbidity. Guidelines for the management of NPSC should be explored.

P364

Investigating Genetic Variants in Esophageal Carcinoma using Massively Parallel (Next-Generation) Sequencing Methods

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Introduction: Esophageal cancers ranks amongst top-ten malignancies across the globe and its incidence is persistently rising in Pakistan. Data regarding genetic variants in esophageal malignancies in Pakistani population are scarce. In this study we aimed to perform Whole Exome Sequencing on esophageal cancer samples from Pakistani patients using massively parallel sequencing to identify genomic landscape of esophageal cancer patients in Pakistan.
Methods & Procedures: Consecutive patients (n = 31) with biopsy-proven esophageal cancer who were chemo/radio-therapy naive were recruited in the study. After IRB approval, samples were obtained from patients' tumor that had been biopsied or surgically removed. Specimens were fixed in 10% buffered-formalin as well as were snap-frozen for subsequent DNA extraction and NGS studies. DNA was extracted using DNA extraction kit and quantified using a NanoDrop as well as Qubit. Extracted DNA was subjected to Whole Exome Sequencing using NGS platform. For NGS, captured library construction was undertaken using Sure Select Target enrichment workflow utilizing ultra-long biotinylated cRNA baits. Illumina platform was used for bridged amplification/sequencing-by-synthesis approach. Data were processed using established pipeline. Breifly, FASTQ files were QC-ied followed by alignment, removal of duplicates, variant calling, variant filtration and annotation.
Results: Of the 31 recruited patients, 13 were males and 18 were females. Mean age of our patients was 49.3 years. WES was performed on 10 tumour samples. Of these, 9 were squamous cell carcinoma and 1 was adenocarcinoma. Q20/Q30 scores for each sample was $> 90\%$. A range of genetic variants were detected in our samples including SNPs and Indels. Most frequently observed SNPs were synonymous, followed by missense, stop gain and stop lost. Amongs the Indels, most frequently observed was frameshift, followed by inframe insertion and inframe deletion. For all the samples, $> 85\%$ variants were found in the dbSNP151. Identified genetic variants were analyzed for their pathogenicity and actionability. Amongst detected variants, EGFR amplification was observed in 80% of the samples. Moreover, TP53 variants including c.844C > T (missense), c.524G > A (missense), c.451C > A (missense), c.464C > A, c.341 T > A (stop gained), c.773A > C (missense) and c.723delC (frameshift) were observed. MET low confidence deletion was also observed in some of the samples.
Conclusion: To the best of our knowledge, it is the first report detailing WES, NGS based, on esophageal cancer samples from Pakistan. Extended to larger horizons, data generated from this study hold potential for identifying actionable variants of diagnostic, prognostic and therapeutic potential for esophageal cancer patients in Pakistan

P365

Watchful Waiting After Definitive Radiochemotherapy in Patients with Esophageal Cancer: Independent Predictors for Recurrence

Sarah Gerber; Tobias Haltmeier; Hossein Hemmatazad; Martin Berger; Daniel Candinas; Yves Borbély; University Hospital Inselspital

Introduction: Esophageal Cancer (EC) treatment consists of neoadjuvant radiochemotherapy (RCT) followed by resection. However, esophagectomy is associated with considerable morbidity in patients already burdened with comorbidities, malnutrition, and unhealthy lifestyle.
In this context, a watch and wait (WW) strategy has gained importance in patients with complete response to RCT and was adopted by our center a decade ago. However, there are no early indicators for success or failure of such a therapeutic strategy. The aim of this study was to investigate independent predictors for recurrence in patients with EC undergoing WW.
Methods and Procedures: We retrospectively analyzed data of all patients with potentially curable EC and complete response to RCT from 01/2014–12/2020 at a tertiary university hospital. Patients underwent staging (computed tomography (CT), upper endoscopy with ultrasound and biopsies (EUS), and positron-emission tomography (PET)), followed by RCT with restaging six weeks after completion. Routine follow-up consisted of EUS every three and CT every six months. Clinical data were extracted from electronic medical records. Factors associated with recurrence were adjusted for patient-and tumor-characteristics in multivariate regression analysis.
Results: A total of 42 patients were included. Of these, 24 (57%) had cancer recurrence. Tumor type was squamous cell carcinoma in 25 (60%), and adenocarcinoma in 17 (40%), respectively. T3-stage was most frequent (n = 26, 65%), 35 (88%) patients were nodal-positive. Mean age was 67 years (SD 8.8), 32 (76%) patients were male. Recurrence occurred after a mean of 402 days (SD 169). Multivariate analysis revealed a circumferential tumor extent $> 50\%$ in staging ($p = 0.026$), fatigue and detoriation of general condition at restaging ($p = 0.021$ resectively $p = 0.029$) as independent risk factors for recurrence.
Conclusion: The current study revealed initiial tumor extent and reduced general condition as independent risk factors for recurrence. These predictors may help in the early identification of patients with EC recurrence, thus contributing to a personalized follow-up.

P366

Esophagectomy After Previous Pancreatic Surgery—Approaches and Challenges

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Introduction: Esophagectomy (EE) is the mainstay of curative cancer treatment in esophageal cancer (EC). After resection, continuity is usually restored by gastric pull-up. However, previous abdominal procedures may jeopardize the use of stomach as a conduit.
Currently, data on EE after pancreatic resection is sparse. We demonstrate possible techniques and pitfalls for EE in patients with a history of such resections.
Methods and Procedures:
We present two cases:

A 65-year-old male patient underwent left pancreatic resection with splenectomy for adenocarcinoma of the pancreatic tail 11 years prior to diagnosis of a distal EC. Endoscopic submucosal dissection for T1a -adenocarcinoma was performed but revealed positive resection margins. Mesenteric angiography ruled out an injury to the gastroepiploic arcade. McKeown-EE with gastric conduit was performed. After an uneventful stay, the patient was discharged on the 15th postoperative day.

A 61-year-old man underwent postpyloric duodenopancreatectomy (with routine dissection of the gastroepiploic arcade) for an intraductal papillary mucinous neoplasia in the pancreatic head 5 years before diagnosis of a distal EC. He underwent neoadjuvant radiochemotherapy and McKeown-EE with colonic interposition with colo-gastrostomy. The patient was discharged after a prolonged recovery time and a difficult return to solid foods on postoperative day 45.
Results: Adhesions, altered anatomy and changes in the blood supply following major abdominal surgery can complicate EE. Division of the gastroepiploic arcade, as routinely performed during pancreatic surgery, prohibits the use of stomach as conduit. Preoperative angiography and colonoscopy are mandatory to evaluate alternative conduits. Functional aspects such as diabetes, gastroparesis or malassimilation after pancreatic surgery places patients at further risk for complications.
Conclusion: Esophagectomy for EC in patients after pancreatic surgery is challenging, but feasible. Consequences of previous abdominal surgery may complicate EE and the peri- and postoperative course. Adequate patient selection with preoperative preparation is mandatory.

P367

Does Frailty Predict Worse Outcomes in Elderly Paraesophageal Hernia Repair Patients?

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Introduction: Frailty, a reflection of a patient's physiologic reserve, has been associated with worse surgical outcomes in the elderly. We hypothesized that frail, elderly, patients undergoing laparoscopic paraesophageal hernia surgery would have worse 30-day outcomes, as measured by complication rate and index hospital length of stay (LOS).
Methods: A single-center observational cohort study was conducted of elderly patients (age ≥ 65) undergoing laparoscopic paraesophageal hernia repair from 2015-2023, collected on a convenience sample basis. Frailty testing was performed preoperatively and included "Timed Get Up and Go"(TGUG) (stand, walk 3 m, return, and sit), grip strength, and a modified Frailty Index (mFI) (Image). Frailty parameters were set as: TGUG time greater than the cohort average, grip strength less than the cohort average, and mFI score ≥ 3. If patients refused a test, they were placed within the frail cohort for that test. Outcomes were assessed utilizing univariate and multivariate analysis, adjusting for confounders. $P < 0.05$ was considered significant.
Results: A total of 61 patients were included. Cohort characteristics included average age of 75.3($\pm$ 7.6), average BMI of 30.0($\pm$ 5.9), 47(77%) female, and 60(98%) Caucasian. All patients had medical comorbidities, the most common being HTN (44, 69%), GERD (40, 66%), and HLD (24, 39%). All surgeries were performed laparoscopically and all patients received a fundoplication (97% Toupet fundoplication). The average TGUG time was 8.4 s ($\pm$ 2.5) with 29(47%) considered frail. The average grip strength pressure was 33.3 PSI ($\pm$ 16.5) with 9(15%) considered frail. Nine patients (15%) were considered frail by mFI. The median index LOS was 1.8 days (IQR 1.1-2.1). Seventeen patients (28%) suffered a complication; 11(18%)

were considered minor, while 6(10%) were considered major, including 1 reoperation.

Assessing for the effect of frailty on minor, major, or overall complications, there were no differences found when utilizing the TGUG, grip strength, mFI, or a combination of all three. When assessing for the effect of frailty on LOS, we found that patients who were classified as frail by the TGUG test had a longer LOS: 1.97 days (IQR 1.17-2.96) vs. 1.19 days (IQR 1.02-2.14), p = 0.046. No difference in LOS was found utilizing the grip strength, MFI or a combination of all three tests.

Conclusions: Frailty, as assessed by the TGUG test, was associated with longer index hospital LOS. None of the tests of frailty were associated with higher complication rates. Further research is needed to on frailty assessment in elderly patients undergoing major surgery.

Frailty Index

Date of Test: _____ **Rater:** _____ **(Patient Label)**

Please 'Check' all that apply

- History of diabetes mellitus defined in National Surgical Quality Improvement Program as a metabolic disorder whereby individuals require daily dosages of exogenous parenteral insulin or an oral hypoglycemic agent to prevent hyperglycemia or metabolic acidosis, corresponding to CSHA-FI "history of diabetes mellitus."
- Not independent functional status defined as a patient requiring some or total assistance from another person for activities of daily living, corresponding to several CSHA-FI items, namely, "changes in everyday activities," "problems with getting dressed," "problems with bathing," "problems with carrying out personal grooming," "problems with cooking," and "problems with going out alone."
- History of either chronic obstructive pulmonary disease (COPD) or pneumonia defined as COPD resulting in any one or more of the following: for COPD functional disability, hospitalization, chronic bronchodilator therapy, or a forced expiratory volume (FEV1) <25% of predicted; for pneumonia, rales or dullness to percussion on physical examination and any of the following: new onset of purulent sputum, organisms isolated from blood culture, chest radiographic examination with new or progressive infiltrate, corresponding to "lung problems" and "respiratory problems."
- History of congestive heart failure defined as the heart's inability to pump sufficient quantity of blood to meet the metabolic needs of the body, commonly manifesting as abnormal limitations in exercise tolerance because of dyspnea or fatigue, orthopnea, paroxysmal nocturnal dyspnea, rales, cardiomegaly, or pulmonary vascular engorgement, corresponding to "congestive heart failure" in the CSHA-FI.
- Myocardial infarction defined as a history of a non-Q wave or a Q wave infarction in the 6 months before surgery as documented in the patient's medical record, corresponding to "myocardial infarction" in the CSHA-FI.
- History of percutaneous coronary intervention, cardiac surgery, or angina as defined by having undergone any type of percutaneous coronary intervention or stenting, any major cardiac surgical procedure, or pain or discomfort between the diaphragm and mandible resulting from myocardial ischemia, corresponding to "cardiac problems" in the CSHA-FI.
- Hypertensive medications as defined by a persistent elevation of systolic blood pressure >140 mm Hg or a diastolic blood pressure >90 mm Hg or requiring antihypertensive treatment at the time the patient is being considered for an operation, corresponding to "hypertension" in the CSHA-FI.
- Peripheral vascular disease or rest pain as defined by a patient with any type of angioplasty or revascularization procedure for atherosclerotic peripheral vascular disease or extremity rest pain or gangrene as a result of atherosclerotic vascular occlusion, corresponding to "peripheral pulses."
- Impaired sensorium as defined by a patient who is acutely confused and/or delirious and responds to verbal and/or mild tactile stimulation, corresponding to "clouding or delirium."
- Transient ischemic attack or cerebrovascular accident defined as a focal neurologic deficits of sudden onset and brief duration (usually <30 min) that usually reflects dysfunction in cerebral vascular distribution and a history of a cerebrovascular accident with neurologic deficits lasting >30 min, but no current residual deficits, corresponding to "cerebrovascular problems."
- Cerebrovascular accident with deficit as defined by a history of a cerebrovascular accident with persistent residual motor, sensory, or cognitive dysfunction, corresponding to "history of cerebrovascular accident."

The number of variables present divided by the total possible calculates the modified FI. (i.e., a FI of 0.09 is equivalent to having one variable (1/11).

FI = ____ /____

FI = ____

P368

Gastro-Esophageal Reflux After Laparoscopic Heller's Cardio-Myotomy and Anti-Reflux Procedure in Achalasia Cardia: Subjective and Objective Evaluation

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Introduction: This study aimed to evaluate the prevalence of pathological gastro-esophageal reflux (GER) following laparoscopic Heller's cardio-myotomy (LHCM) with anti-reflux procedure (ARP) in achalasia cardia. We also assessed the correlation between subjective symptoms and objective GER.

Methods and Procedures: This study was registered in the Clinical Trial Registry-India (CTRI) before the commencement (CTRI/2021/09/036909 http://ctri.nic.in). We conducted this prospective study on 20 patients who underwent LHCM with two different ARPs namely Tou pet's Fundoplication (TF) and Accentuation of angle of His (AOH) at least 6 months ago. Patients underwent post-operative evaluations using both subjective and objective measures, including Eckardt's score, Modified DeMeester Clinical score (MDCS), upper gastrointestinal endoscopy (UGIE) and 24-h pH monitoring. Data was expressed as median (interquartile range) and quantitatively and qualitatively anal ysed using independent t-test and Fisher's exact test respectively.

Results: Median age (years) was 30 (25th-75th percentile: 25.75-39.5), and post-surgery duration (months) averaged 37.2 ± 16.79. LHCM + ARP patients reported chest pain for 20.5 ± 23.25 months. Most had < 4% acid exposure (90.00%) and 0-10 reflux episodes (75.00%). Median DeMeester score was 1.45 (25th-75th percentile: 0.372-3.515). Symptomatic success rate, based on Eckardt's score (< 3), was 90%. Among the patients, 50% (10/20) reported occasional minimal heartburn. Out of these 10 heartburn patients, 3 had LA grade A esophagitis, but none demonstrated pathological GER (DeMeester score > 14.7) in the 24-h pH study. Only 2 out of 10 patients with heartburn had pathological GER confirmed by 24-h pH study and one of these two patients had severe regurgitation but none had esophagitis on UGIE. Among the 10 patients without heartburn, none had pathological GER in the pH study but one patient had LA grade A esophagitis. None of the patients in our study had LA grade B or C or D esophagitis. The overall prevalence rate of pathological GER in our study was 10% (2/20). Among 2 patients who had GER based on the 24-h pH study, one of them exhibited 24-h pH pattern suggestive of fermentation.

Various factors like age, gender, BMI, Post-operative duration, Eckardt's score, heartburn severity (MDCS), esophagitis (LA classification), different ARPs like AOH and TF were analysed, revealing no significant associations with GER.

Conclusion: Pathological GER following LHCM with ARP was 10%, consistent with other studies. Discordance existed between objective GER by pH study, esophagitis findings and subjective symptoms. Comprehensive evaluation using both UGIE and 24-h pH study is vital during follow up.

P369

Challenging Chicago Classification 4.0 and EGJOO

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Introduction: The Chicago Classification 4.0 updated the criteria for EGJOO to include manometry and clinically relevant symptoms with at least one of the supportive investigations (a timed barium esophagram or a functional lumen imaging probe). Our aim was to assess whether the updated definition of EGJOO applied in our clinical practice.

Methods: A retrospective review was performed on 267 patients with high resolution manometry between 2017 to 2021. Data collected included demographics, symptomatology, manometric, endoscopic findings, preoperative upper gastrointestinal series (UGI) findings, interventions and follow up. EGJOO was diagnosed based on manometry in conjunction with detailed history, and findings on other studies. Successful intervention was defined as improvement in symptomatology after intervention.

Results: Forty one patients had the diagnosis of EGJOO. Thirteen patients were lost to follow up (31.7%). Out of the 28, 13 (36.6%) had EGJOO while 26 (64%) had concomitant esophageal pathologies. There were 7 males and 21 females with a mean age of 64.6 years and a mean BMI of 33.3. Symptoms pre-intervention were heartburn (71.4%), dysphagia (64.3%), pain (50%), regurgitation (35.7%) and cough (21.4%). Nine (32.1%) patients had isolated EGJOO, 10 (35.7%) had EGJOO and hiatal hernia (HH), 5 (17.9%) had a possible achalasia variant, 3 (10.7%) had EGJOO and jackhammer esophagus, while 1 (3.6%) had EGJOO, HH and pseudoachalasia. Of note, 5 (21.4%) patients had a prior foregut surgery. Esophagogastroduodenoscopy (EGD) findings were: normal (n = 12), stricture /tight gastroesophageal junction (n = 4), benign distal esophageal tumor (n = 1), HH (n = 6), barrett's (n = 1), schatzki ring (n = 2), and eosinophilic esophagitis (n = 1). One patient did not have an EGD. Procedures were HH repair (24.0%), myotomy (41.6%), fundoplication (22.4%), endoscopic dilation (5.6%), and botox injection (11.2%). Symptom improvement occurred in 80% of patients who underwent HH repair, 94% myotomy, 42.9% balloon dilation, 53.8% botox injection, and 16.7% in medically managed patients. Four patients did not have a pre-intervention UGI study. Table 1 delineates the frequency of symptoms while Table 2 delineates the frequency of diagnosis of EGJOO with the UGI findings. Amongst the 15 patients who underwent surgical intervention, heartburn improved in 87.5% of the patients while all of them had improvement with dysphagia, regurgitation, cough and pain.

Conclusion: While UGI findings are helpful in diagnosing EGJOO, we found that the results are not always consistent with the symptomatology or diagnosis of EGJOO. We found that careful history and manometry with the aid of EGD findings can be sufficient in diagnosing EGJOO.

UGI findings	Heartburn (n=17)	Dysphagia (n=16)	Pain (n=12)	Regurgitation (n=10)	Cough (n=6)
Delay in contrast	2 (12%)	3 (19%)	1 (8%)	1 (10%)	1 (17%)
Decreased peristalsis	3 (18%)	4 (25%)	4 (33%)	2 (20%)	1 (17%)
Esophageal dilation	1 (6%)	2 (13%)	2 (17%)	1 (10%)	1 (17%)
Tertiary contractions	4 (24%)	7 (44%)	5 (42%)	5 (50%)	1 (17%)

UGI findings	EGJOO (n=9)	EGJOO and HH (n=8)	EGJOO with possible achalasia (n=3)	EGJOO and Jackhammer (n=3)	EGJOO, HH and pseudoachalasia (n=1)
Delay in contrast	0	1 (13%)	2 (67%)	0	0
Decreased peristalsis	1 (11%)	0	0	2 (67%)	1 (100%)
Esophageal dilation	0	0	1 (33%)	0	1 (100%)
Tertiary contractions	4 (44%)	2 (25%)	3 (100%)	0	1 (100%)

P370

Fundoplication vs Gastropexy for Paraesophageal Hernia Repair and Impact on Reflux Symptoms

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Background: Paraesophageal hernia with accompanying GERD symptoms is a common disorder, and surgical management options include fundoplication, where the fundus of the stomach is wrapped around the lower esophageal sphincter, and gastropexy, suturing the stomach to the abdominal wall or diaphragm. This study aims to compare the relief of reflux symptoms following these surgeries.

Method: Retrospective chart review at a single institution was performed to abstract demographics, hernia type, type of surgery, pre- and post-operative reflux symptom scores for patients who underwent paraesophageal hernia repair. Reflux symptoms were quantified by GERD-HRQL score. The surgical technique for gastropexy was suturing the fundus in multiple locations along the central tendon of the diaphragm with permanent suture.

Results: A total of 135 patient were included; 58 (43.0%) underwent gastropexy and 77 (57.0%) underwent fundoplication (including Nissen (51), Toupet (22), Dor (4)). The average age of fundoplication was 57.8, and 69.9 for gastropexy. There were 58 (43.0%) Type 1, 5 (3.7%) type 2, 59 (43.7%) type 3, and 13 (9.6%) type 4 paraesophageal hernias. Pre-operative GERD-HRQL scores were available for 38 patients. Of these patients, there were post-operative scores available for 20 patients at 2 weeks, 14 at 3 months, and 6 at 1 year. At 2 weeks, 80% (8/10) of gastropexy patients reported improvement of symptoms, with an average improvement of 85.7%. Similarly, 80% (8/10) fundoplication patients had improvement of symptoms at 2 weeks, with average improvement of 63.3%. At 3 months, 75% (6/8) of gastropexy patients reported improvement in symptoms, with average improvement being 65.0%, compared to improvement in 83.3% (5/6) of fundoplication patients, with average improvement of 88.1%. At 1 year, there was reduction of symptoms in 50% (2/4) of gastropexy patients with average improvement of 71.2%, compared to symptom reduction in 100% (2/2) of fundoplication patients, with average improvement of 93.5%.

Conclusion: Patients who underwent fundoplication for paraesophageal hernia repair had higher rates of improvement in GERD symptoms compared to gastropexy patients at 3 months and 1 year. However, gastropexy did result in a large reduction in GERD symptoms. GERD-HRQL is a meaningful tool that can quantify subjective information and allow for precise evaluation of the effect on GERD symptoms of various surgical interventions. A prospective study with GERD-HRQL scores obtained in patients undergoing surgical repair at routine intervals is warranted to further investigate the effect of either surgery on long-term management of symptoms.

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Robotic Pexied Sling Fundoplication: A Novel Anti-Reflux Procedure with Favorable Perioperative Outcomes

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Background: The fundoplication has long been recognized as an effective surgical therapy for GERD. However, the Nissen fundoplication has been plagued with concerns of post-operative dysphagia, gas-bloating, belching, and inability to vomit. Conversely, while the Toupet fundoplication may mitigate some of these concerns, it may not provide durable anti-reflux control. Here we describe, for the first time, the peri-operative outcomes of the robotic Pexied-Sling Fundoplication (PSF), a novel method of performing a partial fundoplication involving circumferential hiatal pexy stitches and creation of a posterior esophagogastric junction (EGJ) sling.
Methods: A prospective, IRB-approved database was maintained for all robotic Nissen and Pexied-Sling Fundoplications (with or without hiatal hernia repairs) performed by a single surgeon at a tertiary academic hospital from 2009 to 2023. Thirty-day primary outcome measures included GERD-HRQL, with sub-scores for heartburn, dysphagia, gassiness/bloating, patient satisfaction and medication use.
Results: 1257 patients underwent robotic fundoplication during this time period (440 Nissen; 817 PSF). Demographics of both groups were similar, including BMI, hiatal hernia type, and primary vs. reoperative. Patients who underwent PSF had similar reductions in overall GERD-HRQL scores from baseline to 30-days post-operatively (PSF 32.8 to 1.7; Nissen 30.9 to 2.3, $p > 0.05$) and heartburn subscores (PSF 17.4 to 0.7; Nissen 16.7 to 1.0, $p > 0.05$). Notably, patients undergoing PSF had significantly lower 30-day dysphagia subscores (PSF 0.9, Nissen 2.7, $p < 0.01$), lower bloating/gassiness scores (PSF 0.5, Nissen 2.5, $p < 0.01$) and higher % of patients reporting satisfaction (PSF 94.6%, Nissen 87.1%, $p < 0.01$).
Conclusions: Here we report the peri-operative outcomes of one of the largest comparative series of robotic Nissen fundoplication to a novel anti-reflux procedure – the robotic Pexied-Sling Fundoplication. The PSF aims to emulate the native EGJ sling fibers by creating a retro-esophageal sling using the fundus. By avoiding a circumferential fundoplication, the PSF appears to mitigate some of the long-standing concerns of the 360 degree Nissen approach while still providing excellent anti-reflux control. Our findings show that the robotic PSF repair is a safe and effective technique that provides favorable patient-centered outcomes.

P372

Foreign Body Induced Neuropathy After Magnetic Sphincter Augmentation Implantation—Case Report and Review of Literature

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Introduction: In this report, we describe a case of peripheral neuropathy as an uncommon reaction to an implanted magnetic sphincter augmentation (MSA) device. This highlights the possibility of a foreign body immune reaction in patients with these implanted devices and the subsequent need for removal to treat this immunologic response.
Case Presentation: A 50-year-old female underwent implantation of a magnetic sphincter augmentation device for gastroesophageal reflux disease that had failed medical management. Post-operatively, the patient's reflux symptoms significantly improved. However, over the following few months, the patient developed esophageal spasm and life-limiting peripheral neuropathy. She underwent EGD with dilation twice with significant improvement of her esophageal spasms. Nevertheless, the patient continued to experience paresthesia involving her hands and feet which the patient had not experienced prior to implantation of the MSA device. Other causes of peripheral neuropathy were ruled out by her primary care physician and specialists. Given the concern for a foreign body immune reaction, the patient underwent an uncomplicated explantation of the MSA device. Within 3 days of her procedure, she had complete resolution of her peripheral neuropathy symptoms.
Discussion: The use of MSA devices has increased in popularity over the past decade since it was first approved as a minimally invasive treatment for reflux. Studies have shown that MSA devices provide symptom improvement comparable to fundoplication in select patient groups. The literature, however, lacks robust data on patients undergoing explantation for device complications. In one prospective study, Asti et al., found that in 164 patients undergoing MSA implantation, only 11 of those patients later underwent device removal. The reasons for removal included recurrence of reflux, dysphagia, and device erosion. In another prospective study of 100 patients undergoing MSA implantation, seven patients had the device explanted secondary to chest pain or persistent symptoms. Thus far, there has been no published data demonstrating an immune foreign body reaction to an MSA device, such as peripheral neuropathy. We aim to draw attention to this phenomenon in patients that develop nonspecific symptoms, unexplained by other causes, after MSA implantation and that removal of the device can result in symptom resolution.
Conclusion: We present a unique case of peripheral neuropathy after magnetic sphincter augmentation implantation. Removal of the device resulted in complete resolution of symptoms. Foreign body immune reactions to MSA devices have not been previously reported in the literature.

P373

The Utility of pH Studies After Anti-Reflux Surgery

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Background: Wireless esophageal pH monitoring has become the preeminent diagnostic tool for the assessment of esophageal acid exposure in correlation with symptoms with reflux episodes. Components of this study have been used to guide the utilization of proton pump inhibitor (PPI) therapy and aid in identifying patients that should be offered an anti-reflux procedure. Questions remain regarding its utilization in the postoperative management of patients. Currently, no guidelines exist regarding the clinical utility of post-operative pH studies. This study was undertaken to analyze a single institutions' experience with postoperative pH studies and to determine its utility in the management of GERD patients.
Methods: With IRB approval, a retrospective review of a prospectively maintained gastroesophageal database was performed for all patients undergoing Toupet or Nissen fundoplication, anti-reflux mucosal resection (ARMS), or magnetic sphincter augmentation, and returning for their postoperative pH study. Demographic data and perioperative outcomes, including symptom resolution, BravoTM results, postoperative use of PPI, interventions, Reflux Symptom Index (RSI), GERD-HRQL, and Dysphagia scores, were analyzed and

compared between patients with the chi-square test and Spearman's correlation coefficients.

Results: From 2011-to-2022, 98 patients who underwent operative management for GERD returned for their postoperative pH study. Toupet fundoplication (N = 40), Nissen fundoplication (N = 10), ARMS (N = 30), and LINX (N = 18). Seventy-three (74.4%) patients had incomplete symptom resolution at presentation for their pH study. Twenty-four (24.4%) were ARMS patients. Though not statistically significant, higher subjective quality of life scores were correlated with pH study positivity. Twenty-eight patients (28.9%) had two or more days of $> 6\%$ acid exposure time (%AET) on postoperative pH study. Patients who had two or more days of abnormal %AET, were more likely to undergo an intervention postoperatively (53.6% vs. 10.1%; $p < 0.001$). Additionally, patients with two or more days of abnormal %AET were less likely to experience resolution of all symptoms (50.0% vs. 78.3%; $p = 0.004$). In patients who had two or more days of abnormal %AET, those still symptomatic were more likely to undergo an intervention postoperatively compared to those who were asymptomatic (78.6% vs 28.6%; $p = 0.008$). Patients with normal results (0 or 1 day abnormal %AET), yet still symptomatic, were more likely to have one day of abnormal %AET compared to those who were not (40% vs 11.1%; $p = 0.017$).

Conclusion: Postoperative pH studies, when used as an adjunct to clinical assessment, may help guide surgeons to determine which patients will likely need an intervention following anti-reflux procedures.

P374

Calzonic Gastritis: A Case Report of Gastric Ischemia Secondary to Large Volume Food Ingestion

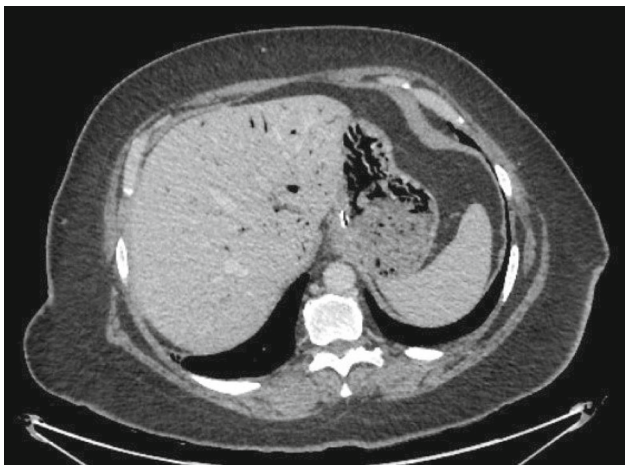
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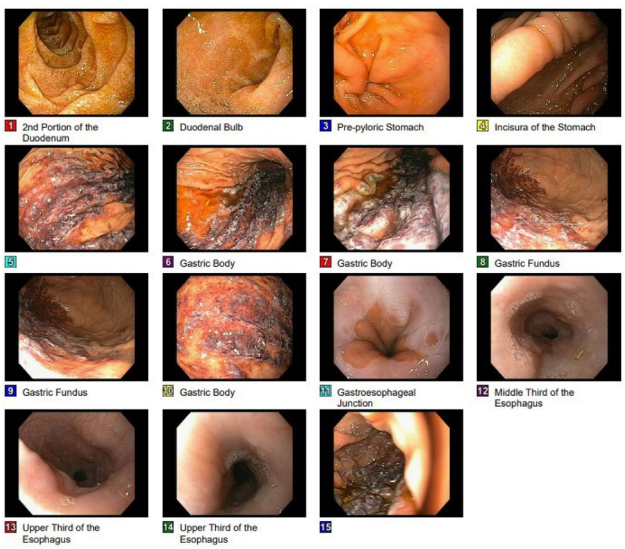
Introduction: Acute gastric ischemia is a rare and often fatal condition occurring predominantly in patients with substantial vascular comorbidities or with significant cardiovascular dysfunction. The stomach's robust vascularization and collateralization is protective against ischemic events in otherwise healthy patients. There are only rare reports in the literature of large food ingestion leading to gastric ischemia. (Dewangan, 2016) We present a case of acute gastric ischemia secondary to massive food bolus. We discuss presentation, imaging findings, endoscopic and histologic findings associated with this condition, and the successful non-operative management of the patient.

Case Presentation: We present the case of a 52-year-old-female with past medical history significant for hypertension and morbid obesity with body mass index (BMI) of 45 who presented to the emergency department with severe epigastric abdominal pain, nausea, and vomiting after consuming a large calzone. Workup in the emergency department showed labs without significant abnormalities, but computerized tomography (CT) scan showed evidence of emphysematous gastritis and portal venous gas. CT angiography was performed demonstrating patent mesenteric vasculature and specifically patent gastric vascular pedicles. Endoscopic examination of the stomach revealed necrotic mucosa which was biopsied. The patient was treated in the hospital ward with nil per os (NPO), proton pump inhibitor (PPI) and prophylactic antibiotics. The patient tolerated slow advancement of diet and is currently on a regular diet with repeat imaging showing resolution of her gastritis. Final histologic examination revealed mucosal erosion, prominent hemorrhage in lamina propria, and focal loss of glands consistent with ischemic gastritis.

Discussion: Gastric ischemia is a rarely reported phenomenon throughout literature, likely secondary to the rich vascular supply of the stomach by the celiac trunk and its branches. This phenomenon is even more rare in otherwise healthy patients without predisposing factors such as atherosclerosis, vasculitis, gastric volvulus, psychiatric dispositions, DIC, small bowel obstruction, recent surgery, or sepsis. Reported cases have high morbidity/mortality and are associated with shock, sepsis, volvulus, embolism, vasculitis, DIC, or corrosive ingestion Tognoni, 2020, Islam, 2023, Jin Han, 2022, Chambon 2012). These cases often require extensive medical support, surgery, and/or prolonged hospital stay.

This case illustrates first that significant gastric dilatation in the setting of food consumption, even with intact gastric blood supply, can lead to gastric ischemia. Second, that gastric ischemia can be managed expectantly with bowel rest, proton pump inhibitors, and prophylactic antibiosis. This management has led to no long-term sequelae from her ischemic episode.





P375

The Presence of Barrett's Esophagus Among Cadavers with Concomitant Hiatal Hernia

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Introduction: A hiatal hernia occurs when the stomach and/or gastroesophageal junction (GEJ) abnormally protrudes through the diaphragmatic hiatus. Patients with hiatal hernias have an increased risk of gastric esophageal reflux disease (GERD) due to a loosening of the lower esophageal sphincter and lack of normal compression of the lower esophageal sphincter by the diaphragm. Chronic reflux, if left untreated, can over time lead to the development of intestinal metaplasia (Barrett's esophagus), dysplasia, and even esophageal adenocarcinoma. Screening recommendations for Barrett's esophagus involves upper endoscopy every 3-5 years in individuals over the age of 50 with a history of chronic reflux, yet despite these recommendations, the incidence of esophageal adenocarcinoma in Western societies has been increasing over the past 40 years. This study seeks to evaluate the prevalence of underlying Barrett's esophagus in patient cadavers with concomitant hiatal hernias to determine if screening recommendations are adequately detecting patients at risk for esophageal adenocarcinoma or if these recommendations need to be broadened to account for other patient risk factors.
Methods: Forty-nine formaldehyde-preserved human cadavers were examined. The esophagus, stomach, and diaphragm were dissected, and the presence or lack of hiatal hernia was noted. If present, measurements were taken of the height and width of the hernia sac. The hiatal hernia sacs were then opened and evaluated for gross changes. Biopsies were taken at the gastroesophageal junction (GEJ) and sent for pathologic review to analyze for the presence of Barrett's esophagus. SPSS was utilized for Pearson's correlation.
Results: 49 cadavers were examined. 19 cadavers had a BMI less than 25 and 11 cadavers had a BMI over 25. A total of 16 cadavers had underlying hiatal hernias, among these 6 had a BMI > 25, and 10 had a BMI < 25. There is a moderate correlation between hernia size and age with a positive Pearson's correlation. One out of 16 cadavers with a hiatal hernia had pathologic findings of intestinal metaplasia at the GEJ, consistent with Barrett's esophagus (6%).
Conclusion: The presence of a hiatal hernia is a risk factor for Barrett's esophagus, however the incidence of undetected Barrett's esophagus among patients with incidentally noted hiatal hernias remains low. Current screening guidelines for upper endoscopy in patients with underlying hiatal hernia are adequate for detecting patients at risk for Barrett's esophagus, though other risk factors should be further explored to better account for the rise in cases of esophageal adenocarcinoma.

P377

Babesiosis Manifesting as Splenic Rupture

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Introduction: Babesia microti is a protozoa transmitted primarily by the tick vector Ixodes scapularis. It invades red blood cells leading to cell lysis. Babesiosis is endemic in the Northeast and Upper Midwest United States. Clinical manifestations range from subclinical to severe and may take weeks or months to manifest as the incubation time following a tick bite is approximately one to four weeks. Splenic rupture is a rare complication that usually presents in an otherwise healthy, younger patient with low parasitemia. In this case report, we present an Ohio resident with numerous tick bites months prior to an atraumatic splenic rupture requiring emergent splenectomy.
Methods and Procedures: A 71-year-old male presented to the emergency department with multiple episodes of syncope. He reports falling face forward during one of the episodes and waking up 2 or 3 min later but denies any trauma prior to the onset of symptoms. He complained of back pain, generalized abdominal pain, nausea, and dizziness upon standing. A CT scan of the abdomen and pelvis with contrast revealed a grade V splenic injury with active hemorrhage. The patient presented tachycardic and hypotensive and was subsequently taken to the operating room for emergent exploratory laparotomy with splenectomy. He was discharged on POD5 but returned 15 days later with fever, leukocytosis, and lactic acidosis. A parasite was detected in the blood and a blood smear was ordered which confirmed babesiosis.
Results: This patient had been experiencing intermittent fevers, cough, and myalgias for approximately 3 months. He continued to have shortness of breath from unknown etiology. Upon the diagnosis of babesiosis, he was started on atovaquone and azithromycin. Additionally, he was found to have parasitemia of 13% requiring plasmapheresis. The patient subsequently recovered and was discharged home.
Conclusions: Splenic rupture occurs in less than 1% of babesiosis cases, possibly caused by the increased erythrophagocytosis within the spleen. Few case reports describe spontaneous splenic rupture occurring secondary to babesiosis in the Upper Midwest region, and it remains unknown to many clinicians as a possible differential. Patients with atraumatic splenic rupture may benefit from parasite screening with a blood smear to prevent further development and other complications associated with parasitemia.

P379

Staged Emergent Gastric Volvulus Repair with Endoscocpic Decompression Provides Favorable Short Term Outcomes

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Introduction: Giant paraesophageal hernias may present with incarceration and volvulization of the stomach which is a rare condition with a reported high mortality. We investigated the acute management and postoperative outcome of patients presenting with acute gastric volvulus undergoing step-wise decompression followed by laparoscopic repair.
Methods: This is a retrospective study of all patients who presented with acute gastric volvulus and underwent urgent endoscopic reduction followed by laparoscopic paraesophageal hernia repair at a single institution between May of 2016 and May of 2023. Patients were medically optimized prior to hernia repair including volume resuscitation and correction of metabolic derangements.
Results: Forty-three patients presented with acute gastric volvulus. The mean age was 68.1 years (range 21-93). Thirty-one patients were female (72%) and 34 patients were white (79%). Seven patients (17%) had a Type IV hernia while 36 patients (83%) had a Type III hernia. Endoscopic decompression was performed on all patients. One patient was discharged home and returned at a later date for elective outpatient hernia repair. All other patients underwent laparoscopic paraesophageal hernia repair during index admission. Mean time from reduction to repair was 4.65 days (SD 3.49). Endoscopic evidence of gastric ischemia was present in 13 patients (30%). The mean Charlson Comorbidity Index (CCI) was 3.46 (SD 2.28). Median total

length of stay was 7 days (95% confidence interval 5-11). Ten patients (23%) experienced complications (Clavian-Dindo III-V). One patient died within 30 days and mortality was unrelated to surgery. In a multivariate regression, discharge to a facility (nursing home or rehab) was more likely as length of stay increased (OR 0.74, CI 0.58-0.96).

Conclusion: Step-wise laparoscopic paraesophageal hernia repair appears to be an acceptable management strategy in patients with a moderate CCI presenting with gastric volvulus. Decreasing hospital length of stay will allow more patients to be discharged home.

Table 1 Multivariable logistic regression for binary outcome of being discharged home

Variable	Comparison	Odds Ratio	95% CI	p-value
Age	Per year increase	0.946	(0.836, 1.071)	0.38
BMI	Per unit increase	1.206	(0.836, 1.740)	0.3159
Complication	Major Complication Vs Non-Major Complication	0.409	(0.022, 7.429)	0.5454
Total Length of Stay (days)	Per day increase	0.748	(0.583, 0.959)	0.0221

P380

Recurrence After Primary Hiatal Hernia Repair: Outcome and Risk Factors

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Background: Symptomatic recurrences after laparoscopic hiatal hernia repair and fundoplication have been estimated up to 30%. Previous literature indicates the association of redo hiatal hernia repair with longer operating times, increased mortality, as well as more severe complication rates. Here, our aim is to evaluate the outcomes of laparoscopic primary hiatal hernia repair and their recurrence based on our institutional experience.

Methods: We retrospectively reviewed a cohort of patients who underwent hiatal hernia repair and subsequent redo operation for recurrence at our institution between the years of 2005 and 2022. Patients were identified and categorized for demographic information, perioperative/intraoperative details, and postoperative outcomes.

Results: From 2005 to 2022, 1,166 primary hiatal hernia repairs were performed at our institution, of which 61 (5.2%) developed a symptomatic recurrence and underwent a reoperation. In this specific population, the median age at the index surgery was 60 (range 26-77) and median BMI was 30 kg/m2 (range 21-55). 51 (83.6%) were female. The median time until the recurrence was 47 months (range 1,168) with 4 recurrences within the first 3 postoperative months and 10 recurrences within the first year. Differences in operation time between index surgery and reoperation were not statistically significant at 94 (34-238) and 84 (37-240) minutes ($p = 0.605$). Differences in lengths of stay were also not statistically significant, with a median of 2 days for both groups (2 (range 1-18) versus 2 (range 1,20) $p = 0.687$). Intraoperative complications occurred in 1 (1.6%) index surgery and 6 (9.8%) redo; these differences were not statistically significant ($p = 0.114$). Postoperative complications were higher after redo than after the initial surgery (21(34.4%) vs 10(16.4%), $p = 0.037$), similar results were observed for readmission. In multivariate logistic regression including all primary hiatal hernia, risk factors for recurrence were open surgery (OR[CI95%] 5.66 [2.25-14.20], $p < 0.001$) and reoperation for complication at 30 days postoperatively (OR[CI95%] 4.07 [1.31-12.60], $p = 0.015$). Male sex (OR[CI95%] 0.48 [0.24-0.98], $p = 0.04$) and older age (OR[CI95%] 0 0.97[0.95-0.99], $p = 0.001$) were protective factors of hiatal hernia recurrence.

Conclusion: Recurrence of hiatal hernia repair can present a more complex anatomical and surgical landscape. Operation times and hospital stays are not longer in reoperations, in experienced hands. However, recurrent surgery poses an increased risk for postoperative complications and readmissions within 30 days. Reoperation for complication as well as open surgery are associated with a higher recurrence rate after primary repair.

P381

Role of Inflammatory Indices in Prognosis of Carcinoma Esophagus

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Introduction: Esophageal carcinoma poses a significant healthcare challenge, with high morbidity and mortality rates. Despite advances in treatment, prognosis remains poor, primarily due to late-stage diagnoses and variable treatment responses. Understanding patient-specific factors influencing prognosis is crucial. Systemic inflammation has emerged as a key factor in cancer development and progression. This study aimed to investigate the prognostic significance of various inflammatory indices in esophageal carcinoma.

Methods: We conducted a prospective study involving 146 patients diagnosed with esophageal carcinoma. Clinical data, demographics, tumor characteristics, and various inflammatory indices (such as Neutrophil Lymphocyte Ratio [NLR], Platelet Lymphocyte Ratio [PLR], Lymphocyte Monocyte Ratio [LMR], CRP/Albumin Ratio, Platelet Red Cell Distribution Width Ratio [P-RCRW], modified Glasgow prognostic score [mGPS], Systemic Inflammation Score [SIS], and Systemic Immune-Inflammation Index [SII]) were collected.

Data was analyzed using SPSS version 24. Optimal cut-off values were determined for these inflammatory markers, and their associations with the patient outcomes (alive or expired) were thoroughly assessed. We compared the prognostic inflammatory indices with the outcome variables using chi-square test. To investigate the risk factors associated with mortality among patients with esophageal cancer, we used Cox proportional hazard models. Additionally, overall survival (OS) was measured using Kaplan-Meier estimates. P value < 0.05 was taken as statistically significant.

Results: Among the 146 patients, those with advanced tumor stages and elevated Neutrophil Lymphocyte Ratio (NLR), C-reactive Protein Albumin Ratio (CRP/Albumin Ratio), Platelet Red Cell Distribution Width Ratio (PRR), and Systemic Immune-Inflammation Index (SII) experienced higher mortality rates. The median Overall Survival was 11.0 months, and individuals with higher SII values had notably lower OS rates (32% vs. 53%, $p = 0.020$).

In the univariate Cox analysis, higher M stage and an SII of ≥ 858 were identified as significant risk factors for mortality. However, in the multivariate analysis, only the higher M stage remained significantly associated with poorer OS.

Conclusion: This study underscores the potential prognostic importance of inflammatory indices, with a specific focus on the Systemic Immune-Inflammation Index (SII), in cases of esophageal carcinoma. Higher SII values were found to be linked to poorer Overall Survival. Although not independently significant in the multivariate analysis, the higher M stage continued to demonstrate its robust predictive capacity for unfavorable outcomes. The incorporation of inflammatory indices into the prognosis assessment of esophageal carcinoma is of critical importance, especially in third world countries where we cannot rely on circulating DNA analysis for all patients because of the cost.

P382

Predictors of Recurrence After Paraesophageal Hernia Repair

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Introduction: Recurrence rates after laparoscopic paraesophageal hernia (PEH) repair have been reported anywhere up to 60%. Several technical maneuvers have been thought to reduce risk of recurrence including measures such as hiatal mesh placement and gastropexy. We sought to identify patient and operative factors that are predictive in PEH recurrence.
Methods: This was a retrospective review of patients that underwent PEH repair at a single tertiary academic institution between 2010 and 2019. Recurrence was identified radiographically or endoscopically. Patients were excluded from analysis if they were missing data on recurrence or if they had a previous PEH repair. Univariate comparison of patient and operative factors between patients that did and did not have recurrence was completed using Wilcoxon rank sum test for continuous variables and Chi-squared test for categorical variables. Univariate logistic regression to predict recurrence was completed using these factors; factors with a p-value less than 0.05 were included in multivariate logistic regression.
Results: A total of 655 were included in the final analysis of which 108 had recurrence (16.5%). Median age was 61 and BMI was 32.9. Of the patients that recurred, 57 (52.8%) underwent surgical revision, 13 (12.0%) within 90 days. Patients that recurred were significantly older (65 vs 59, p = 0.026), had large hernias over 5 cm (91.7% vs 78.2%, p = 0.001), more frequently had fundoplication performed (50.6% vs 38.7%, p = 0.041) and had gastropexy performed (24.7% vs 14.5%, p = 0.019). On univariate analysis, age over 65 (OR 1.65, 1.09 to 2.49), large HH (OR 3.06, 1.50 to 6.25), fundoplication (1.63, 1.02 to 2.60), and gastropexy (1.93, 1.10 to 3.38) were associated with recurrence. On multivariate analysis, no factors were associated with recurrence.
Conclusions: Patients that recurred were significantly older, had larger hernias, and had fundoplication and/or gastropexy performed on univariate analysis. Despite our univariate analysis, no factors were associated with recurrence on multivariate analysis. This is likely due to multiple factors identified on univariate analysis being concurrently present in individual patients.

Table. Univariate and Multivariate Regression to Predict Paraesophageal Hernia Recurrence

	Univariate Regression		Multivariate Regression	
	OR (95% CI)	P-value	OR (95% CI)	P-value
Age > 65	1.65 (1.09, 2.49)	0.019	1.16 (0.69, 1.94)	0.58
BMI > 30	1.11 (0.71, 1.72)	0.655		
Diabetes	0.79 (0.41, 1.52)	0.488		
Smoker	1.37 (0.64, 2.93)	0.414		
Cardiac Disease	0.87 (0.52, 1.44)	0.582		
Pulmonary Disease	0.69 (0.43, 1.11)	0.126		
Previous Abdominal Surgery	1.30 (0.77, 2.18)	0.322		
Elective Surgery	2.05 (0.62, 6.81)	0.239		
HH Size ≥ 5cm	3.07 (1.50, 6.25)	0.002	1.77 (0.79, 3.97)	0.16
Hernia Sac Excision	1.68 (0.98, 2.88)	0.06		
Divided Short Gastrics	1.63 (0.98, 2.72)	0.06		
Endostitch Used	0.65 (0.34, 1.21)	0.174		
Mesh Used	0.47 (0.17, 1.33)	0.156		
Fundoplication Performed	1.63 (1.01, 2.60)	0.043	1.55 (0.95, 2.54	0.081
Nissen	1.04 (0.49, 2.21)	0.921		
Partial	0.96 (0.45, 2.05)	0.921		
Gastropexy	1.93 (1.10, 3.38)	0.021	1.79 (0.99, 3.24)	0.055

P383

Short-term Outcomes Depending on Type of Esophagojejunostomy in Laparoscopic Total Gastrectomy for Gastric Cancer: A Retrospective Study Based on a Korean Nationwide Survey for Gastric Cancer in 2019

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Background: Although laparoscopic total gastrectomy (LTG) has been increasingly performed, esophagojejunostomy during LTG is still a technically demanding procedure. The purpose of this study was to investigate the optimal esophagojejunostomy (EJ) method during LTG for gastric cancer.
Methods: A total of 1,155 patients who underwent LTG were selected from data of a Korean Nationwide Survey for gastric cancer in 2019. Mortality and morbidities were compared between patients who received intracorporeal and extracorporeal EJ using linear or circular staplers during LTG. The groups' variables were balanced by using the inverse probability of weighting treatment.
Results: Seven hundred and seventy-three patients received intracorporeal EJ using linear stapler (IL), 137 received intracorporeal EJ using circular stapler (IC), 134 received extracorporeal EJ using linear stapler (EL) and 111 extracorporeal EJ using circular stapler (EC). Overall complication rates were less frequent in the extracorporeal group (13.4% for EL and 12.6% for EC group) than in intracorporeal group (22.6% for IL group and 17.5% for IC group). Fewer major complications (Clavien-Dindo classification ≥ IIIa) were also observed in extracorporeal group (9.4% for EL and 7.3% for EC group) than in intracorporeal group (1.4% for EL and 1.8% for EC group). There was no significant difference in EJ related complications between groups. Multivariate analysis showed that intracorporeal method correlated with more overall and major complications when compared with extracorporeal methods.
Conclusion: In our study, the extracorporeal methods seem most appropriate. However, considering that the EJ procedure has already been converted to an intracorporeal method, either IL or IC method can be performed depending on surgeons' preference without significant difference in complication rates. Well-designed randomized controlled trial is necessary to confirm this.

P384

Stuck in the Chest: BMI and Recurrence After Paraesophageal Hernia Repair, A Single Institution Experience

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Introduction: Obesity and paraesophageal hernia are often found together. Obesity is believed to negatively affect outcomes. However, it has not been well studied nor reported. The authors present a retrospective single institution analysis of obesity and recurrence to add to the generalizable knowledge about this relationship.
Methods and Procedures: A total of 150 patients underwent laparoscopic paraesophageal hernia repair from 2014 until 2022. Patient characteristics such as smoking status, BMI, operative factors such as operative length, conversion to open procedure, recurrence by imaging and need for re-operation were collected. Recurrence by imaging was defined as $> 10\%$ of the stomach or > 2 cm above the hiatus. R statistical software was used to perform Chi-square testing.
Results: In our population of 150 patients, the average age at index operation was 65 with average BMI of 29. 105/150 or 70% were classified as giant or containing $> 50\%$ of the stomach. 19.3% presented as urgent cases (surgical intervention performed at same admission). The average length of stay was 2.6 days with average follow-up of 57.9 weeks. Of non-smoking patients, 12/92 (11.5%) required reoperation for hernia recurrence while 2/44 (4.3%) in the smoking population needed reoperation. Smoking was not statistically significantly associated with need for reoperation for hernia recurrence ($p = 0.167$). For the BMI < 30 group, 5/79 (5.9%) patients required reoperation for paraesophageal hernia recurrence. In the BMI 30-34.99 group, 6/39 (13.3%) required reoperation. No patients in the BMI 35-39.99 group required reoperation, however 3/5 (37.5%) of the patients with BMI > 40 required reoperation. Chi-square analysis demonstrated $p = 0.012$.
Conclusion: Our study establishes that there is an association between elevated BMI and reoperation for recurrence of paraesophageal hernia. Further investigation into the factors associated with reoperation is needed. In elective cases, BMI matters and should be considered and communicated in the decision for, and in the timing of surgery for paraesophageal hernia.

P386

360-Degree Release of Median Arcuate Ligament Is a Better Option for Treating MALS—52 Patients 3 Years Followup

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Linear surgical cutting of the median arcuate ligament in symptomatic Median arcuate ligament syndrome is the only treatment. The systematic review suggests a sustainable symptom relief of more than 70% after treatment for MALS in most adult and pediatric studies. The reason behind the unsatisfactory result is that 30% of the patient was searched surgically. MAL is a complex structure and compresses not only the origin of CT but also the branches of CT. The angle between the celiac trunk and aorta was between 90° and 150° with a mean value of 121.2°. Also, because of compression by MAL, the angle of emergence of CT is compressed to more than 50%. This compressed angle of emergence plays a pivotal role in the dynamics of blood flow. Newer surgical approach- 360-degree release of MAL and simultaneous release of trifurcation of CT gives better results up to 98% in our study over 5 years and 60 patients. moreover, the 360-degree release of MAL also takes care of celiac ganglions situated at the angle between CT and the aorta. We present a video of the procedure here.

P387

Fundoplication vs. Gastric Fixation for the Management of Emergency Hiatal Hernia Repairs: A Retrospective Cohort Study

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Introduction: There is a paucity of literature comparing safety outcomes between formal fundoplication and gastric fixation procedures for hiatal hernia repairs, especially in the emergency setting. The objective of this study was to evaluate 30-day clinical outcomes between fundoplication and gastric fixation performed in emergency hiatal hernia repairs.
Methods: A retrospective cohort study using the National Surgery Quality Improvement Program (NSQIP) database from 2011-2021 was conducted. The study population was determined using ICD9/ICD10 codes describing diaphragmatic hernia without obstruction or gangrene, with obstruction, and with gangrene. Elective cases were excluded. CPT codes were used to group fundoplication procedures and gastric fixation procedures. The primary outcome was the 30-day complication rate. Secondary outcomes included 30-day readmission, reoperation, and mortality rates. A multivariable logistic regression analysis was used to adjust for clinically relevant confounding variables.
Results: A total of 971 and 346 were in the fundoplication and gastric fixation groups, respectively. Fundoplication was associated with significantly lower ($p < 0.05$) 30-day complication, reoperation, and mortality rates. There was no statistically significant difference with respect to readmission. After adjustment, fundoplication was significantly associated with a decrease in odds of 30-day complications (OR 0.532, $p < 0.0001$ 95% CI 0.401-0.706) and mortality (OR 0.553, $p = 0.0329$ 95% CI 0.321-0.953). However, there was no significant difference with respect to 30-day readmission (OR 0.861, $p = 0.4493$ 95% CI 0.585-1.268) and reoperation (OR 0.656, $p = 0.0629$ 95% CI 0.421-1.023).
Conclusion: Patients with hiatal hernias who underwent emergent repair with fundoplication had significantly lower 30-day complication and mortality rates compared to those who underwent gastric fixation procedures. Fundoplication is a safe approach and potentially preferable option to manage hiatal hernias in the emergency setting.

P388

Laparoscopic Repair of Large Paraesophageal Hernias with Concomitant Percutaneous Endoscopic Gastrostomy (PEG) May Reduce Recurrence: A Single-Institution Series

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Introduction: Large paraesophageal hernias often recur following repair. Besides standard of care reduction, sac resection, esophageal mobilization, crural closure, and fundoplication, adjunctive measures, such as mesh and PEG placement, have been advocated. We report a single-institution series where mesh overlay and PEG placement were employed systematically.

Methods: We reviewed cases of laparoscopic large (> 33% stomach incarcerated) paraesophageal hernia repairs performed by a single surgeon. All included formal repair as above. Overlay absorbable mesh was used if crura were attenuated, and PEG gastropexy was performed if > 50% of stomach was incarcerated. Recurrence rates were calculated for patients with follow-up stratified by PEG placement, use of mesh, and type of fundoplication (partial vs. complete), recognizing these measures were differently applied. The risk difference of recurrence over the study period was estimated and chi-square tests were performed. Survival analysis was performed using Kaplan-Meier plots with Log-rank tests.
Results: 400 patients underwent laparoscopic repair of large paraesophageal hernias from 2000-21. Mean age was 65 ± 11 years and 73% were female. 50% had partial fundoplication and 50% complete fundoplication. 78% received overlay mesh and 51% had PEG gastropexy. For 279 patients having radiographic/endoscopic studies (mean follow-up 5 years), PEG was associated with a trend for fewer recurrences (23.1% vs 33.1%, p = 0.087). Neither mesh nor fundoplication type was associated with significant differences in recurrence. There were 4 reoperations (1%); 3 from the no-PEG group had hiatal recurrences and 1 from the PEG group a para-hiatal herniation of colon without hiatal failure.
Conclusion: This series suggests that laparoscopic repair of large paraesophageal hernia may be associated with fewer recurrences when PEG gastropexy is utilized. Future randomized studies are warranted to determine if PEG placement or other measures are associated with fewer recurrences of paraesophageal hernias.
Table 1 Recurrence and Reoperation stratified by intervention

	+ PEG	-PEG	+ Mesh	-Mesh	Partial Fundoplication	Complete Fundoplication
N	205	195	312	88	199	199
No Recurrence	103	97	158	42	93	105
Recurrence* (%)	31 (23.1%)	48 (33.1%)	57 (26.5%)	22 (34.3%)	33 (26.2%)	46 (30.5%)
p-value	0.087		0.286		0.515	
Reoperation, n = 4	1	3	3	1	0	4

*Recurrence on radiograph or endoscopy.

P389

The Role of EndoFLIP with Timed Barium Swallow in the Evaluation of Achalasia

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Introduction: The aim of this study is to compare timed barium swallow (TBS) with endoscopic functional luminal imaging probe (FLIP) in achalasia. TBS has been considered the gold standard objective test to assesses esophageal emptying and Eckhardt score (ES) is the most common clinical assessment. We hypothesize that EndoFLIP provides comparable information to TBS.
Materials and Methods: Retrospective review of 60 patients who underwent distal esophageal myotomy between 1/2020 and 8/2023. Use of EndoFLIP was at the surgeon's discretion. Post-op upper endoscopy/EndoFLIP, TBS and ES were offered per protocol at 3 months. Percent emptying on TBS was calculated by comparing the maximum height x width between 1 and 5 min. EndoFLIP was performed under sedation with the 8 cm balloon. Distensibility index (DI) was measured at the 40 ml fill after > 30 s acclimation. Successful outcomes were defined as > 90% emptying at 5 min, DI ≥ 2, and ES < 3. Only patients with complete datasets were included in the study cohort.
Results: The final cohort included 16 patients (9 M, 7F, mean age 60.1 y, mean BMI 26.8 kg/m2). TBS, ES and DI were consistent in only 30%: TBS and DI correlated in 38%, TBS and ES correlated in 50%, ES and DI correlated in 63%.

	Surgery	Timing of Dataset Collection	Eckardt Score	% emptying TBS	DI (mm^2/mmHg)
1	POEM	Post Myotomy	**2**	5	**2.9**
2	Heller	Post Myotomy	**1**	**100**	**4.3**
3	Heller	Post Myotomy	**2**	51	1.7
4	Heller	Post Myotomy	5	**100**	1
5	Heller	Post Myotomy	4	**100**	**4.5**
6	Heller	Post Myotomy	**1**	66	**2**
7	Heller	Post Myotomy	**2**	**100**	**5**
8	Heller	Post Myotomy	3	27	**4**
9	Heller	Post Myotomy	**2**	60	**2.2**
10	Heller	Post Myotomy	**0**	**100**	**7**
11	Heller	Pre Myotomy	5	21	**4**
12	Heller	Pre Myotomy	3	0	**13**
13	Heller	Pre Myotomy	4	57	0.7
14	Heller	Pre Myotomy	3	1	1
15	POEM	Pre Myotomy	7	0	**2.1**
16	Heller	Pre Myotomy	5	**100**	1.9

*Success in bold

Conclusion: No single assessment modality comprehensively encompasses the symptomatic and objective characteristics of this complex disease. Neither EndoFLIP nor TBS consistently identify patients with abnormal Eckardt scores. Patients may have adequate myotomy by FLIP but still show poor emptying on TBS due to persistent esophageal body dysfunction. FLIP may be more useful to evaluate adequacy of myotomy post-surgery than TBS.

P390

Investigating the Relationship between Esophageal Tumor Length and TNM Staging: A Prospective Study of 171 Patients in a Tertiary Care Hospital in Pakistan.

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Introduction: Esophageal carcinoma poses a significant global health challenge, marked by high morbidity and mortality. In managing this malignancy, two key factors emerge: TNM tumor staging and histological grading. Interestingly, historical consideration of tumor length, once crucial for staging, was abandoned long ago.
Recent medical investigations have reignited interest in reassessing tumor length's relevance. This study aims to investigate the relationship between esophageal tumor length and TNM staging, shedding light on its potential role as an adjunctive criterion in esophageal carcinoma staging and management.
Methods: We conducted a prospective and descriptive study at a tertiary care facility, enrolling 171 patients with biopsy-proven esophageal carcinoma. Patient data, including demographic details, clinical factors, and histopathological information, were meticulously collected. Tumor length was measured using preoperative CT scans, and statistical analysis was performed using SPSS version 26.

Descriptive statistics for continuous variables were reported as mean with standard deviation when normally distributed, while frequencies and percentages were reported for all categorical characteristics. Moreover, Continuous variables were compared using one-way Analysis of Variance (ANOVA), whereas Pearson $\times$ 2 or Fisher's exact tests were used to assess the correlation between the categorical variables with tumor length groups.

All independent variables were included in the univariate multinomial logistic regression model whereas covariates with $p < 0.10$ in univariate analysis were considered for multivariate analysis. A two-tailed p-value of < 0.05 was regarded as statistically significant.

Results: Analysis of the patient cohort revealed that larger tumor lengths correlated significantly with higher T stages ($p = 0.006$), metastasis ($p = 0.011$), clinical stages ($p = 0.014$) and treatment ($p = 0.012$).

Notably, patients with tumors exceeding 10 cm had a substantially increased risk of metastasis (RRR = 3.94, $p = 0.005$) as well as T3 stage (RRR = 13.20, $p = 0.020$). Further multivariate analysis affirmed the association between extensive tumor length (> 10 cm) and T3 staging (RRR = 10.86, $p = 0.039$), even after adjusting for potential confounders.

Conclusion: Our study establishes a significant correlation between tumor length and TNM staging, particularly evident in T3 stage tumors. Furthermore, larger tumor lengths exhibit an association with a heightened risk of metastasis. These findings suggest that tumor length could serve as a valuable supplementary criterion in esophageal cancer staging, offering enhanced risk stratification and guiding clinical decision-making. Further research is warranted to validate these observations and refine the accuracy of esophageal cancer staging in terms of length.

P391

Impact of Decreased Distal Contractile Interval on Early Postoperative Dysphagia After Anti-Reflux Surgery

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Background: Patients considered for anti-reflux surgery (ARS) undergo comprehensive preoperative evaluations to determine the optimal surgical approach for symptom management. One important consideration is distal contractile interval (DCI), a measure of esophageal smooth muscle contraction, on high-resolution manometry (HRM). However, there's limited research on how DCI affects perioperative outcomes. This study aims to identify patient characteristics linked to low DCI and to explore the connections between reduced mean DCI and early postoperative dysphagia.

Methods: We conducted a retrospective analysis of our prospectively maintained ARS database from 2012 to 2023, including patients who had undergone preoperative HRM.

Results: Our study included 555 patients who underwent preoperative HRM, categorized into three groups: DCI > 500 (n = 426), DCI 100-500 (n = 111), and DCI < 100 (n = 18). Median DCI values were 1444 (IQR 892.4-2350), 324.4 (IQR 216-432), and 40.8 (IQR 15.3-75.9), respectively ($p = 0.0001$). There were no significant differences among the groups in terms of body mass index, prior foregut surgery, preoperative dysphagia severity, or hiatal hernia on barium swallow. However, the DCI < 100 group had more male patients (61% vs. 51.4% in DCI 100-500 and 37.6% in DCI > 500, $p = 0.007$) and a younger median age of 46.9 (IQR 33.9-53.8) compared to 55.3 (IQR 38.7-66.3) and 55.58 (IQR 43.1-65.1) years in the DCI 100-500 and DCI > 500 groups, respectively. No significant differences were found in terms of fundoplication type, length of hospital stay, complications, or readmissions among the groups.

At the three-month follow-up, 191 patients reported no dysphagia, 41 mild dysphagia, 32 moderate dysphagia, and 2 severe dysphagia. Median DCI values for these groups were 1119 (IQR 558-2194), 1117 (IQR 440-1652), 938 (IQR 395-1692), and 911 (IQR 829-993), respectively. Those reporting worse dysphagia had slightly lower preoperative DCI, but these differences did not reach statistical significance ($p = 0.08$). Sub-analysis revealed that patients with DCI < 100 reported dysphagia more frequently than those with DCI > 100 (60% vs. 27%, $p = 0.02$). Among those with DCI < 500, patients were also more likely to endorse dysphagia compared to those with DCI > 500 (35% vs. 26.2%), though this difference did not reach statistical significance ($p = 0.18$).

Conclusion: In the early postoperative period, individuals with DCI < 100 may be at a higher risk of developing preoperative dysphagia. However, a lower preoperative DCI, indicative of poor esophageal motility, alone doesn't predict postoperative dysphagia. Further investigation of additional factors is necessary to explain these outcomes. Clinicians should counsel patients regarding these potential issues prior to surgery.

P392

Incidence of Delayed Gastric Emptying and Gastroparesis Following Orthothotopic Lung Transplant

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Background: Gastroparesis (Delayed Gastric Emptying) can be a complication of bilateral orthotopic lung transplantation (BOLT). Gastroparesis can lead to lung allograft dysfunction and ultimately significant morbidity and mortality. The etiology of postoperative gastroparesis is not completely understood. Suspected causes are multifactorial including possible vagal nerve injury, vagal nerve dysfunction, or toxicity of immunosuppressive medication. This study aims to identify comorbidities or factors that correlate with the development of gastroparesis in BOLT patients.

Methods: This is a single institution retrospective review of patients following BOLT between January 1,2011 and January 1, 2021. The primary objective of this study is to investigate the incidence and risk factors associated with gastroparesis post-operatively in BOLT patients.

Results: Gastroparesis was found postoperatively in 71 out of 124 BOLT patients (57%). 6 patients were found to have gastroparesis pre-transplantation. Previous abdominal surgeries (38 patients (54%); p-value of 0.011), prior EGD (43 patients (61%); p-value of 0.027), prior UGI (35 patient (49%); p-value < 0.001), prior gastric emptying study (55 patients (76%); p-value < 0.001), and prior diagnosis of gastroparesis (6 patients (8%); p-value of 0.038) had a significant relationship with post lung transplant patients diagnosed with gastroparesis. Diabetics had a 6.19 times higher chance of developing post-operative gastroparesis in comparison to non-diabetics(not statistically significant).

Conclusions: More than half of BOLT patients were diagnosed with post-operative gastroparesis. Previous surgery, prior EGD, prior UGI, prior gastric emptying study, and prior diagnosis of gastroparesis have significant association with development of post-operative gastroparesis in BOLT patients. Additionally, diabetics had a higher chance of developing post-operative gastroparesis when compared to non-diabetics. By recognizing comorbidities and risk factors for development of gastroparesis in BOLT patients, we hope to intervene earlier in preventing potentially detrimental sequelae associated with gastroparesis.

P393

Association of Idiopathic Type 3 Hypertrophic Pyloric Stenosis with Gastric Volvulus

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Introduction: Gastric volvulus (GV) is a medical anomaly characterized by the stomach's atypical rotation, leading to obstruction and potentially compromising blood supply. In rare instances, gastric volvulus has been associated with idiopathic hypertrophic pyloric stenosis (IHPS). In this report, we chronicle the cases of two patients diagnosed with mesenteric-axial gastric volvulus in the context of Idiopathic Type 3 pyloric stenosis.
Procedures: In both cases, these patients presented with gastric volvulus requiring operative intervention. A robotic Billroth 2 procedure was performed in both instances, with removal of the pylorus along with antrectomy. The first patient had an incidental finding of appendiceal mucocele, requiring an appendectomy. The second patient had a large hiatal hernia, requiring repair of this defect along with the Billroth 2 procedure.
Results: Both patients recovered from their robotic Billroth 2 procedures without incident. Pathologic findings revealed a hypertrophic pylorus, with hypertrophy of the muscularis mucosa. Postoperatively, both patients received upper GI series to reveal free passage of contrast into the jejunum.
Conclusions: The concurrent presentation of idiopathic type 3 idiopathic hypertrophic pyloric stenosis (IHPS) with gastric volvulus (GV) in adult patients is not often encountered. Their potential association emphasizes the need for clinicians to consider potential overlaps between different gastrointestinal disorders and the complex interplay of clinical conditions resulting from diagnoses.

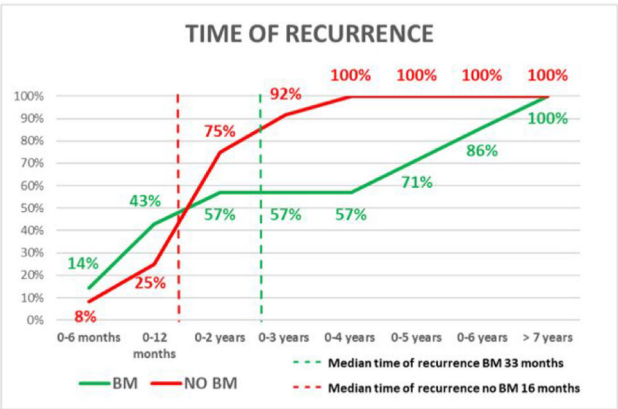


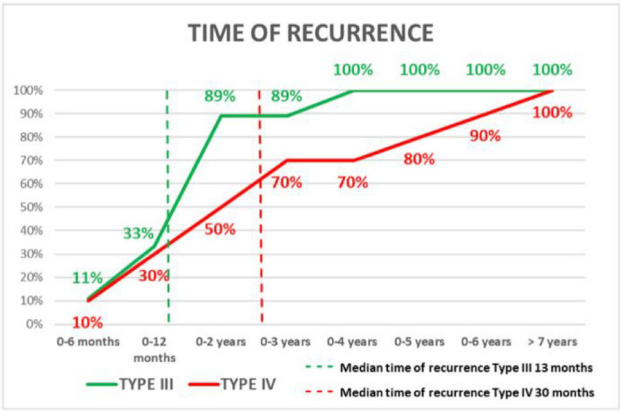
P394

Long Term Outcome of Selective Biological Mesh Placement in Patient Undergoing Large Para-Esophageal Hernia Repair. Biological Mesh Delays Recurrence

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Background: Laparoscopic Para-esophageal hernia repair (PEHr) is associated with high recurrence rate; biological mesh (BM) usage in PEHr has been associated with decreased short-term recurrence, but not significant difference in long-term recurrence rate. We stablished internal criteria to select the use of a biological mesh reinforcement for PEHr.
Methods: We prospectively studied 67 patients with type III and Type IV PEH who underwent laparoscopic PEHr from May 2016 to January 2023. We use a biological cross-link mesh (Permacoltm-Medtronic). Decision whether reinforce with a mesh was made preoperatively (type IV / redo-repairs) and intraoperatively by the surgical team (hiatal tension and poor tissue quality). Radiological recurrence was defined as the presence of > 2 cm. intrathoracic stomach on post-operative follow-up on a CT scan and/or upper gastrointestinal (UGI) series.
Results: We performed 67 PEHr, 37 Nissen, 12 Toupet, 8 Dor fundoplication with 10 Collis gastroplasty in 65 patients with 68 years-old median age. 33 Type III and 34 type IV PEHr; we placed 33 BM, 18% (6) on type III PEH and 79% (27) in type IV PEH. Median follow-up was 36.5 months (3 to 86 months). Overall recurrence rate was 30% (20), 35% (7) with BM and 65% (13) without BM, there was no statistically difference in recurrence rate between patients with or without BM $p = 0.14$. Overall, median time of recurrence was 22.21 months SD 20.89 CI 95% [15.89, 30,51]; patients with BM presented a statistically significant delayed recurrence when compared with patients without BM, with a median time of recurrence of 32.57 months SD 31.28 CI 95% [20.16, 68.88] vs 15.83 months SD 9.53 CI 95% [6.83, 15.73] respectively $p = 0.04$. We indicated more BMs in patients with Type IV PEH than in patients with type III PEH X^2 $p < 0.05$. Paradoxically, median recurrence time was shorter in type III PEH vs type IV PEH repairs 13.44 SD 8.73 CI 95%[6, 15.93] vs 29.7 months SD 26.34 CI 95%[18.12, 48.09] $p = 0.04$.
There was 19% morbidity with 1.4% mortality rate; 4.4% reoperation for complications and 2.9% required a redo-repair.





Conclusions: We selectively used biologic mesh in 33 of our cases mainly Type IV PEH repairs and redo-repairs. In type III PEH repairs, we have indicated less BM placement and we obtained an unexpected earlier recurrence rate compared with type IV PEHr, despite of being a more severe disease. Irrespective of our 29% recurrences only 2.9% needed redo-repairs during follow-up.

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Subcutaneous Emphysema Following Paraesophageal Hernia Repair: A Single-Center Study on Incidence and Outcomes

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Introduction: Subcutaneous emphysema following robotic-assisted paraesophageal surgery is an uncommon problem, but can be worrisome for patients and possibly lead to a longer hospital stay. Data regarding the impact of postoperative subcutaneous emphysema on perioperative outcomes is limited.
Methods and Procedures: A retrospective, single-center analysis was conducted on consecutive patients undergoing robotic-assisted paraesophageal hernia repair from 2018 to 2023. Demographics, comorbidities, intra-operative variables, and peri-operative complications were collected. In addition, 30-day re-admission, and 30-day mortality were recorded.
Results: 73 patients who underwent robotic-assisted paraesophageal hernia repair were analyzed. Twenty-eight (38.3%) developed postoperative subcutaneous emphysema confirmed by chest x-ray (CXR). Patients had a mean age of 62 (± 14.3) and were mostly females (57.5%). Eight patients had extensive subcutaneous emphysema with majority of these patients being female. Patients with extensive subcutaneous emphysema had notably longer operative times, and this difference was statistically significant when compared to patients with mild to moderate subcutaneous emphysema (mean = 257.3 min versus 182.5 min, $P = 0.01$). Female patients with subcutaneous emphysema experienced significantly longer hospital stays compared to their male counterparts (mean = 3.7 days versus 2.0 days, $P = 0.007$). None of the operations were modified or interrupted due to respiratory challenges. No significant morbidity was associated with subcutaneous emphysema or pneumomediastinum. Even in cases where extensive subcutaneous emphysema was present, patients did not require interventions such as prolonged oxygen therapy, positive end-expiratory pressure (PEEP), reintubation, or subcutaneous decompression. Management of subcutaneous emphysema was largely of Clavien-Dindo grade I severity.
Conclusion: Longer operative time, and therefore longer insufflation time, is an important factor that could potentially lead to the development of postoperative subcutaneous emphysema. While not life-threatening, postoperative subcutaneous emphysema can affect the recovery process. In a minority of patients, it results in an extended hospital stay and may require minor alterations to the postoperative pathway to optimize recovery.

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Gastro-Esophageal Reflux Test is Valuable to Determine the Surgical Indication for GERD Patients and Our Results of Laparoscopic NISSEN Fundoplication

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Introduction: To determine the surgical indication of laparoscopic anti-reflux surgery for GERD patients is difficult. To find out the GERD patients who really need the surgical treatment, we have established "Reflux Test " as the tool.
Surgical Indication: Reflux Test
At the standing position a patient swallows 300 ml barium solution. After total solution goes into stomach, a patient lies down at the flat position. Then a patient changes the position to left lateral decubitus position, flat position, right lateral decubitus position and flat position again every 10 s in the order. During this procedure, gastro-esophageal reflux was evaluated and assigned to severe, moderate and slight category. If the reflux was observed slightly up to cervical esophagus, the case was assigned to moderate category. The anti-reflux surgery was considered to the patients in the moderate or severe categories.
Results: We have performed laparoscopic Nissen procedure in 130 cases for the GERD patients. In this number, the giant hiatal hernia cases which needed surgery without any doubts and with no need for Reflux Test are excluded. Median follow-up period of this study was 91 months (5-163 months). In 25 cases (19.2%) PPI was restarted before 6 months after the anti-reflux surgery. In 45 cases (34.6%) PPI was restarted after the anti-reflux surgery during the whole follow-up period of this study. The results of the study have shown that the reflux esophagitis was improved obviously after the anti-reflux surgery even in the PPI restarted group which was analyzed by our endoscopic esophagitis grading score ($p < 0.001$).

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Near Infra-Red Imaging in Laparoscopic Hellers Myotomy

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The surgical technique of Hellers myotomy has been modified to include only the division of the anterior muscle fibres, and it is now the standard myotomy procedure. After adequate exposure, a long myotomy of about 6 cm is performed on the Esophageal side and 2–3 cm on the gastric side. Various complications are documented like Mucosal injury and inadequate myotomy, development of GERD,

Older age, duration of disease, increased symptoms score, degree of dysphagia, grade of achalasia, previous balloon dilatation, higher LES pressure on manometry, BMI of the patient, nutrition status of

the patient, serum albumin smoking was significantly associated with mucosal perforation. Perforation significantly delays oral intake and has a longer duration of hospitalization. Perforation if detected late will increase morbidity and mortality significantly
Using Near Infra-Red Imaging and instillation of ICG dye in the oesophagus intraoperatively after completion of surgical dissection will give an idea about the completion of myotomy, any residual fibres of muscles remaining over the mucosal tube, and any unnoticed mucosal small perforation. This helps in decreasing the morbidity of incomplete myotomy and inadvertent perforation in the mucosal tube which went unnoticed. ICG dye green background demonstrates residual muscle fibres, the smallest perforation is detected by leaking ICG dye

P399

Comparative Analysis of Gastroesophageal Junction Distensibility Changes: Combined Transoral Incisionless Fundoplication vs. Toupet Fundoplication

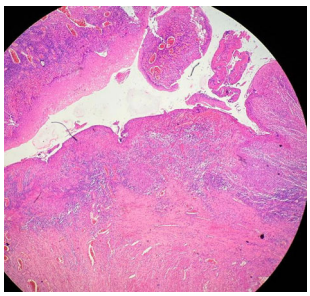
Teagan E Marshall, MD; Abhinay Tumati, MD; Benjamin Greenspun, MD; Hala Al Asadi, MD; Niloufar Salehi, MD; Brendan Finnerty, MD; Thomas J Fahey, MD; Srihari Mahadev, MD; Reem Z Sharaiha, MD; Kartik Sampath, MD; Rasa Zarnegar, MD; Weill Cornell Medicine

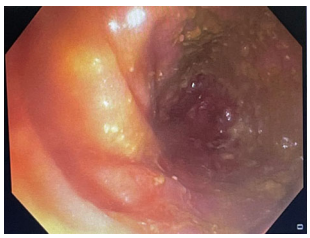
Background: Gastroesophageal reflux disease (GERD) is a prevalent condition, and transoral incisionless fundoplication (TIF) has emerged as a potential solution for addressing anatomical issues at the gastroesophageal junction (GEJ) in GERD patients. TIF involves creating a 270-300 degree, 3 cm fundoplication through endoscopically placed fasteners. However, this procedure solely targets the GEJ and is unsuitable for individuals with hiatal hernias exceeding 2 cm, which can also contribute to GERD. For those with large hiatal hernias, combining TIF with surgical hiatal hernia repair (cTIF) becomes a viable option.
Endoflip has been used in the literature to show reduction of the distensibility index (DI) at the GEJ following anti-reflux surgery, however, there is limited literature on Endoflip measurements in cTIF patients. Therefore, our study aimed to investigate alterations of the GEJ in cTIF patients and compare these measurements with a cohort of matched hiatal hernia and Toupet fundoplication patients.
Methods: In our retrospective analysis of a prospectively maintained ARS database from 2016 to 2023 we identified thirteen patients who underwent cTIF and matched them with 39 Toupet patients by age, sex, and BMI. Patients were evaluated with the EF-325N catheter with 30 ml balloon fill volume.
Results: No statistically significant differences were observed between the groups in terms of sex, age, BMI, comorbidities, preoperative symptoms, or proton pump inhibitor use. However, the cTIF group had lower preoperative GERD symptom scores (23 vs. 45.5, p = 0.02). Preoperative examination findings, including barium swallow, esophagogastroduodenoscopy, pH testing, and manometric measurements, did not significantly differ, nor did postoperative complications, readmissions, or reoperations.
Post-induction Endoflip measurements were similar between the two groups, however, post-fundoplication measurements showed that cTIF patients had a higher cross-sectional area (67.5mm2 vs. 34.5 mm2, p = 0.002) and lower intra-balloon pressure (25.5 mmHg vs. 33.2 mmHg p = 0.013), resulting in a higher DI (2.98 mm2/mmHg vs. 1.11 m2/mmHg, p = 0.0001). Minimum diameter was higher in cTIF patients (9.3 vs. 3.0, p = 0.005), while high pressure zone length was lower (2.25 vs. 3.0, p = 0.005). When comparing post-induction and post-fundoplication measurements, the cTIF procedure decreased DI by 55.3%, as opposed to 65.7% in the Toupet group; however, this difference was not statistically significant (p = 0.07).
Conclusion: Our study revealed that cTIF patients experienced less pronounced changes in GEJ measurements compared to matched Toupet patients. Further examination of long-term postoperative data is warranted to determine whether the results associated with cTIF are as durable as those seen in other fundoplications, especially regarding dysphagia, bloating, and GERD recurrence.

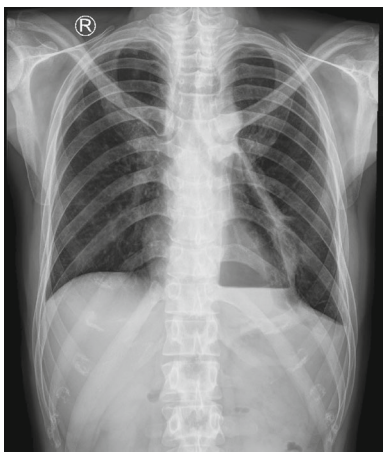
P400

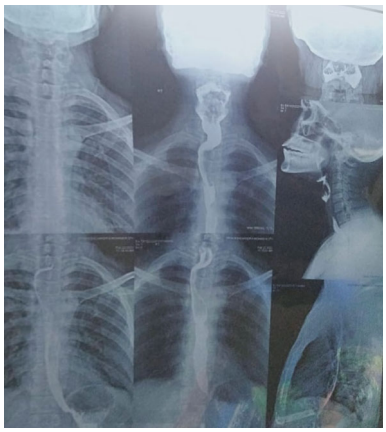
Esophageal Duplication Cyst in Adult with Suspected Isolated Crohn's Esophagus: A Rare Case Report

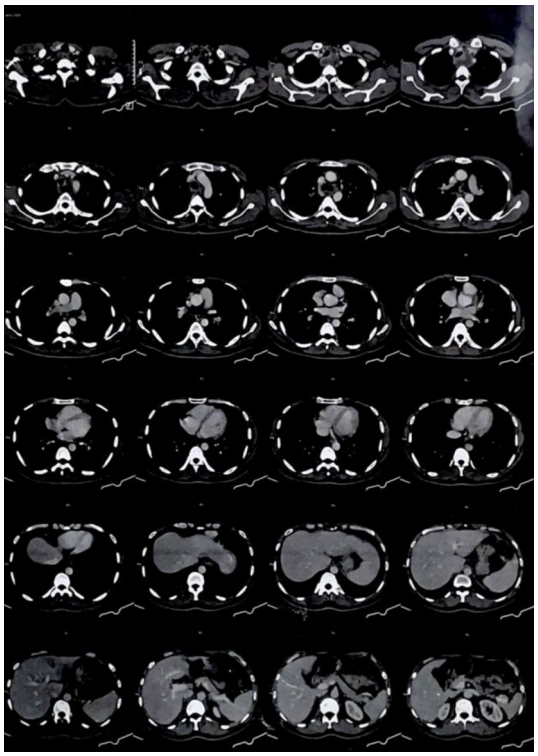
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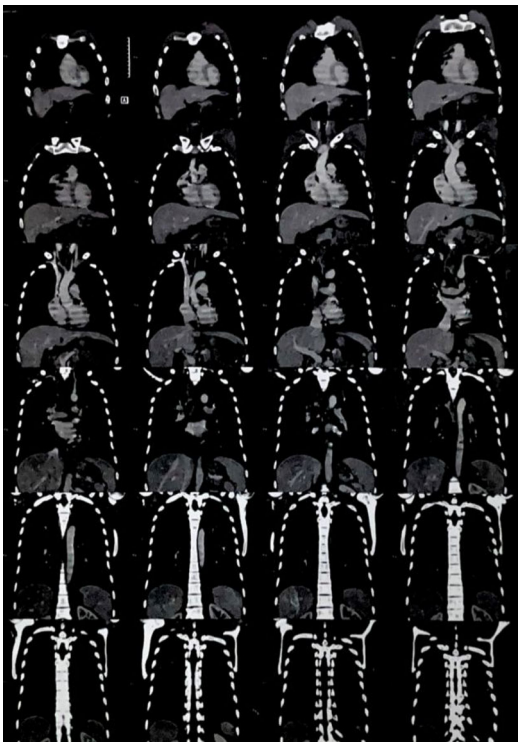












Esophageal duplication cysts are benign, asymptomatic anomalies of foregut formation. This anomaly is more common in pediatric rather than adult age groups. This is a case of esophageal duplication cyst with acute clinical presentation, treated successfully with surgical resection and a Histopathology report of the specimen to investigate the reasons behind symptoms suggestive of Crohn's Esophagus. A 37-year-old male patient presented at our clinical setting of a tertiary care hospital with a chief complaint of dysphagia for 25 days. Passing solid food was more difficult than liquid contents. The patient underwent a Barium Swallow to diagnose the cause behind Mechanical Dysphagia. Barium Swallow results were consistent with mass effect with mild mucosal irregularity noted in the upper thoracic esophagus with proximal dilatation. Approximately 56*27 mm sized hypoechoic lesion noted along esophagus on screening sonography. An Upper GI scopy was scheduled which showed a submucosal bulge with overlying ulceration seen at the left upper esophageal wall causing mild luminal narrowing. To get a better view of the extent, a Computed Tomographic scan of the thorax was conducted, which suggested a 43*31*46 mm^3-sized well-defined, irregular, non-enhancing, fluid-containing lesion with internal septa involving post cricoid area and upper 1/3rd of the thoracic esophagus on the left side causing enough luminal narrowing to push the esophagus on the right side with extension. The benign etiology was determined as an Esophageal Duplication cyst with possible differentials being a granulomatous esophagus disease. with a chance of fast-growing esophageal carcinoma due to a positive history of chronic tobacco chewing, it was decided to resect a large part of the esophagus with enough margin on both sides to prevent recurrence. Informed and written consent was taken for resectioning the upper esophagus with the fundus and cardiac part of the stomach due to granulomatous changes in these parts. End-to-end anastomoses of the cervical part of the esophagus and a gastric conduit which was created via a transhiatal open approach at the level of the cricoid. A feeding jejunostomy was placed for the patient's nutrition and bilateral intercostal chest tube placement was for unwanted complications. The resected Esophageal specimens were sent for histopathology which was suggestive of Chronic active esophagitis with deep ulceration and

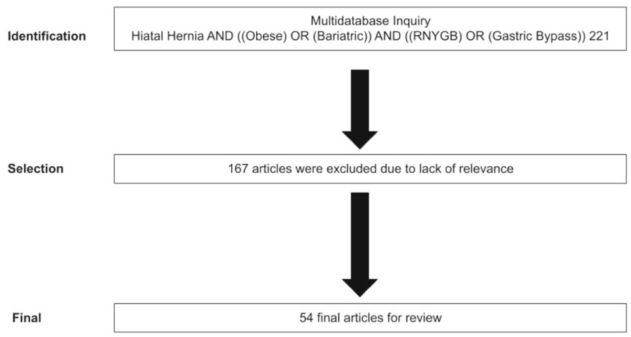
non-caseating granulomas most consistent with Crohn's esophagus. The patient was followed up under observation as an outpatient and started tablets of azathioprine, methylprednisolone, and Rabeprazole and is doing well.

P401

Roux-en-Y Gastric Bypass as Primary Management of Hiatal Hernia in the Obese Patient

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Introduction: The aim of this paper is to review the literature regarding management of hiatal hernias in obese patients with a laparoscopic or robotic assisted Roux-en-Y gastric bypass (RNYGB). Numerous studies have shown that patients with a BMI greater than 30 have an increased risk of developing both a hiatal hernia and GERD due to increased intra-abdominal pressure secondary to visceral fat content. Hiatal hernias have a prevalence of 20-50% among obese bariatric surgery candidates. Hiatal hernia repair (HHR) and fundoplication is the standard surgical management of symptomatic hiatal hernias.
Methods and Procedures: A comprehensive electronic database search, not limited to year or language, was performed in PubMed, Google Scholar, and referenced manuscripts to identify all the articles that reported hiatal hernia repair in morbidly obese patients and HHR with RNYGB. The primary endpoints include basic science research, epidemiology, surgical management, clinical data outlining pathophysiology, risk factors, and outcomes. Secondary endpoints included symptomatic and asymptomatic hiatal hernia recurrence and recurrence requiring intervention. The length and modalities of follow-up were extracted from the results.



Results: Our review underlines the increasing worldwide obesity epidemic and the increased intra-abdominal pressure transmitted across the hiatus due to high levels of adiposity. Consideration of this fact highlights the need for investigating the management of hiatal hernias in this population. This review demonstrates that concomitant HHR is a safe and effective procedure in patients undergoing RNYGB. Evidence suggests a more durable repair with a RNYGB. Concomitant repair did not change the rate of adverse outcomes or overall weight loss at various endpoints. This literature review comments on various technical points and options when considering HHR including wedge fundectomy and the use of mesh as well as a one anastomosis gastric bypass.
Conclusion: HHR and fundoplication is the current standard surgical treatment for symptomatic hiatal hernias in the obese patient. However, this population is at a much higher risk of hernia recurrence. The literature supporting standardization of RNYGB for the management of hiatal hernias in the bariatric surgery population is currently lacking high quality evidence. However, case reports and small case series do support the concomitant repair of hiatal hernias at the time of RNYGB with equivalent morbidity, mortality, and weight loss outcomes for obese individuals.

P403

Postoperative Outcomes After Paraesophageal Hernia Repair with And Without the Use of Esophageal Bougie

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Introduction: Intraoperative use of an esophageal bougie is a common surgical adjunct during laparoscopic paraesophageal hernia repair (PEH) but is not universally used. This study sought to investigate the safety and benefit of intraoperative esophageal bougie during PEH repair.
Methods: We conducted a retrospective review of patients that underwent elective PEH repair with or without use of esophageal bougie use at a single academic institution between 2010 and 2019. Patients were excluded from analysis esophageal bougie and fundoplication data was not collected. Analysis was completed using the Wilcoxon rank sum test for medians (with IQRs) and chi squared test with categorical/binary variables.
Results: A total of 572 patients were included in the final analysis. In these patients, 279 (49%) underwent PEH without intraoperative bougie use and 293 (51%) underwent PEH repair with intraoperative bougie use. Median age was 60 and BMI was 33.5 with no significant difference. There was no difference in intraoperative complications between no use esophageal bougie vs use of esophageal bougie (2.0% vs 1.1%, $p = 0.11$). Postoperative complications also showed no significant difference overall (12.5% vs 8.1%, $p = 0.09$) and no difference in GERD after 30-days ($p = 0.68$), dysphagia after 30-days ($p = 0.15$), 30-day reintervention ($p = 0.77$), recurrence ($p = 0.62$), reoperation ($p = 0.64$), and 30-day mortality ($p = 0.24$). In patients who underwent fundoplication at the time of PEH repair, the use of intraoperative bougie decreased the rate of dysphagia after 30-days (15.2% vs 24%, $p = 0.048$)
Conclusions: We found in patients undergoing elective PEH repair, there was no increase in intraoperative complications with bougie use or difference in postoperative outcomes overall when esophageal bougie was used. Patients who underwent fundoplication with PEH repair, had a significant decrease in postoperative dysphagia. Use of intraoperative esophageal bougie does not increase adverse events and should be considered when performing fundoplication.

Outcomes after PEH with fundoplication

	Bougie not used	Bougie used	p-value
30 Day complication	8.0%	7.1%	0.83
30 Day reintervention	2.0%	3.0%	0.69
GERD after 30 days	18.0%	14.3%	0.52
Dysphagia after 30 days	24.0%	12.6%	0.048
Recurrence	18.0%	15.3%	0.65

P404

Reflux at the Expense of Addressing Gastroesophageal Outlet Obstruction: How a Simultaneous Heller Myotomy and Bariatric Revision Can Mitigate Both

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Introduction: The obesity epidemic has resulted in an increasing incidence of bariatric surgery,with sleeve gastrectomy being the most common bariatric surgery performed around the world. There is a large amount of literature on gastroesophageal reflux disease after undergoing sleeve gastrectomy, however there is a paucity of data on dysmotility in the post-operative sleeve gastrectomy population. Treating gastroesophageal outflow obstruction with the classic Heller Myotomy with Dor Fundoplication cannot be performed due to the absent fundus and would therefore cause significant post operative reflux disease. Here we review the outcomes of patients with gastroesophageal outflow obstruction that underwent Heller myotomy with conversion to Roux En Y Gastric Bypass performed at the same time.

Methods: We conducted a retrospective review of patients over the age of 18 years with history of sleeve gastrectomy who underwent a Heller myotomy and conversion to Roux En Y Gastric Bypass at a single institution between the years 2017 and 2023. Gastroesophageal junction outflow obstruc-tion was diagnosed by gold standard High Resolution Manometry based on the Chicago Classifica-tion v4.0. Our primary outcome was symptom improvement at time of first follow-up 2-4 weeks post-operatively. Secondary outcomes include postprocedural complications, hospital length of stay, time to oral intake, and symptom recurrence rate. We used ranges and frequencies (percent-ages) to describe the patient population and outcomes.

Results and Discussion: Eight patients met inclusion criteria. The median age was 63 years old (51-36), all were female, and most were Caucasian (n = 6, 75%). Median BMI was 39 kg/m2 (27-67). Six had the heller my-otomy performed at the time of conversion from sleeve gastrectomy to Roux En Y gastric bypass, whereas two had the Heller myotomy performed in staged fashion. The median procedure length was 145 min (107-168). There were no intraoperative complications. There was one (12.5%) 90-day complication which was a post-operative leak, managed by takeback with omental patch and gastrostomy tube placement. All patients endorsed symptom improvement at their routine follow-up appointment. Only one patient had recurrence of symptoms at 15 months following her surgery, however repeat high resolution manometry demonstrated a normal relaxing and residual lower esophageal sphincter pressure. Heller myotomy with conversion to Roux En Y Gastric Bypass is effective and safe in the management of gastroesophageal junction outlet ob-struction and prevention of unrestricted gastroesophageal reflux disease in patients with a history of sleeve gastrectomy.

P407

Autologous Platelet Rich Fibrin: A Worthy Companion in Chronic Wound Management in Low Resource Settings

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Introduction: Chronic wounds and non healing ulcers are a challenge posing a burden on medical resources and loss of man hours cost. Concentrated platelets and fibrin adhesives have shown promising results in microvascular surgical procedures. The present study aims to understand the role of PRF as an adjunct in management of Chronic nonhealing wounds.

Methods: 45 patients with 50 non healing ulcers i.e. an ulcer which has not improved in last 4 weeks, either neuropathic and post burn ulcers were covered with PRF dressings every 5thday. Changes were analysed in terms of formation of healthy granulation tissue and reduction in maximum diameter. Ulcers less than 5 cm were treated with only PRF whereas those larger were covered with skin grafts eventually

Results: Mean age of the patients was 43.4 years with 28 male patients. All ulcers less than 5 cm size healed with mean of 3 PRF dressings. Larger ulcers underwent mean of 4 PRF dressings till the formation of healthy granulation tissue and a mean reduction in maximum diameter by 2.3 cm was noted following which they underwent SSG. One ulcer failed to improve. There was no secondary infection and patient scores of pain became better.

Conclusion: Autologous PRF matrix has emerged as a new therapeutic modality. This technique of healing, by modified secondary intention, is inexpensive, associated with good patient acceptability, forming an important part of surgeons armamentarium in complex wounds management especially in low resource settings as it obviates the need for extensive surgical procedures

P410

Anastomotic Leaks Through Surgeons' Eyes: A Survey-Based Analysis of Current Challenges, Gaps, and Perspectives on Novel Approaches to Improving Postoperative Care

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Background: Despite advancements in medical care, surgical practice- particularly gastrointestinal surgery- continues to be a challenging specialty. With numerous different postoperative complications that may arise following gastrointestinal surgery, it is critical to explore perspectives from surgeons first-hand. This includes identifying the most prominent complications they may encounter, apprehending their management strategies, and pinpointing the prevailing gaps in patient care delivery. Considering surgeons' insights is essential for understanding the needs of the medical community and guiding the development of new techniques, procedures, and tools.

Methods: To address this need, we conducted a qualitative assessment, aimed at understanding the most burdensome complication associated with gastrointestinal surgery and the techniques employed to manage these complications. We recruited surgeons (general, bariatric, colorectal, trauma, hepato-biliary/pancreatic, thoracic) from different states for phone/zoom interviews. A total of 40 American surgeons participated in the study. Findings from the study were subjected to qualitative analyses, assessing themes that emerged from

interview questions. These were summarized using descriptive statistics.

Results: By far, the most significant and unprompted concern brought up by surgeons was anastomotic leaks (80%). Surgeons emphasized that leaks are a critical postoperative complication with high morbidity and mortality rates, imposing substantial economic burdens on healthcare systems. Leaks were also considered uniquely emotive to surgeons as they were often correlated with suboptimal surgical skill. Other complications of concern included sepsis (17.5%), arrythmias/myocardial infarction (20%), pneumonia (30%), bleeding (35%), wound infection (37.5%), and deep vein thrombosis/pulmonary embolism (47.5%). When discussing leak prevention in current surgical practices, respondents mentioned options such as sealants/glue, stents, staplers, and fluorescent imaging to monitor vascular perfusion at the anastomosis. However, they acknowledged that these techniques have limited impact on clinical outcomes. Surgeons emphasized the need for early leak detection using novel inflammatory biomarkers such as CRP, cytokines, and interstitial pH for better patient management.

Conclusion: Anastomotic leaks are the most critical concern among gastrointestinal surgeons, despite current advancements in surgical techniques. Surgeons expressed a clear need for novel, innovative tools that allow for the early detection of postoperative complications, such as anastomotic leaks, to enhance surgical outcomes.

P412

Prognostic Role of Immuno-Nutritional Indices in Esophageal Cancer Patients Undergoing Esophagectomy

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Introduction: Esophageal carcinoma is a rapidly rising global malignancy, often diagnosed at advanced stages, limiting treatment options and leading to a high mortality rate. Immuno- nutritional indices have the potential to be key regulators in cancer progression. Our study aims to investigate the prognostic significance of various nutritional and hematological markers and their correlation with the overall survival in patients undergoing MIE.

Methods: We conducted a study with 43 esophageal carcinoma patients, collecting data on demographics, tumor details, and various immune-nutritional markers (MCV, RDW, MPV, CRP-CAR, PNI, CRP, TLC, and albumin). STATA version 16.0 was used to perform statistical analyses. Time to event was measured from the date of diagnosis to the date of the last follow-up or recorded death. Descriptive statistics including mean, median values, frequency, and proportions were reported and compared using Fisher's Exact/Chi-square analysis. Survival probabilities were calculated using the Kaplan–Meier method, and differences in survival were assessed by the log-rank test. A significance level of $p < 0.05$ was considered statistically significant.

Results: A total of 43 patients with a mean age of 43.74 ± 13.52 years were enrolled in this study, with 25 (58.1%) females and 18 (41.9%) males. Squamous cell carcinoma was the predominant histological type in 36 (83.7%) patients, while adenocarcinoma was observed in 5 (11.6%) patients. Clinical stages II, III, and IV-A were identified in 20.9% (n = 9), 41.9% (n = 18), and 37.2% (n = 16), respectively, and the majority (62.8%, n = 27) had moderately differentiated cancer.

Notably, the mean PNI values were 38.58 ± 12.97 in surviving patients and 38.06 ± 19.35 in deceased patients, and no statistically significant difference was found between the two groups (p-value = 0.436). The overall median survival was 13.4 months. Survival analysis in relation to PNI suggesting that patients with lower PNI tended to have worse prognosis, although the difference in survival was not statistically significant (p-value = 0.382)

Conclusion: Our study did not establish any substantial correlations or prognostic value among the immuno-nutritional indices we investigated in terms of survival outcomes in esophageal carcinoma. It's worth noting that while some studies have reported significant findings for these markers as prognostic indicators, our findings may suggest variations within different patient cohorts. Meanwhile, lower PNI values appeared to correlate with worse prognosis, this correlation did not reach statistical significance. Overall, our findings underscore the complexity of prognostic markers in esophageal carcinoma, highlighting the need for further research to unravel additional factors affecting survival in this malignancy.

P413

Pain is Well-managed in the Post-discharge Setting Following Ambulatory Surgery in Rural Uganda

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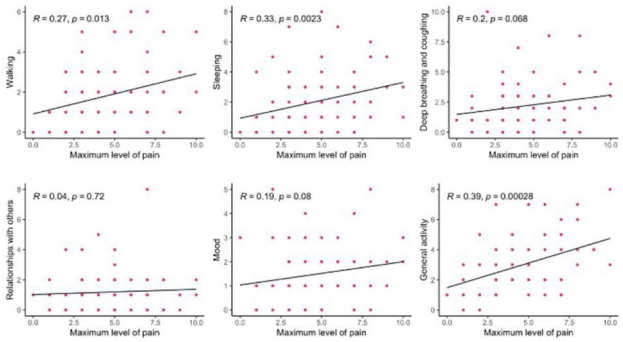
Introduction: Uncontrolled postoperative pain is a risk factor for complications, unplanned readmissions, and worse quality of life. As such, inadequate pain management in the post-discharge setting can be a substantial barrier to the adoption of ambulatory surgery in low- and middle-income countries. This study examines the post-discharge pain experiences of patients at Kyabirwa Surgical Center (KSC), a standalone ambulatory surgery center in rural Uganda, assessing the impact of pain on patients' functional status during the immediate recovery period.

Methods: For patients who received non-endoscopic procedures at KSC between November 2021 and April 2022, a survey on postoperative pain experience at home was administered between postoperative days (POD) 5 to 7. Patient charts were retrospectively reviewed to identify patients' surgery, anesthesia given, and discharge medications. Univariate analysis was used retrospectively to correlate patients' pain scores with postoperative pain medication regime.

Results: Of 377 patients who received non-endoscopic procedures, 115 were surveyed. After excluding pediatric patients, 83 patients were included in the final analysis. The median age was 45 years, with 62.7% (n = 52) males. The most common procedures were inguinal hernia repair (67.5%), soft tissue tumor excision (14.5%), and umbilical hernia repair (9.6%). All but two patients were discharged on a multimodal pain regimen, most commonly aceclofenac with paracetamol (48.2%). Tramadol was the only opiate option and was prescribed to 20 (24.1%) patients. On the postoperative day with maximum pain, 62.7% patients had moderate to severe levels of pain, but only 10.8% reported moderate to severe pain by POD 5-7. Patients who were prescribed tramadol reported higher maximum pain scores than those not prescribed tramadol ($p = 0.030$), whereas patients whose regimen included paracetamol reported lower maximum pain scores ($p = 0.0028$). Pain did not have a substantial impact on patients' overall functional status, but higher maximum pain score was correlated with interference in walking ($p = 0.013$), sleeping ($p = 0.0023$), and general activity ($p < 0.001$). Patients with longer prescription durations (6-7 days versus 4-5 days), reported that pain interfered less with walking ($p = 0.047$) and mood ($p = 0.011$). Preoperative counseling regarding post-surgical pain was not associated with a difference in pain scores.

Conclusions: Post-discharge pain in patients who have undergone ambulatory surgery in rural Uganda can be well-managed without widespread use of oral opiates, resulting in minimal impact on functional status during the early post-operative setting.

Figure: Correlation of maximum postoperative pain level and interference with functional status



P415

Innovative Approach to Establishing Laparoscopy Services in Low-Resource Settings: Promising Outcomes from Ethiopia

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Introduction: The current standard approach for addressing gallbladder stone disease is laparoscopic cholecystectomy. However, implementing this procedure in public surgical facilities, particularly in developing nations, has proven to be a persistent obstacle. This research introduces an innovative method for introducing laparoscopy services in resource-limited settings. It primarily relies on leveraging local resources and establishing global partnerships, as exemplified by the successful execution of 132 laparoscopic cholecystectomies at Yekatit 12 Hospital Medical College in Ethiopia.

Methods: A retrospective analysis was carried out to evaluate patient data from the initial 132 laparoscopic cholecystectomies performed at Yekatit 12 Hospital between August 2021 and September 2022. The study primarily focused on key outcome measures, including the duration of the surgical procedure, the achievement of a critical view of safety, the frequency of conversions to open surgery, and over all hospital stay.

Results: The F:M ratio is 7.6. Average hospital stay was 1.6 days and the conversion rate to open was 5.3%. Our approach demonstrates promising outcomes, with an overall acceptable service quality despite limited resources. This model offers a sustainable solution to expand laparoscopy services in similar settings, addressing critical healthcare needs.

Conclusion: Establishing laparoscopy services in low-resource settings is feasible and can yield positive outcomes, enhancing access to advanced surgical care for underserved populations. Our experience in Ethiopia serves as a valuable case study for similar initiatives worldwide.

P416

Transhiatal Esophagectomy and Gastric Ascent in the Treatment of Benign Stenosis. A 6- year Retrospective Study

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Introduction: Since the introduction of laparoscopy in esophageal resections (1995), there has been improvement in terms of approaches, instruments, and the quality of anastomoses and this is reflected in better results, early discharges, improvement in quality of life and patient comfort. Gastric transposition is a surgical procedure that involves relocating a portion of the stomach. The most common application of gastric transposition is to reconstruct the esophagus, which may have been damaged or removed due to Benign Esophageal Stricture, Refractory GERD, Caustic Ingestion, Refractory Achalasia, Esophageal Trauma, Barrett's Esophagus, Complications of Endoscopic Procedures, Esophageal Carcinoma. Gastric transposition has advantages over other methods such as colonic interposition, including lower complication rates and short recovery times.

Methods and Procedures: It was a 6-year retrospective study that was carried out in the department of general and minimally invasive surgery of the Hospital Juárez de México, where the records of patients with benign esophageal stenosis treated with laparoscopic gastric ascent, who were admitted to our hospital, were reviewed. service from February 2016 to August 2021. 80% of the stenoses were due to caustic ingestion and 20% due to refractory achalasia. It was a series of cases, where 10 patients were included.

Results: A total of 10 patients were included in the study, 70% were men while 30% were women, the average age was 42 years, minimally invasive retrosternal transhiatal esophageal replacement was performed in 100% of the cases. With a total average surgical time of 220 min, hospital stay < 5 days, bleeding 120 ml, and oral initiation time < 4 days.Among the complications, it occurred in 30% of the total sample (3 patients), who presented: Esophageal stenosis 66% (2 patients) with subsequent early dysphagia and leak from the anastomosis 33% (1 patient) with subsequent fistula formation.

Conclusion: Esophageal replacement in developing countries is a surgical challenge due to lack of experience and resources, however, in this context, gastric transposition restores effective gastrointestinal continuity with few complications, oral feeding and adequate weight gain are achieved in most patients. Therefore, it is a suitable surgical alternative for esophageal replacement in the hands of experts and minimally invasive reference centers.

In this series of cases of laparoscopic gastric ascent in a Third Level Hospital in Mexico City, it was possible to report shorter surgical times, less bleeding, shorter hospital stay and earlier initiation of the oral route, than that reported in the international literature. regarding the open surgery technique.

P417

The Neglected Parasite: Strongyloidiasis-induced Jejunal Perforation Leading To Systemic Complications

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Strongyloidiasis, a parasitic infestation caused by the soil-transmitted helminth

Strongyloides stercoralis, can cause asymptomatic infections as well as severe life-threatening infections. Gastrointestinal manifestations are rare and can range from bleeding due to mucosal ulceration to frank perforation. We present a case of a male patient who presented with spontaneous jejunal perforation caused by a mucosal infestation of S. stercoralis, diagnosed on histopathologic examination. Strongyloidiasis leading to intestinal perforation requires emergent surgical intervention. Prompt diagnosis to start necessary treatment is crucial to prevent catastrophic outcomes. S. stercoralis infections of the gastrointestinal system ending in perforation have seldom been reported, thus our goal is to highlight the importance of a rare parasitic intestinal infection manifestation and management, as surgical correction represents only the initial phase of treatment.

P420

Effect of Renal Impairment on the Pharmacokinetics, Safety, and Tolerability of Pudexacianinium (ASP5354) After IV Administration, A Mechanistic Exploration

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Introduction: Pudexacianinium (ASP5354) chloride, a novel indocyanine green derivative, is an imaging agent under development for intraoperative ureter visualization in patients undergoing minimally invasive and open abdominopelvic surgeries. Phase 1 studies in healthy volunteers have suggested that pudexacianinium is almost exclusively excreted unchanged into urine. Objectives of the present study were to elucidate the mechanism of renal excretion of pudexacianinium and to evaluate the effect of renal impairment on its pharmacokinetics, safety, and tolerability.

Methods and Procedures: Both in vitro and clinical approaches were taken. Transcellular transport or transporter-mediated uptake of pudexacianinium was investigated in vitro using cells expressing major human renal drug transporters of P-gp, BCRP, OAT1, OAT3, OCT2, MATE1 and MATE2-K. For clinical: a phase 1 open-label, parallel-group study was conducted, where subjects with normal renal function (n = 10) or mild, moderate, or severe renal impairment (n = 6 each) received a single intravenous dose of pudexacianinium 3 mg followed by plasma and urine sampling for pharmacokinetics analysis.

Results: The in vitro experiments suggest that pudexacianinium is not a substrate of the major renal drug transporters tested. In the clinical study, one severe renal impairment subject with suspected extravascular administration was excluded from the pharmacokinetic analysis set. Systemic pudexacianinium exposure increased with increasing renal impairment, with the adjusted geometric mean ratios for area under the plasma concentration-time curve from time 0 to infinity of 153 (mild), 230 (moderate), and 369 (severe) renal impairment groups, respectively, versus matching normal renal function groups (Fig. 1). Renal excretion of pudexacianinium slowed with increasing renal impairment, but mean percentage of administered dose excreted into urine up to the last measurable concentration exceeded 90% for all groups, except for the severe renal impairment group (Fig. 2). Mean renal clearance (CLR) was nearly equivalent to mean CL for all groups for all subjects except 2 subjects in the severe renal impairment group. The eGFR of unbound drug accounted for approximately 60%-100% of CLR. Pudexacianinium was generally safe and well-tolerated regardless of renal function, with only mild treatment-emergent adverse events.

Conclusions: The present study demonstrated that renal impairment significantly affects pudexacianinium pharmacokinetics, with apparent increases in plasma exposure and slower excretion into urine. It was suggested that the majority of pudexacianinium elimination is through glomerular filtration. Given the pudexacianinium safety profile, surgical patients with moderate or severe renal impairment can be included in phase 3 studies to evaluate the clinical utility of pudexacianinium in this population.

Figure 1 Plasma Pudexacianinium Concentration

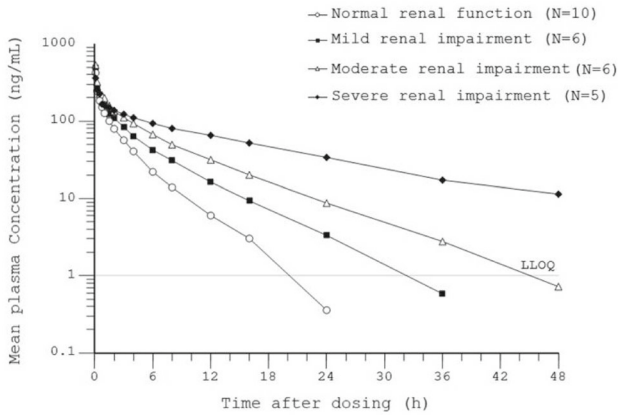
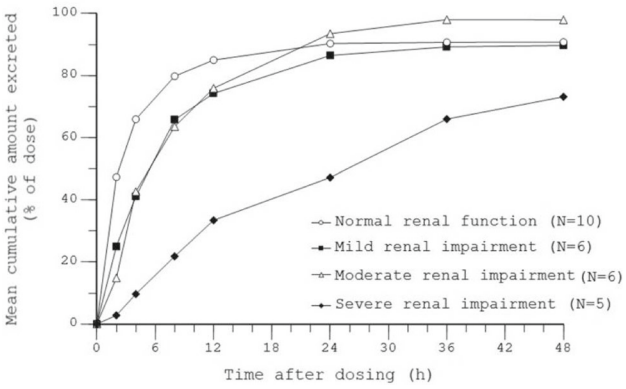


Figure 2 Cumulative Pudexacianinium Amount Excreted into Urine



P421

Interventional Endoscopy in the Management Of Duodenal Perforation Caused by Migrated Biliary Stent: A Case Report

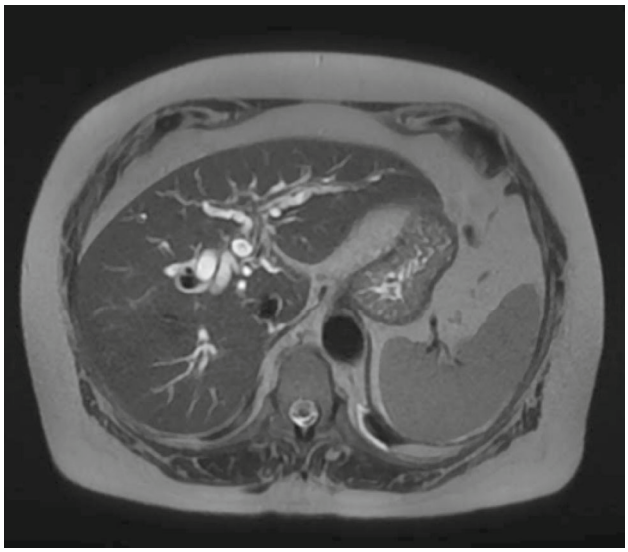
Luisanna Pantaleon Santana, MD, SPC[1]; Priscilla Guerrero Camarena, MS[2]; Angel Gomez, MD, SPC[1]; [1]CEDIMAT; [2]UNIBE

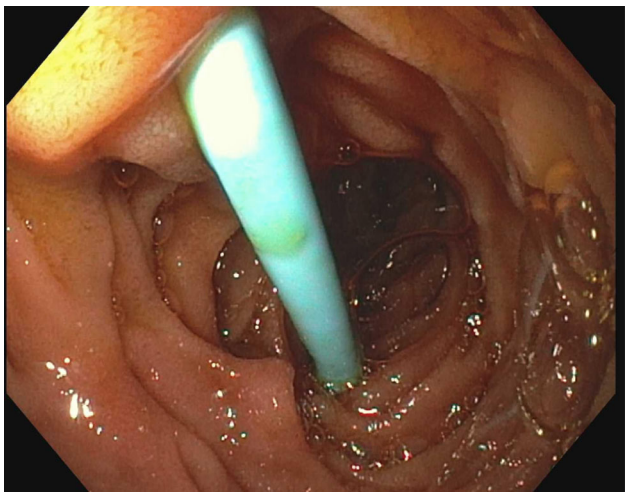
Gastrointestinal endoscopic perforations are complications with high morbidity and mortality rate requiring early intervention. In the recent decades, there has been an increase in these complications proportional to the number of endoscopic procedures performed. Interventional endoscopy provides prompt correction of these defects, preventing extraluminal leakage of gastrointestinal contents and avoiding the need for surgery, which comes with increased costs, risks of complications and hospitalization days.

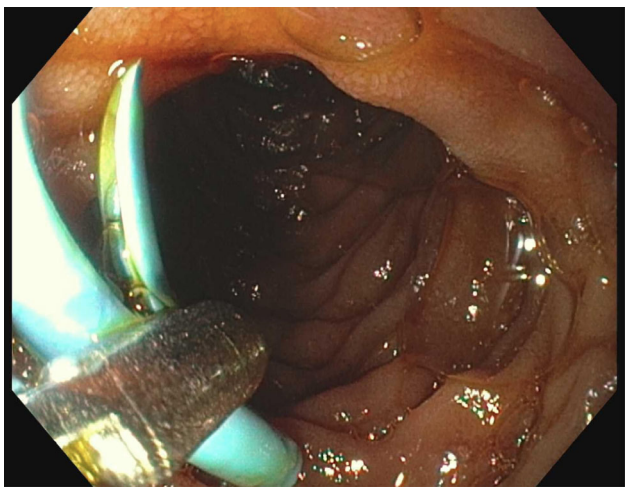
A 68-year-old woman came to the emergency department with a three-week history of intermittent abdominal pain in the epigastric and right hypochondriac regions (rated 6/10 on the pain scale), nausea and jaundice of the skin and mucous membranes. She has a medical history of controlled hypertension and hypothyroidism. A magnetic resonance cholangiography (MRC) was performed revealing an enlarged gallbladder with multiple filling defects suggestive of gallstones; dilation of the bilateral intrahepatic ducts with a transition point and small filling defect at the level of the common bile duct. Blood test showed: ALT: 191 U/L; AST: 167 U/L; ALP: 256 U/L; GGT: 510 U/L; TB: 13.1 mg/dL; DB: 11.3 mg/dL; IB: 1.68 mg/dL; Amylase: 53 U/L; Lipase: 63 U/L; PCT: 0.45 ng/mL.

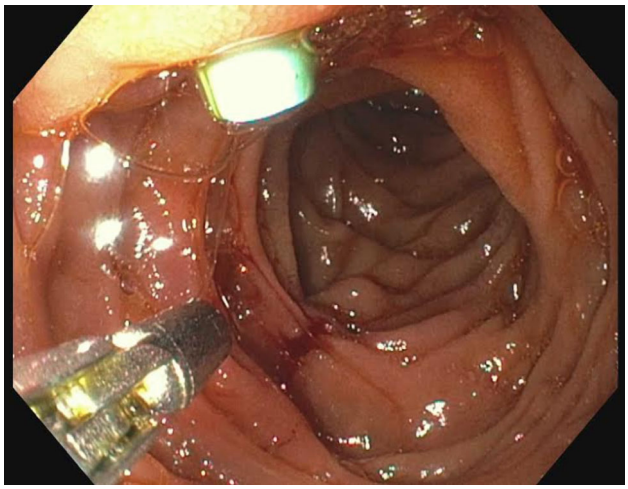
An endoscopic retrograde cholangiopancreatography (ERCP) was performed without eventualities, revealing an ampulla of Vater with normal appearance and morphology, but no bile outflow. The common bile duct was cannulated and opacified, showing a dilated intrahepatic bile duct secondary to a lack of contrast uptake in the common hepatic duct two centimeters below the bifurcation, suggestive of a Bismuth-Corlette Type I cholangiocarcinoma. A 7Fr x 10 cm plastic biliary stent was placed ensuring biliary tract patency. 26 h later, the patient developed sinus bradycardia (47 bpm), retching and worsening epigastric pain. Blood tests for acute coronary syndrome and pancreatitis were negative. An abdominal CT was performed revealing periduodenal inflammation with free fluid at this level. We proceeded with an endoscopy which revealed partial migration of the plastic biliary stent towards the third portion of the duodenum creating a microperforation. The stent was repositioned with the assistance of foreign body forceps and closure of the microperforation was achieved using three hemostatic clips. Antibiotic therapy with coverage for intraabdominal agents was administered.

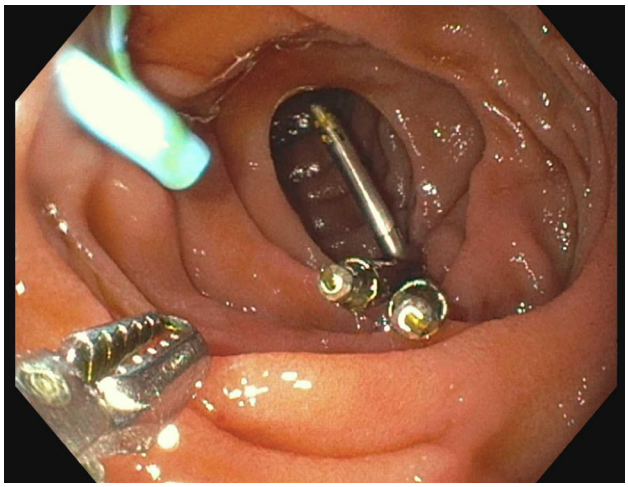
This patient had a satisfactory evolution and a good clinical response, thus avoiding the need of surgery because of endoscopic intervention; a much safer, cost effective procedure with reduced postoperative morbidity.

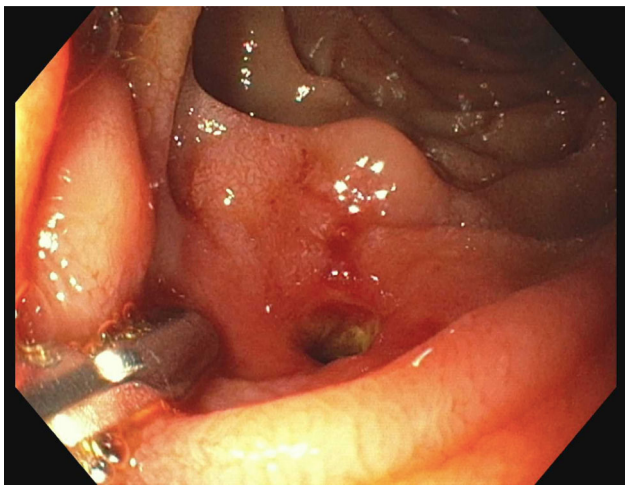


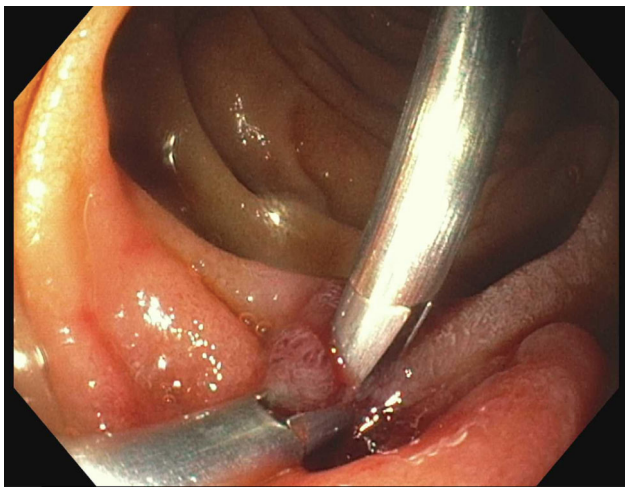












P422

Affect of Antibiotics Use During Laparoscopic Cholecystectomy with Intraoperative Cholangiogram on Post-operative Complications

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Background: Prophylactic antibiotic is unnecessary in laparoscopic cholecystectomy (LC) alone. However, the use of antibiotic is recommended in cases with bile spillage.
Objectives: The study examined the hypothesis that prophylactic systemic antibiotics may reduce postoperative complications in a patient who is undergoing laparoscopic cholecystectomy with intraoperative cholangiogram (LCcIOC).
Materials and Methods: This study is a retrospective cohort study examining patients who underwent LCcIOC from Paholpolpayuhasena hospital from the year January 2018 to March 2023. The exclusion criteria included LCcIOC that are converted to open cholecystectomy or concomitant with other operations. Propensity score (PS) and PS inverse weighting multivariable risk regression were introduced to reduce to the possible bias in baseline characteristics between the two treatment groups, including 94 patients with prophylactic antibiotics and 87 without antibiotics. The primary outcomes were rate of the postoperative complications. The endpoints comparing between groups were compared by using generalized linear with Poisson working model.
Results: A total of 181 were categorized into two groups: prophylactic antibiotics (n = 94), no antibiotics group(n = 87), and generated 72 PS-matched pairs including age, sex, surgeon, body mass index, underlying hypertension, diabetes, renal disease, heart disease, and dyslipidemia. Twelve patients (6.6) had postoperative complications including one (0.6%) CBD injury, five (2.8%) surgical site infections, six (3.3%) post-IOC cholangitis, six (3.3%) with other complication (postoperative thoracic respiratory deficiency, diabetic ketoacidosis, infected CAPD) and no case of post IOC pancreatitis. There were no significant differences in complication between the controls versus prophylaxis groups by unmatched analysis, PS

matching and PS model with double adjustment including operative duration and estimate blood loss. The rate of complications in the control group versus experimental group is 6.4% versus 6.9%, respectively (risk difference is -0.02 and the 95% CI is -0.10 to 0.06. **Conclusions:** Preoperative prophylactic antibiotics for LCcIOC had no benefit for preventing any post-operative complications. Surgeons should prescribe medication for individuals following the indication that advantages outweigh risks.

P423

Massive GI BLEED Caused by Erosion of a Duodenal Ulcer into the Cystic Artery: A Case Report

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Introduction: With advancing interventions for upper gastrointestinal bleeds, it is increasingly rare for patients to require surgery for hemorrhage. We describe a patient who required exploratory laparotomy despite endoscopy and angioembolization, found to have duodenal ulcer erosion into the cystic artery.

Methods and Procedure: An 87-year-old woman with chronic pain on daily NSAIDS was admitted to the medical ICU from the ED in hemorrhagic shock with severe anemia, epigastric pain, hematemesis and melena for 1 day. After initial stabilization, the patient urgently underwent esophagogastroduodenoscopy (EGD). Non-bleeding ulcers were noted at the first part of the duodenum without evidence of perforation. The largest anterior lesion measured 2.2 cm and clips were placed (Figs. 1–3). Given the location of the ulcers, she was taken for empiric coil-embolization of the gastroduodenal artery with interventional radiology (IR). No extravasation was appreciated.

Because the patient continued to require transfusion, the surgical team took her to the operating room (OR) for an exploratory laparotomy. The first portion of the duodenum was found to be densely adhered to the anterior gallbladder with erosion into the cystic artery. The artery was suture-ligated and hemostasis was ensured. Upon further exploration, the posterior duodenum was also scarred to the porta hepatis. The surgeon performed an antrectomy and posteriorly dissected out the post-pyloric duodenum distal to the liver hilum adhesions, before stapling across the duodenum proximal to the ampulla of Vater. Billroth II gastrojejunostomy was created, abdomen was irrigated and abdominal fascia was closed. Patient remained intubated in the ICU. Postoperatively, she remained hypotensive and returned to the OR for exploration with concern for hemorrhage. No bleeding was noted. The anastomosis was viable and intact. The gallbladder was viable but distended.

Patient ultimately was extubated and advanced diet by postoperative day 7. Patient complained of abdominal pain with RUQ tenderness and had leukocytosis by postoperative day 11. CT scan confirmed cholecystitis (Fig. 4) and patient underwent percutaneous cholecystostomy (Fig. 5) without complication. Patient was ultimately discharged on postoperative day 23.

Conclusion: Massive hemorrhagic shock in the setting of duodenal ulceration might prompt consideration of the cystic artery as a source. This would require ulcer localization through EGD and angiography with IR—both of which occurred in this case. One could argue that preemptive embolization of the cystic artery would have been appropriate, but risked gallbladder ischemia. Like this patient, this potential complication may be addressed with a less invasive percutaneous cholecystostomy.

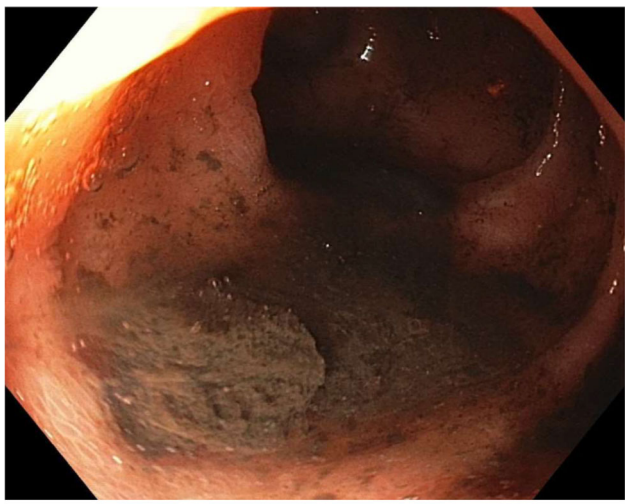


Figure 1: Duodenal Bulb with Hematin

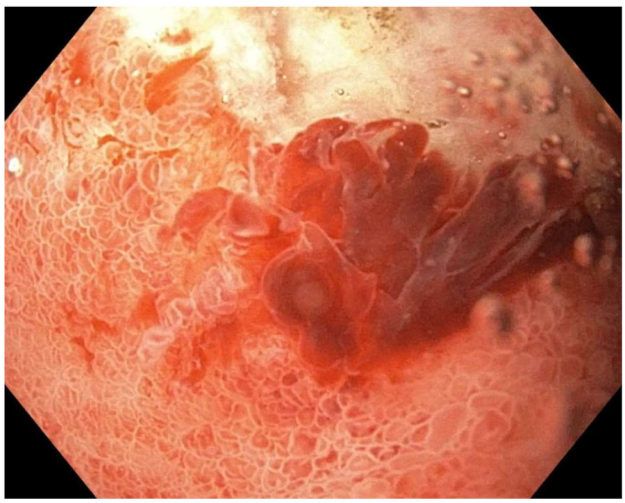


Figure 2: Ulceration

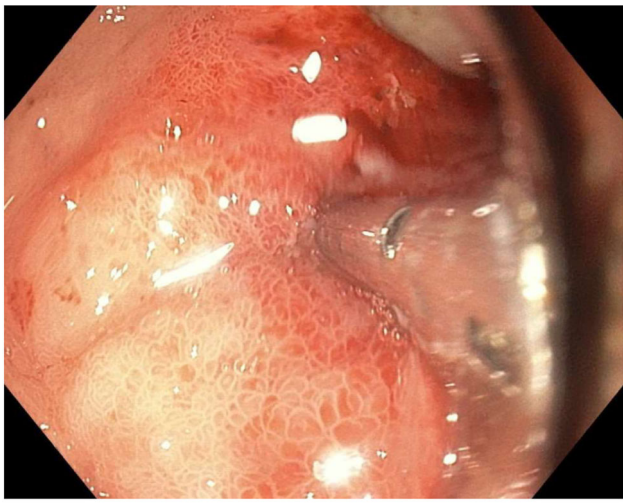


Figure 3. Second Portion of Duodenum

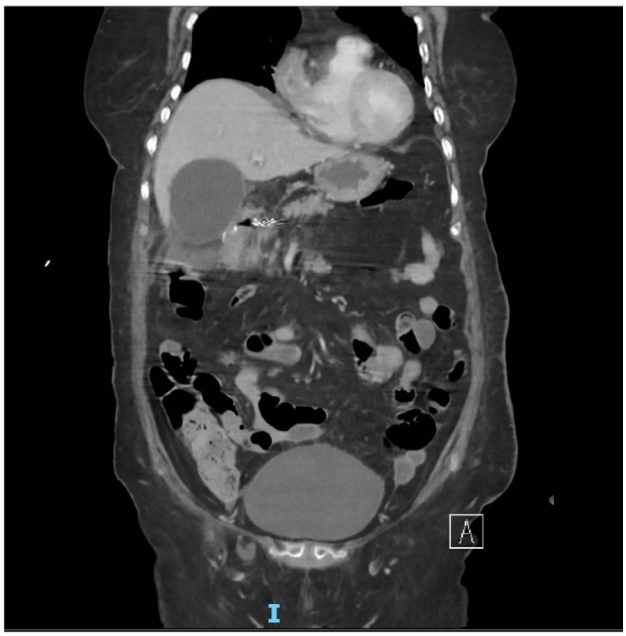


Figure 4. Cholecystitis



Figure 5. Percutaneous Cholecystostomy

P424

Case Report: Management of a Pericardioesophageal Fistula with Endoluminal Wound Vacuum Therapy

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Introduction: Esophageal perforation may result in fistulization with surrounding structures and can be managed by surgical, endoscopic, or observational strategies. Herein, we present a unique case of pericardioesophageal fistula (PEF) secondary to esophageal ulceration that was definitively managed with endoluminal wound vacuum therapy.

Case Report: A 36-year-old male with a history of gastroesophageal reflux esophagitis and polysubstance use presented with worsening chronic chest pain, nausea and vomiting, and hemodynamic instability. Electrocardiogram was initially suggestive of myocardial infarction. However, a bedside ultrasound showed a large pericardial

effusion, and he was diagnosed with cardiac tamponade. He developed cardiac arrest requiring cardiopulmonary resuscitation and pericardiocentesis, leading to return of spontaneous circulation within four minutes. The pericardiocentesis returned air and bile-stained fluid. Computed tomography (CT) of the chest with enteric contrast demonstrated a PEF with communication between the distal esophagus and pericardium, and esophageal contents seen tracking along the mediastinum (Fig. 1). In the operating room, a subxiphoid pericardial drain was placed with immediate improvement in hemodynamics. Esophagogastroduodenoscopy (EGD) showed a large ulcer in the distal esophagus. A percutaneous endoscopic gastrostomy with jejunal port tube was placed for enteral feeding, followed by an endoluminal wound vacuum placed over the ulcer and suctioned via nasogastric tube. The patient was started on intravenous proton pump inhibitor therapy, antibiotics, and renal replacement therapy. He underwent EGD and sponge exchanges every few days (Fig. 2). Following three sponge changes there was healthy granulation tissue without extravasation of contrast on fluoroscopy. The sponge was removed on hospital day 10. Resolution of the PEF was confirmed by echocardiogram and esophogram. Unfortunately, the patient remained critically ill and succumbed to multiple organ failure present on admission.

Discussion: Endoluminal vacuum assisted closure (EVAC) therapy has gained popularity as a novel management tool for gastrointestinal leaks. Under endoscopic guidance, a sponge attached to a nasogastric tube is placed over the defect and connected to continuous negative pressure; the sponge is replaced every 3 to 7 days. Closure of esophageal perforation with EVAC has a reported clinical success rate of 89%. In addition to wound closure, EVAC provides source control, promotes tissue reperfusion, and debrides necrotic tissue. In this case, twice-weekly sponge changes facilitated assessment of healing progress and resulted in ultimate resolution of the defect. This case suggests that endoluminal wound vacuum therapy may be an effective treatment modality for PEF.

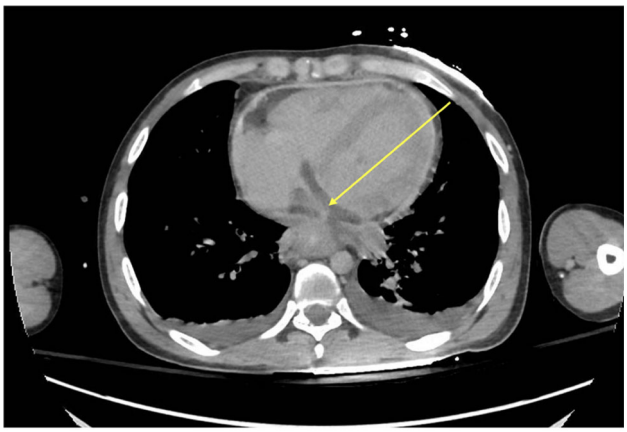


Figure 1: CT esophagram demonstrating PEF.

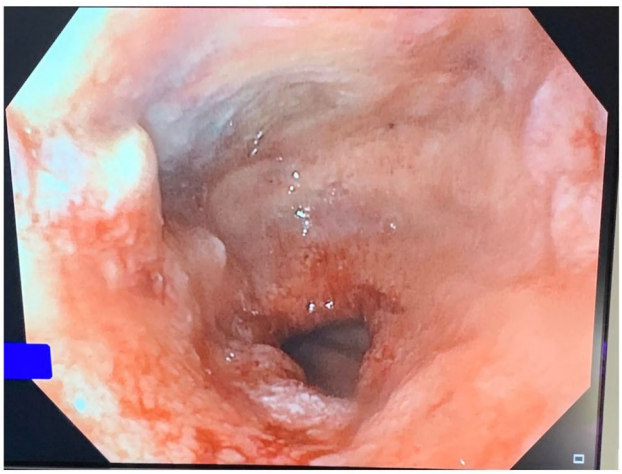


Figure 2: EGD demonstrating esophageal ulcer.

P425

Long-term Effectiveness of Endoscopic Gastrojejunostomy in Patients Presenting with Gastric Outlet Obstruction from Periampullary Malignancies

William Cobb, MD[1]; Shelby Harris, MD[1]; Jonathan Xavier[2]; Sebastian de la Fuente, MD[1]; [1]AdventHealth; [2]Loma Linda University School of Medicine

Recently, endoscopic ultrasound-guided (EUS) gastrojejunostomy (GJ) has emerged as an alternative option to surgical palliation and endoscopic duodenal stenting of malignant gastric outlet obstruction (GOO). Overall, there is a lack of data regarding the long-term patency of this treatment. In this study, we investigated long-term effectiveness in patients that underwent EUS-guided GJ for palliation of periampullary malignancies through symptom recurrence and adverse events. A total of 192 studies were reviewed and 6 studies with a follow up time frame of a minimum of 5 months were included in the final analysis, totaling 238 patients. A total of 14 patients (5.9%) experienced recurrence of GOO symptoms. A total of 25 patients (10.5%) experienced adverse events associated with EUS-GJ. The most common adverse events were stent mis-deployment (3.4%), stent misplacement/occlusion/leakage (2.4%), abdominal pain requiring hospital readmission (1.3%), and bleeding (0.8%). In the era of more effective chemotherapy regimens that result in prolonged survival in malignant GOO, data is scarce regarding long-term effectiveness of EUS-guided GJ. Our meta-analysis shows that EUS-guided GJ appears be a safe procedure with low symptom recurrence and adverse events. Further studies should focus on long-term data and surgical palliation should continue to be the treatment of choice until more evidence becomes available regarding the long-term effectiveness of EUS-guided GJ.

P426

Near-Infrared Fluorescence (NIRF) Visualization of Iatrogenic Ureteral Injury Using Pudexacianinium Chloride (Asp5354) in a Porcine Model In Vivo

Hiroshi Fushiki; Akiyoshi Ohtake; Futoshi Kunieda; Astellas Pharma Inc.

Introduction: Intraoperative iatrogenic ureteral injury (IUI) is a major medical complication during abdominal surgery, and its occurrence is one of the medical issues with a poor prognosis for patients. IUI places a serious health burden to the patient and necessitates additional surgery. New technologies such as ureteral stents and intraoperative imaging have been developed to avoid IUI; however, some technologies including ureteral stents are invasive for patients and require lengthy surgical procedures. We are conducting phase 3 studies for ureter visualization during abdominal surgery using Pudexacianinium chloride, known as NIRF imaging agent ASP5354. Here, we report the effect of Pudexacianinium chloride on IUI detection using NIRF imaging in a porcine in vivo model.
Methods and Procedures: Göttingen mini-pigs underwent laparotomy and were intravenously administered Pudexacianinium chloride (0.01 mg/kg), and both left and right ureters were visualized using the clinically approved NIRF camera, pde-neo. Indigo carmine was used as an agent for comparing visual assessment. After the confirmation of urine flow by NIRF video image in the Pudexacianinium chloride group and visual recognition in the indigo carmine group, various ureteral injuries (obstruction, blunt cut, perforation) were induced, and visual assessment by the surgeon on images was examined in each case.
Results: Intraoperative NIRF imaging by Pudexacianinium chloride was able to visualize ureters through the retroperitoneum of mini-pigs. In each IUI, the NIRF signal by Pudexacianinium chloride allowed visualization of damage. In the indigo carmine group with obstruction and blunt cut, it was possible to visually detect IUI in the same way as in clinical settings, but the detection sensitivity by Pudexacianinium chloride was higher than that of indigo carmine. With perforation damage, Pudexacianinium chloride showed a potential to detect the ureter leakage from the perforation site (2 out of 3), whereas indigo carmine did not (0 out of 3).
Conclusion: These preclinical results suggest that intraoperative NIRF imaging with Pudexacianinium chloride, undergoing phase 3 studies for ureter visualization, is potentially useful for detection of IUI occurrence.
Funding: The study was funded by Astellas Pharma Inc.

P427

The Role of ICG in Improving Operative Safety During Emergency Laparoscopic Cholecystectomy: Preliminary Results of an Observational Prospective Study

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Introduction: At present, there is little evidence regarding the efficacy of fluorescent cholangiography in acute cholecystitis in emergency setting. The purpose was to evaluate the efficacy of near-infrared fluorescent cholangiography (NIRF-C) by ICG in real-time visualization of the biliary tree during emergency laparoscopic cholecystectomy and to analyze the clinical outomes.
Methods and Procedures: Inclusion criteria were patients with clinical and ultrasound diagnosis of acute cholecystitis undergone laparoscopic cholecystectomy within 24-72 h and operable patients (ASA score 0-3). The primary outcomes were the visualization rates of the extra-hepatic biliary tracts (CD, CHD, CBD, any accessory or aberrant ducts) in the different degrees of acute cholecystitis according to the AAST classification, total duration of surgery, conversion rate, bail-out procedures, iatrogenic bile duct lesions. Secondary outcomes were post-operative complications (30 days); length of hospital stay; mortality at 30 days.
Results: We report the preliminary results of the interim analysis of the study (N = 44). The cystic duct (CD) was identified successfully by NIRF-C in 22 of 44 patients (50%) and in 44 of 44 patients (100%) before and after Calot's dissection respectively ($p < 0.0001$). The common hepatic duct (CHD) and the common bile duct (CBD) were identified successfully in 6 of 44 patients (13.6%) and in 25 of 44 patients (56.8%) before Calot's dissection respectively and in 22 of 44 patients (50%) and in 43 of 44 patients (97.7%) after complete Calot's dissection ($p < 0.0001$). Comparing non-gangrenous forms (AAST I) and gangrenous forms (AAST II, III, IV), it emerged that there is a significative reduction in the visualization of the biliary tract in gangrenous forms compared to non-gangrenous forms, both before and after Calot's dissection ($p < 0.001$ for CBD visualization before dissection). In 6 patients (13.6%), intraoperative complications were recorded; 4 minor iatrogenic bile duct injuries were observed (3 leaks of Luschka's duct and one cystic duct leak). The mean duration of surgery was 109.8 min $\pm$ 53.6 (range 35-310 min). The mean duration of hospital stay was 7.4 days $\pm$ 5.7; complications within < 30 days of surgery occurred in 13 (29.5%) patients, and two patients (4.5%) required re-intervention. Only one patient died.
Conclusions: These preliminary data demonstrated that the use of ICG during emergency laparoscopic cholecystectomy for acute cholecystitis may be helpful for the intra-operative visualization of the extrahepatic bile ducts to prevent biliary injuries and it may be used as an adjunct even in emergency setting and difficult cholecystectomies.

P428

Efficacy and Safety of Endoscopic Self-Expendable Metal Stents Utilization in Elderly and Frail Patients

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Introduction: In 2000, 600 million persons were aged 60 years or older. This shift of age toward the elderly pushed us to better understand the accumulating impact of comorbidities, Frailty, functional status, and the cognitive state as a predictor of peri-procedural morbidities and mortality rather than chronological age.
Self-expendable metal stents (SEMS) for upper gastrointestinal tract obstruction are regarded as an accepted adjunct in the treatment of Upper GIT obstruction, perforation, or leakage, as a definitive treatment, bridge to surgery, or palliation.
Data on SEMS utilization in the elderly and specifically frail population is lacking.
Methods: A retrospective data analysis of our prospectively maintained database of patients who underwent endoscopic SEMS between 2018 and 2021 at our tertiary medical center. Demographics, clinicopathological characteristics, stent efficacy, and stent-related complications were compared between elderly patients above the age of 70 years (EG) and a control group (CG) of adult patients 18-69 years old. We further stratified the cohort into frail (FG) and non-frail groups (NFG) according to the Memorial Sloan Kettering–Frailty Index (MSK-FI).
Results: 82 patients who underwent endoscopic stent placement in the upper GI tract (Oesophagus, Stomach, and Duodenum) were identified. 36 patients, (ranged 70-94 years) were included in the elderly group and 46 patients (ranged 18-69 years) were included in

the CG. No difference was identified in the demographic and clinicopathological characteristics, indications, and SEMS locations.
There was no statistical significance in the 90-day major morbidity (%, 22 vs 26, p = 0.66), mortality (%, 22 vs 20, p = 1.00), and the length of stay (days, 20 vs 15 p = 0.26) between the EG and the CG respectively. SEMS resolved the symptoms for the majority of the patients in the EG and the CG (%, 86 vs. 76, p = 0.27).
Frail patients were significantly older than non-frail patients (mean age- 75 vs. 60 years, $P < 0.01$), besides that, No difference was identified in the demographic and clinicopathological characteristics. The indications, SEMS locations, and time from symptoms to stenting were all similar. There was no statistical significance in the 90-day major morbidity (%, 24 vs 24, p = 1.00), mortality (%, 24 vs 13, p = 0.26), and the length of stay (days, 24 vs 16 p = 0.16)between the FG and the NFG respectively.
Conclusion: In the era of advanced endoscopic treatments and improved intensive care, the utilization of upper GIT SEMS is highly effective both in the elderly and in frail patients with similar risk compared with younger and fitter patients.

P429

The Use of Self-Expanding Metal Stents for Extra-Colonic Malignancy Is Safe and Efficient

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Introduction: Malignant bowel obstruction (MBO) in advanced malignancy is common. Up to 51% of women with recurrent ovarian cancer develop MBO and their median survival following MBO diagnosis ranges from 2-6 months. MBO also complicates other types of malignancies such as endometrial and cervical cancer, urinary tract malignancies, and peritoneal spread of Gastrointestinal tract malignancies.
In colorectal cancer (CRC), Self-Expanding Metallic Stent (SEMS) has been used successfully since the early 1990s. Data regarding stent placement for MBO secondary to Extra-Colonic Malignancy (ECM) is conflicting. Some studies report that palliative stent placement was equally effective and safe for the treatment of colonic obstruction arising from either ECM or nonresectable CRC, while other studies found that SEMS for ECM are less effective and more frequently require re-intervention compared to SEMS for CRC.
We aimed to describe clinical success complication rates for patients with MBO secondary to extra-colonic malignancies.
Methods: A retrospective review of patients with large bowel obstruction resulting from EXM who were referred for colorectal stenting at our academic hospital network between 2002 and 2022.
Results: 80 patients were included in this study. The majority of them suffered from gynecological malignancy (ovarian 58%, endometrial 18%, and cervical 5%), other obstructions were caused by peritoneal dissemination of Gastrointestinal-tract tumors (13%) urinary-tract malignancies (4%), breast cancer 1(%) and lymphoma (1%). The median age was 65 years ranging from 36 to 90. Median follow-up of 6 months ranging from 1 to 27 months. The most common site of obstruction was the sigmoid colon (71%), followed by the rectosigmoid (19%), rectum (5%) and descending colon (5%).
For 11% of patients, SEMS was technically impossible, due to full obstruction or multiple lesions. For the cohort of patients for whom the stent was successfully deployed, the clinical success rates were 73%. The other 27% either underwent surgical decompression or were deemed unsalvageable and were treated in palliative manners. Complication rates were 21%, of which; re-obstruction (61%) stent migration (13%), bowel perforation (13%), and rectovaginal fistula (13%). Most patients who had had complications had re-intervention (88%) either surgically or endoscopically.
Conclusions: SEMS insertion for malignant bowel obstruction secondary to Extra-Colonic Malignancy is a useful tool for palliation. SEMS may substitute the need for surgery and stoma creation and improve quality of life. In our opinion, the use of SEMS rather than classic surgical techniques on this unfortunate group of patients is often advocated, especially when considering patients' preferences, performance status, and quality of life.

P430

What Are the Ethical, Legal and Social Considerations for Recording, Sharing and Utilizing Surgical Videos? A Thematic Analysis and Framework to Guide Stakeholders

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Introduction: Surgical videos have tremendous value for education, research, quality improvement and innovation. Yet, recording, storing, sharing and utilizing this form of data is fraught with procedural challenges. This study aims to produce a roadmap for stakeholders to conceptualize key ethical, legal, and social considerations for acquiring and engaging with surgical videos, rooted in the experiences and perspectives of surgeons and industry professionals.
Methods: 38 surgeons and industry members were recruited and assigned to one of five focus groups. Participants were guided through group discussions that prompted reflection on their experiences with navigating surgical data recording policy within their institution and in partnership with external parties. The first four focus groups loosely defined the emergent framework and informed the final focus group where the focus was to better understand under-developed concepts, categories, and themes. Focus groups were transcribed and analyzed using thematic analysis. Coding was performed by two members of the research team and was inductive and deductive in nature. The research team reviewed all data and constructed a comprehensive framework capturing the experiences of focus group participants.
Results: A conceptual framework was developed following iterative data analysis, highlighting key issues with regard to ethical, intellectual property and legal considerations, irrespective of institution or jurisdiction. We summarize considerations related to patient and personnel consent, ethical principles, and data storage, security, access, and ownership. Our framework guides stakeholders stepwise through key issues, with recommendations and considerations to protect all involved parties. Moreover, we identify a paucity of policy surrounding issues of ownership and commercialization.
Conclusion: A framework was developed to guide surgeons, institutions, and industry partners through key considerations when acquiring surgical videos for various applications. There is a strong need for additional guidelines on the recording, sharing and use of surgical video data to ensure fairness and safety for patients, staff, and external partners.

P431

Physician Leadership in Supply Chain: Important Now More than Ever

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Objective of the Study: Clinical integration of health care supply chain (SC) is an emerging concept designed to drive value. This physician leader provides a key link between clinical practice and SC, and COVID-19 has elevated the importance of this role. This study reports survey data from large health systems in the United States regarding personal protective equipment (PPE) use and the role of SC clinical leadership during the early months of the COVID-19 crisis.
Methods and Procedures: Two surveys were administered by Vizient Inc., to 24 Large IDN Supply Networks (LISN) to evaluate PPE use and the role of physician leaders in SC during the early COVID-19 crisis (4/28/20 – 5/11/20). The responses were collected and analyzed by a Supply Chain Physician Collaborative (SCPS) workgroup.
Results: The first survey reported COVID-19 patient census data and PPE use during the prescribed time period and data was compiled for 15 of the 24 LISN members. There were dramatic increases in PPE use for all categories with wide variation based on the patient census and region of the country. The second survey assessed the roles and value of the SC physician leader and 17 surveys were analyzed. The primary role was to communicate with SC, clinical faculty and staff, and executive leadership to ensure PPE inventory and rapidly changing policies were aligned. The SC physician leader was highly valued by supply chain and executive leadership in their health systems due to their ability to connect supply chain to key leaders in the health system and contribute to workgroups during the crisis.
Conclusions: Physician leadership in supply chain provides a critical link between clinicians and supply chain teams under normal circumstances. During COVID-19, the role of the SC physician leader expanded to include frequent communication between key stakeholders in the health system regarding PPE management. Hospital support for a physician leader in SC is critical to developing a culture of clinical integration and resource stewardship in times of crisis such as this.

P433

When Cancers Collide—Unveiling Cholangiocarcinoma and Hepatocellular Carcinoma in an Astonishing Collision Carcinoma Case

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Collision carcinoma, an exceedingly rare occurrence, involves the simultaneous presence of two distinct malignant tumors within the same organ. Cholangiocarcinoma and hepatocellular carcinoma are relatively uncommon, making collision carcinoma an even rarer clinical entity that requires careful evaluation and personalized therapeutic strategies. This case study highlights a rare diagnosis involving cholangiocarcinoma and hepatocellular carcinoma. A 71-year-old female with a past medical history of chronic back pain presented with nonspecific symptoms of fatigue and abdominal pain. Physical examination was remarkable for right upper quadrant tenderness. Routine laboratory tests were notable for an elevated alkaline phosphatase. Alpha-fetoprotein and CA 19-9 levels were approximately 520 ng/mL and 230 U/mL, respectively. An abdominal CT scan revealed multiple hepatic masses, with an enormous mass measuring approximately $10.6 \times 8.3 \times 7$ cm in the medial segment of the left lobe, prompting further investigation. A follow-up MRI revealed a dominant mass within the central liver, measuring $7.7 \times 13.9 \times 12.5$ cm, with associated capsular retraction and upstream biliary ductal dilation, consistent with mass-forming cholangiocarcinoma. The dominant mass exerted a mass effect on adjacent intra-abdominal viscera, causing displacement of the pancreas and the gallbladder and compression of the portal vein and common bile duct. Ultrasound-guided biopsy was indicated, and the nature of these tumors was investigated using immunohistochemical testing. The samples exhibited positive staining for ck7, satb2, and ca19-9 and negative staining for ck20, ttf1, napsin, and gata3, confirming the simultaneous presence of cholangiocarcinoma and hepatocellular carcinoma. Due to the unique nature of collision carcinoma, a multidisciplinary team was involved in devising an optimal treatment plan. The patient was started on a combination chemotherapy regimen of cisplatin, gemcitabine, and Abraxane. The patient responded exceptionally well to treatment, as evidenced by repeat imaging and tumor marker levels after five months. Alpha-fetoprotein and CA 19-9 levels decreased to 4.5 ng/mL and 9U/mL, respectively. Subsequent imaging revealed more than 50% reduction in the size of the primary lesion. This encouraging response opened up the potential for surgical intervention that was previously deemed unattainable. The planned surgical resection promises further disease control and improved long-term outcomes for the patient. The presented case report delves into an intriguing and unusual scenario of collision carcinoma. We aim to emphasize the importance of a comprehensive, adaptive approach to diagnose collision carcinomas accurately. This case suggests that tailored treatment approaches show promising outcomes. Further studies are needed to explore the underlying mechanisms of tumor coexistence and to optimize their therapeutic approach.

P435

Surgical Outcomes of Liver Transplantation in Bariatric Surgery Patients with Acute Liver Failure: A Case Series from the United Arab Emirates

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Introduction: Bariatric surgery (BS) has emerged as an effective therapy for weight loss and improvement in cardiovascular comorbidities. While considered safe, it is not without risks, and severe complications such as acute liver failure (ALF) can occur. Although ALF after BS is rare, might require liver transplantation (LT). Unfortunately, limited data is available reporting LT in cases of post-bariatric surgery-induced liver failure. As such, the objective of this study was to evaluate the postoperative outcomes of patients who underwent (LT) following ALF post-bariatric surgery.
Methods and Procedures: We conducted a retrospective study from June 2016 to June 2023. Patients with documented ALF following BS, requiring liver transplantation for survival, were included in the study. Demographic characteristics, preoperative comorbidities, intraoperative and postoperative outcomes were collected and analyzed.
Results: A total of three patients were included. The mean age was 36 ± 9.5 years, with a predominance of female patients (66.7%). The mean initial body mass index (BMI) was 28.46 ± 4.36 kg/m2. The

most common bariatric procedure preceding ALF was Roux-en-Y Gastric Bypass (RYGB) 100%. The median index-time between RYGB and the onset of ALF was 12 months. Ascites and encephalopathy were recorded in all 3 patients (100%). 2 patients (66.7%) were under parenteral nutritional support before the LT and 2 patients (66.7%) documented concomitant acute kidney failure. Liver biopsies before LT were reported as follows: 2 cases of Non-Alcoholic Fatty Liver Disease (NAFLD) and 1 case of Non-Alcoholic Steatohepatitis (NASH). One patient (33.3%) had their BS procedure reversed during the LT. Following LT, 66.7% of patients experienced resolution of ALF-related complications, demonstrating a significant improvement in overall health. The overall survival rate at 6-month follow-up was 66.7%, highlighting the effectiveness of liver transplantation in this specific patient population. Notably, none of patients experienced post-transplantation surgical complications. There were no fatalities (0%) among patients while on the LT waiting list, and one patient (33.3%) died after LT due to graft failure.

Conclusions: Our results highlight the rare occurrence of ALF post-bariatric surgery, requiring LT for survival. The predominance of RYGB underscores the need for vigilant monitoring. While two-thirds of patients showed significant improvement post-transplantation, one case of graft failure led to mortality. This demonstrates that timely intervention with LT leads to significant improvements in patient outcomes, including survival rates and resolution of ALF-related complications. Further prospective studies are warranted to refine patient selection criteria and optimize post-transplantation management strategies.

P437

Hepatocellular Carcinoma Insights: A Comprehensive Updated Analysis of 60,034 patients from the Surveillance, Epidemiology, and End Results (SEER) Database

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Introduction: Hepatocellular carcinoma (HCC) is the primary liver neoplasm linked to chronic liver diseases (CLD), including hepatitis B and C, alcohol overconsumption, nonalcoholic fatty liver disease (NAFLD), and aflatoxin exposure. Its late diagnosis and limited advanced-stage treatment make it even more challenging. Early detection can improve survival outcomes, with treatments ranging from surgery, transplantation, and ablation to systemic therapy. The current study describes the largest cohort of patients with HCC from the Surveillance, Epidemiology, and End Results (SEER) database to better identify the demographic, clinical, and treatment modalities that impact clinical outcomes.

Methods: Demographic and clinical data were abstracted on 60,034 patients with HCC from the SEER research plus database (2000 – 2018).

Results: A total of 60,034 cases of HCC were identified, comprising 45,868 (76.4%) male and 14,166 (23.6%) female patients. Most of the patients (n = 289) were diagnosed after the 7th decade of life (18, 816; 31.3%) and belonged to Caucasian ethnicity (40, 974; 68.3%). When information regarding tumor staging 51,934 (86.5%), grading 32,472 (54.1%), and tumor size 31,757 (52.9%) was available, most of the tumors were localized 27,422 (52.8%), moderately differentiated 14,207 (43.7%), and were more $>$ 5 cm in size 15,424 (48.6%). Also, where the treatment information was available, most 25, 654 (43.2%) received no treatment; surgery alone, 13,639 (23.0%), chemotherapy alone, 14,184 (24.0%), and 83 (0.1%) had radiation alone. Also, 4,915 (8.2%) of the cases had surgery plus chemotherapy combined, 452 (0.8%) had surgery plus radiation combined, and 114 (0.2%) had chemotherapy plus radiation. The overall 5-year survival was 20.2% (19.8-20.6) and highest in those who received surgery 57.7% (56.8-58.5). Multivariable analysis identified age $>$ 60 hazard ratio (H.R) 1.167 (0.001), moderately differentiated; H.R 1.212 (0.001), poorly differentiated; H.R 1.704 (0.001), undifferentiated; anaplastic; H.R 1.854 (0.001), tumor size $>$ 5 cm; H.R 1.555 (0.001), regional stage; H.R 1.585 (0.001), distant stage H.R 2.303 (0.001), lungs metastasis H.R 1.171 (0.013) and radiation H.R 1.331 (0.001) as factors associated with increased mortality, p-value $<$ 0.05.

Conclusion: HCC preferably affects Caucasian men and is detected later due to non-specific presentation. Surgical resection remains a treatment choice because it significantly increases 5-year survival. Although radiation alone decreases survival, more extensive studies are needed to investigate the proper role of radiation for HCC, given the limited number of cases who underwent radiation in the study.

P438

Laparoscopic Right Hepatectomy for Colorectal Liver Metastases After Initial Management with Percutaneous Liver Ablation

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Introduction: Colorectal liver metastasis (CRLM) continues to be a challenging problem in the management of colorectal cancer. Patients with CRLM have an ongoing risk of disease recurrence regardless of the initial management approach taken. The ability to manage the recurrence of CRLM has been shown to influence survival outcome. We demonstrate in this poster our minimally invasive approach where a laparoscopic right hepatectomy was performed with a wedge resection of a caudate lobe to clear the liver from CRLM.

Patient and Methods: A case of a 39-year-old female with recurrence of CRLM status-post percutaneous liver ablation. The patient initially underwent a laparoscopic left colectomy with primary anastomosis for a T3N1M1 colonic mass. Thereafter, the patient developed bilobar metachronous liver lesions that partially responded to adjuvant chemotherapy and percutaneous liver ablation. The patient was noted to have recurrence of CRLM on surveillance cross sectional imaging. The multidisciplinary tumor board meeting consensus was to proceed with surgical resection of the liver lesion.

Results: The procedure started with a diagnostic laparoscopy that revealed a peritoneal lesion that was noted to be non-malignant on frozen section assessment. This was followed by an intraoperative-liver-ultrasound that confirmed absence of lesions outside the planned liver remnant. A cholecystectomy was then performed. The cystic duct and artery were dissected and reflected to identify the right hepatic artery. The right portal vein was dissected and clamped for selective inflow control. An intracorporeal pringle maneuver control was set using a foley catheter torniquet. The liver was then mobilized from its attachments and resection margin was marked after surface demarcation. The liver was then transected using laparoscopic ultrasonic cavitation device. The right portal vein, hepatic vein, and bile duct were divided intraparenchymally. A wedge resection of the caudate was performed. The resected liver was then delivered through a 7 cm Pfannenstiel incision. Of note, the patient was noted to have a defect in the right dome of the diaphragm from the incisional biopsy site that was repaired intracorporeally. The operative time was 766 min with estimated blood loss of 1200 mL. The patient developed an asymptomatic pneumothorax that resolved conservatively.

Conclusion: Minimally invasive approach allows for better recovery after major surgery. Reintervention on CRLM is warranted to give patients the best chance possible for survival. Furthermore, such patients would be able to return to adjuvant treatment in an expedited manner postoperatively.

P440

Management of Giant Gall Bladder (4.5 Liters Capacity)

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A large cystic mass occupying all quadrants of the abdomen with cysto cutaneous connection was subjected to a CT Scan. Sheer size of the cyst was unable to localize the organ of origin but, since Gall bladder was not seen separately ICG dye was injected 90 min before surgery. laparotomy done, Difficult adhesions with cysto cutaneous connection tackled.NIR imaging confirmed that the cystic mass was gall bladder. Callot structures identified by NIR imaging. GB capacity was 4.5 L. The postoperative period was uneventful. discharged 6th day postoperatively. Histopathology was XGC.

P441

Effectiveness of Patient Education on Laparoscopic Surgery Postoperative Outcomes: A Systematic Review of Randomized Controlled Trials. Is Direct Coaching the Best Approach?

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Introduction: As of 2022, patient postoperative non-compliance can increase the risk of complications by up to 52.4% after laparoscopic abdominal surgery, however, no singular pre-operative education intervention (POEI) demonstrates consistent improvement in patient outcomes. This study aims to determine the impact of POEIs on patient outcomes.
Methods: 4,753 articles investigating POEI (e.g. videos, presentations, mobile apps) were collected from PubMed, EMBASE, and Scopus databases. Inclusion criteria were: patients undergoing abdominal laparoscopic surgery, randomized controlled trials, and reported postoperative outcomes. Title/abstract and full-text articles were screened through a blinded, dual review using Covidence. Study quality was assessed through the Cochrane Risk of Bias tool. Included articles were analyzed for educational content, intervention timing, intervention type, and postoperative outcomes appropriate for a particular surgery. Study protocol registered to PROSPERO: CRD42023438698.
Results: 17 studies matched our criteria, with no overall high risk of bias, with 1,831 patients undergoing laparoscopic cholecystectomy, bariatric surgery (gastric bypass and gastric sleeve), and colectomy. The table illustrates the various POEI outcomes. 41.2% of the included studies showed that one-on-one education/coaching improved outcomes in almost all surgery types, while educational videos had the greatest statistically significant impact for anxiety, nausea, and pain postoperatively ($p < 0.01$). Group education/coaching demonstrates significant improvement in weight, BMI, exercise, and depressive symptoms in 33.3% of the laparoscopic gastric bypass studies.
Conclusion: Direct education/coaching (one-on-one or group-based) positively impacts postoperative outcomes more than the newer POEIs (e.g. mobile apps).

Table 1 Patient Education Interventions and Patient Outcomes

Intervention Type (# of studies)	Surgery Type	Patient Outcomes
One-on-one education/ coaching (7)	Laparoscopic Cholecystectomy	Nausea*
		Pain*
	Laparoscopic Gastric Bypass	Weight**
		Caloric Intake*
	Laparoscopic Colectomy	Complication Rate*
		First Exhaust Time*
		ICU Admission*
Educational Video (4)	Laparoscopic Cholecystectomy	Anxiety**
		Pain**
		Nausea*
	Laparoscopic Gastric Sleeve	Pain**
Group education/ coaching (2)	Laparoscopic Gastric Bypass	Weight**
		BMI**
		Exercise**
		Depressive symptoms**
Presentation (2)	Laparoscopic Cholecystectomy	Anxiety**
		Fatigue**
Mobile App (2)	Laparoscopic Gastric Bypass	BMI*

Statistical significance: *$p < 0.05$; **$p < 0.01$

P442

A Significant Gastrointestinal Basidiobolomycosis that Extended to the Right Ureter: A Case Report

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Background: Intra-abdominal basidiobolomycosis involving multiple organs and extending to the retroperitoneal viscera is exceedingly uncommon. However, we present a case of significant intra-abdominal basidiobolomycosis that extended to involve the right ureter.
Case Presentation: A 33-year-old male with an unremarkable past medical history was referred to our ER with a three-week history of persistent abdominal pain, distension, and constipation associated with nausea, anorexia, and weight loss without vomiting. He had a distended abdomen with a large, non-tender abdominal mass that occupied almost the entire right side. Laboratory investigations were unremarkable. A CT scan of the abdomen revealed a large heterogeneous soft tissue mass inseparable from the cecum and proximal part of the ascending colon, measuring about $12 \times 14.6 \times 7.3$ cm. The mass was encasing the right ureter and displacing surrounding structures; there were no signs of intestinal obstruction and no focal liver lesions. A colonoscopy

showed a circumferential mass obstructing 90% of the lumen, starting at the mid- ascending colon, which was suspicious for malignancy. The biopsy specimen revealed chronic active colitis. The patient's symptoms worsened, necessitating a repeat CT scan, which demonstrated a progressive course with a marked increase in size (20 × 15 × 20 cm) and hydronephrosis. An image-guided biopsy was obtained, which confirmed the diagnosis. Based on an MDT recommendation, voriconazole was initiated, a double J stent was inserted into the right ureter, and an exploratory laparotomy was performed in an attempt to debulk the mass. However, the procedure was declined as the mass was adherent to multiple adjacent structures. Two weeks later, he developed abdominal wound dehiscence with a duodenal fistula, as confirmed by a CT abdomen, which also demonstrated necrosis of the pseudo-tumor. The patient was kept NPO, and total parental nutrition was established. The stent was observed through the abdominal wound a week later, denoting a ureteric injury and prompting the insertion of a nephrostomy tube. The patient underwent repair of the duodenal fistula combined with right hemicolectomy and concluded with repair of the injured right ureter in a two-stage procedure. He is currently in good health and continues to receive voriconazole.

Conclusion: Despite diagnostic challenges, a high index of clinical suspicion supported by histology can lead to an accurate and prompt diagnosis. As the pseudotumor may occasionally respond to the initiated antifungal treatment with necrosis, it is imperative to anticipate the resulting complications and adopt an MDT approach to ensure a favorable outcome.

Keywords: Basidiobolmycosis, Gastrointestinal, Ureter



P443

Variability in Opioid Prescription Practices for Common General Surgery Procedures in Nova Scotia, Canada: A Retrospective Analysis.

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Introduction: Unwarranted variability in opioid prescription practices (OPP) significantly contributes to the opioid epidemic in North America. The objective of this study was to determine variability in OPP for common general surgery procedures in Nova Scotia (NS) Canada from 2016-2022 between outpatients and inpatients upon discharge, as well as between and within institutions.

Methods and Procedures: The study population was identified through the Canadian Classification of Health Interventions (CCI) procedure codes in the Canadian Institute for Health Information (CIHI) Discharge Abstract Database (DAD) and National Ambulatory Care Reporting System (NACRS). Surgical procedures included cholecystectomy, appendectomy, inguinal hernia repair, and hemorrhoidectomy. The Drug Information System (DIS) was used to identify all opioid prescriptions filled at a community pharmacy. OPP were standardized to an equianalgesic pill count of 2 mg hydromorphone tablets. The mean, standard deviation (SD) and coefficient of variation (CV) were calculated. Variation between and within hospitals for those who received an opioid was measured using a two-level ANOVA. For all analyses, a p-value of < 0.05 was considered statistically significant.

Results: There were 4,210 inpatient and 7,403 outpatient cases included in the study population. Upon discharge, 30.7% of inpatients received an opioid prescription, compared to 43.1% of outpatients ($p < 0.0001$). Outpatients were more likely to receive an opioid prescription for each of the surgical procedures, except for hemorrhoidectomy (33.5% inpatients vs 27.5% outpatients, $p = 0.009$). Among patients who received an opioid, the mean number of pills was 12.1 (SD = 7.0) for inpatients, and 14.9 (SD = 7.0) for outpatients ($p < 0.0001$). Significant variation in OPP existed, with a CV of 55.8 for inpatients and 43.7 for outpatients ($p < 0.0001$). ANOVA analysis showed significant variation in mean pill count both between hospitals, as well as between surgeons within any given hospital ($p < 0.0001$).

Conclusion: This study shows significant variability in OPP – both between hospitals, and between surgeons within any given hospital – for patients who underwent common general surgery procedures in NS, Canada. Unwarranted variability in OPP is of significant concern as it may increase the risks of drug diversion, opioid use disorder and long-term opioid use. Shared decision-making models and prescription guidelines by regulatory bodies have been shown to reduce variability in OPP and may be considered in NS, Canada.

P444

Complex Esophageal Surgical Reconstruction Outcomes in Latin American Hospital: A 6-year Retrospective Study

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Introduction: Esophageal reconstruction is a demanding technique that entails challenging surgical skills for surgeons. Numerous surgical approaches have been described throughout the literature, each with comprehensive and specific benefits. Retrospective research was conducted to share our experience of esophageal replacement by trans-hiatal retrosternal approach among patients with benign esophageal lesions.

Methods: The retrospective study that was carried out in the department of general and minimally invasive surgery at Public Health hospital of Mexico City between 2017 to 2022. The medical records of patients treated for esophageal replacement were reviewed. Follow-up patients were called for clinical evaluation and evaluated for long-term complications.

Results: The retrospective study included ten patients; 71.42% were female, and 28.5% were male. The age median was 42 years. Esophageal reconstruction by a minimally invasive transhiatal approach was conducted in 100% of the patients included in the study. The surgical time was 220 min, and the patient averaged six days in the inpatient setting; diet by oral intake was initiated on the third day after surgery. The surgical indications for the procedure were caustic stenosis (60%), achalasia (30%), and epiphrenic diverticulum (10%). The complications described among our population were anastomotic leakage (20%), anastomotic stenosis (20%), fistula formation (30%), esophageal reflux (10%), and death (10%).

P445

Transition from Open to Laparoscopy for Intra-Abdominal Paraganglionoma; Lessions Learnt

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Introduction: To assess feasibility and acceptability of Minimally Access approach for Abdominal Paraganglionoma (PGL) and compare morbidity with open approach.
Methods and Procedures: This is an observational retrospective study conducted in the department of General Surgery at a tertiary healthcare centre in India after seeking institutional ethics committee approval collaborated with the Endocrinology department. It includes 96 patients operated for abdominal paragangliomas from January 1998 to March 2023 were analysed.
Statistical analysis was performed using a software program available for the same, known as Statistical Package for social sciences (SPSS), now known as Predictive Analytical Software (PASW).
Results: A total of 96 patients of abdominal PGLs were included after fulfilling the necessary inclusion and exclusion criteria. Initial 20 patients were primarily operated for open surgery (Group A) while 4 patients with large PGL > 8 cms were considered primarily for open approach. Laparoscopic approach (Group B)was offered for 72 out of 96 patients, out of which 11 required conversion to open procedure and were included in group A.
Data is summarised as below comparing laparoscopy and open technique

1) Paralytic ileus (9.7% in laparoscopy vs 37.5% in open) is the most common complication in the post-operative period followed by pneumonia.

2) Postoperative pain wsa significantly higher in group A as compared to Group B at 12, 24 h and comparable after 48 h.

3) Decreased blood loss (225 ml vs 759 ml in open). Blood transfusions were required for 4 patients in open group while none in Group B.

4) Less hospital stay (4.33 days) compared to patients undergoing open surgery (10 days).

5) There was no significant difference for operative time between the two groups.

6) The laparoscopic surgery group had a lower incidence of post-operative complications. Prolonged ventilatory support and ICU stay was required in 7 patients who either underwent open surgery or an open conversion from laparoscopic surgery (20%).

Conclusion: Laparoscopy is highly effective in reducing post-operative morbidity and mortality and should be considered approach for amenable patients if the laparoscopic skills as available. Laparoscopy allows magnified view of the tumour, reduced post op pain, minimal respiratory complications and minimal metabolic derangements in the body.
Open surgery requires wider incisions for deep dissections, predisposing for increased blood loss and increased post operative pain, poor cosmesis, all of which is associated with increased morbidity and mortality.

P446

Comparing Long-Term Outcomes of Laparoscopic and Open Ladd's Procedures in Children with Malrotation

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Introduction: We aimed to analyze long-term outcomes of pediatric patients undergoing open and laparoscopic Ladd's procedures. Pediatric malrotation has traditionally been managed with open Ladd's procedure. More pediatric surgeons are utilizing the laparoscopic approach given its potential benefits. Past studies are limited by small sample sizes and short follow up.
Methods: A retrospective study was performed using TriNetX—an international database containing electronic health record data. Patients < 17 years old diagnosed with malrotation (ICD10 Q43.3) between January 1, 2003 – January 1, 2023 were identified. Laparoscopic (CPT 44180, 44238) and open correction (CPT 44055) groups were created. Primary outcomes included reoperation, small bowel obstruction, surgical site infection, respiratory complications, and mortality. Chi-square, Fisher Exact, and parametric t-tests were performed.
Results: 428 patients underwent laparoscopic and 1,426 underwent open correction. The laparoscopic group was predominantly white, Non-Hispanic, older (7.94 ± 6.19 vs 3.7 ± 5.27) with fewer cardiac (18% vs 30%), respiratory (5% vs 9%), and urogenital (4% vs 7%) anomalies. At one month, the laparoscopic group had higher odds of reoperation (OR 24.524, $p < 0.0001$) and lower odds of respiratory complications (OR 0.354, $p = 0.0001$). Odds of reoperation increased at 6 months (OR 31.179, $p < 0.0001$) but were negligible at 12 months. Laparoscopic patients requiring reoperation were more likely born preterm (22% vs 4%) with more respiratory (22% vs 3%), genitourinary (22%), and nervous system (22% vs 16%) anomalies. Open correction increased odds of surgical site infection (OR 3.259, $p = 0.0047$) and mortality (OR 3.313, $p = 0.0049$) 12 months after operation.
Conclusion: Patients undergoing laparoscopic Ladd's procedures tend to have fewer comorbidities but have higher risk of reoperation. Careful consideration of Ladd's approach should be taken based on patient factors and surgeon experience.

	30 Days	6 Months	12 Months
Surgical Site Infection	–	OR 1.317 (0.754,2.3) p = 0.3317	OR 3.259* (1.366, 7.778) p = 0.0047
Reoperation	OR 0.354* (0.226, 0.553) p < 0.0001	OR 31.179* (16.456,59.076) p < 0.0001	–
Respiratory Complications	OR 0.354* (0.226,0.553) p < 0.0001	OR 0.425* (0.285,0.634) p < 0.0001	–
Mortality	–	OR 2.062 (0.929,4.578) p = 0.0694	OR 3.313* (1.37,8.015) p = 0.0049

P447

Recurrent Abdominal Cerebrospinal Fluid Pseudocyst After Ventriculoperitoneal Shunt Placement: A Case Report and Review of Management Options

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Introduction: Ventriculoperitoneal (VP) shunt is a common treatment to drain cerebrospinal fluid in patients with hydrocephalus. Often, general surgery assists in accessing the abdomen and placing the distal catheter into the abdominal cavity. Abdominal pseudocyst (APC) formation is a rare complication causing obstruction and dysfunction of the shunt. The incidence ranges from 0.25 to 10%, being less common in the adult population. APC recurrence is rare and is usually related to indolent infections or abdominal adhesions. Currently, the guidelines for managing presumed uninfected APCs differ among experts.

Case: A 34-year-old female with obstructive hydrocephalus after meningitis underwent an uneventful laparoscopic-assisted VP shunt placement. Three months later, she presented to the ED with headache, ocular pain, nausea, vomiting, and left upper quadrant abdominal pain. CT abdomen/pelvis demonstrated a collection containing the shunt catheter abutting the stomach, suggestive of an APC (Fig. 1A). Clinical presentation and additional investigations, including CSF analysis, were negative for signs of infection. The patient underwent diagnostic laparoscopy and intraoperative EGD. Intraoperatively, the distal tip of the catheter was seen entering the APC. The existing catheter was completely removed, the APC collection was opened, and the clear fluid within the cavity was sampled and drained. EGD was unremarkable. A new catheter was inserted into the abdominal cavity with the tip directed to the pelvis. The patient's symptoms resolved, and she was discharged on empiric Augmentin. The intraoperative APC culture grew Staphylococcus aureus five days after revision. Twelve days later, she presented to the ED with similar symptoms and new onset of dysuria. The workup demonstrated evidence of infection and a recurrent APC in the pelvis abutting the bladder (Fig. 1B). The catheter was removed, and the collection was drained percutaneously by IR. A ventricloatrial shunt was successfully placed after a course of IV antibiotics.

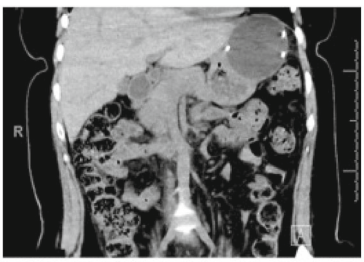


Figure 1A: CT from initial presentation demonstrating an APC in the left upper quadrant.



Figure 1B: CT from second presentation demonstrating an APC in the pelvis.

Conclusion: Our case highlights the rapid recurrence of an APC only 12 days after the initial revision. To our knowledge, this is the shortest period of APC recurrence documented. Despite negative initial inflammatory markers and CSF culture, it is believed there was an indolent infection in the VP shunt. Experts differ on the management of the seemingly uninfected APC patient. Our case favors assuming indolent catheter infection and proceeding with externalization and empiric antibiotics over uprfront revision. Overall, this is a rare complication that warrants awareness and expertise from general surgeons to assist in such complications.

P448

Effectiveness of Semisolid and Liquid Adhesion Barriers in Gynecologic Surgery: A Review of Historical and Current Literature

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Introduction: There is significant overlap in the operative spaces of abdominal and gynecologic surgery. While adhesion formation is a universally accepted sequelae of abdominal surgery, gynecologic abdominopelvic surgeries such as uterine myomectomy, ovarian cystectomy, treatment of endometriosis, and lysis of pelvic adhesions have been noted as particularly adhesiogenic. Despite unique pathology of gynecologic adhesions, the role of adhesion barriers in gynecologic surgery remains ambiguous which has direct implications for surgeons working in any aspect of the abdominopelvic space. This analysis carefully examines all the current and past research on semi solid and liquid adhesion barriers that are used in prevention of adhesions in general and gynecologic surgery. The aim of this analysis is to assess the effectiveness of liquid and semisolid antiadhesion films, gels, sprays, or solutions on reducing the post-operative incidence of adhesion formation and recurrence in women undergoing gynecologic surgery.

Methods: A PubMed and MEDLINE search identified 48 studies eligible for this review. Results were examined across three types of surgical interventions: abdominopelvic surgery, uterine surgery, and cesarean section, according to three main categories of adhesion barriers studied (hyaluronic acid derived, oxidized regenerated cellulose, and additional formulations).

Results: Overall, the use of an adhesion barrier decreased the incidence of adhesions at second look laparoscopy in 28/29 studies (96.6%) in abdominopelvic surgery. Use of semisolid or liquid adhesion barriers demonstrated a reduction in intrauterine adhesion frequency compared to no adhesion barrier. Adhesion barriers protected against adhesion formation at the following junctions: omentum-anterior abdominal wall, uterus-anterior abdominal wall, and uterus-bladder. However, significance of adhesions barriers for Cesarean sections was limited at the fascia-muscle and uterus-omentum junctions. The most commonly studied class of anti-adhesion devices were hyaluronic acid-based products including Seprafilm, Sepracoat, Sepraspray, ACP, and NCH. Of these, SprayGel/Shield, 4DryFieldPH, Oxiplex/AP, and CoSeal were most capable of reducing adhesion severity and extent, suggesting a potentially beneficial role for polyethylene glycol, a common component to these products, in the abdominopelvic cavity.

Conclusion: Despite the overwhelming improvement in adhesion frequency, severity, and extent demonstrated by the trials discussed in this review, these barriers are often not utilized in clinical practice, and more work should be done to assess the longitudinal risks and benefits of adhesion barriers for health systems and patients undergoing gynecologic surgery.

P449

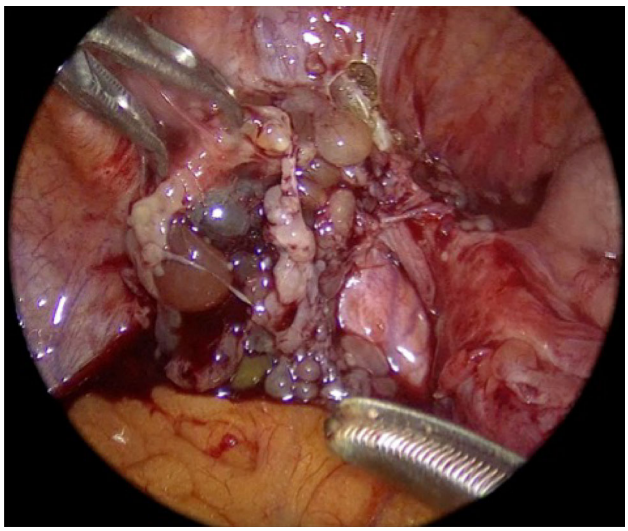
Case Report: Benign Mesothelioma Incidental Finding of Peritoneal Neoplasms

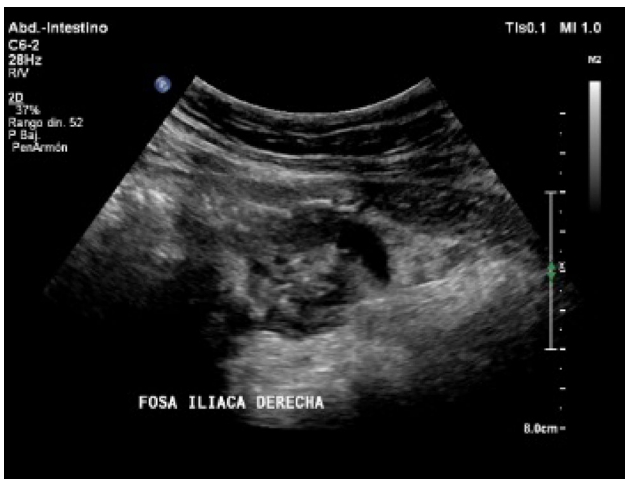
Lucia Patricia Cano Perez; Angel Martinez Vela; Miranda Gonzalez Pinelo; Antonio Morales Cardona; Andrea Vasconez; Christus Muguerza Hospital

Introduction: Benign peritoneal cystic mesothelioma is a rare benign tumor most commonly occurring in women of reproductive age, with an approximate incidence rate of 1 in 1,000,000. Suspicion of mesothelioma typically arises in cases of recurrent ascites and/or presence of peritoneal thickening or masses, nevertheless acute presentations are misdiagnosed, therefore options of management are not yet published by a consensus. This case concerns a patient with clinical symptoms and an imaging study suggestive of appendicitis, which ultimately yielded a more atypical result.

Case Presentation: We hereby present the case of 48-year-old male patient with no noteworthy medical or surgical history. The patient arrived at the ED presenting diffuse abdominal pain, which subsequently migrated to right iliac fossa. During physical examination, positive findings included tenderness at McBurney's point, Blumberg (+) and the absence of palpable masses, hemodynamically stable and afebrile. Labs were within normal parameters and he was admitted with an external ultrasound which displayed an inflammatory mass, surrounded by dense tissue, measuring 53 × 43 mm, with a tubular structure compatible with acute perforated appendicitis. He was prepared for laparoscopic appendectomy, identifying a cystic conglomerate of tumor-like formations with variable content and morphology, ranging from serous to mucoid, in the paracecal region. These formations caused adhesions between the cecum and the abdominal wall, apparently originating from the cecal appendix, although a conclusive evaluation was not feasible initially. Comprehensive adhesiolysis was performed, reaching the apparent base without successful identification of any structure corresponding to the cecal appendix. Subsequently, extensive exploration was carried out, revealing highly suggestive cystic lesions indicative of carcinomatosis solely in the paracecal region. Components comprising the cystic conglomerate were excised. Moreover, an appendix in a para-ileal disposition was identified, devoid of evident acute inflammation signs. Pathology confirmed a benign peritoneal cystic mesothelioma. Subsequently, this patient was more extensively assessed with tumor markers which were within normal parameters and a contrast-enhanced tomography showed no relevant findings. The patient progressed favorably, was discharged, and no further interventions were performed.

Conclusions: Within the realm of abdominal pain, a myriad of potential differential diagnoses exist. Consequently, it becomes imperative to maintain an exhaustive medical history, conduct a meticulous physical examination, and utilize pertinent imaging modalities to ascertain the most precise diagnosis, all while remaining cognizant of the potential for alternative differential diagnoses. Although mesothelioma are uncommon, it's essential to know the protocol for management and follow-up such as imaging and tumor markers.





P450

Primary Cutaneous Mucinous Carcinoma: A Case with Diagnostic Dilemma

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Introduction: Primary cutaneous mucinous carcinoma (PCMC) is a rare slow-growing neoplasm of the skin with an indolent behaviour. PCMC is slightly more common in men than women and typically affects people at 50 to 70 years old. The usual clinical presentation of PCMC in adults is asymptomatic, solitary erythematous nodule, papule, or cyst of variable sizes typically occurring on the face, scalp or in the axilla. Histologically, PCMC is indistinguishable from metastatic mucinous adenocarcinoma of breasts, gastrointestinal tracts, lungs, and salivary glands. This case report presents a case of PCMC, mimicking a skin metastasis from a male breast cancer.

Case Presentation: A 43-year-old Indian gentleman had small bowel resection for small bowel Neuroendocrine Tumour (NET). He underwent a standard contrast-enhanced CT scan and a positron emission tomography (PET) scan that revealed large matted left axillary lymph nodes. Further history revealed that he had a painless left axillary skin lesion for many years. He did not seek any medical advice though recently; he did notice minimal serous discharge over this skin lesion after the Covid booster vaccination. Clinical examination showed a wart-like skin lesion (2 × 2 cm) at the medial aspect of the left axillary region, with multiple matted enlarged left axillary lymph nodes. Otherwise, there were no abnormalities on bilateral breast examination. Mammogram and breast MRI were performed and neither of the imaging showed any breast lesions or abnormality. However, there were left intramammary and left axillary lymphadenopathy with prominent non-enhancing intramammary lymphatic channels and skin thickening likely due to lymphatic congestions.

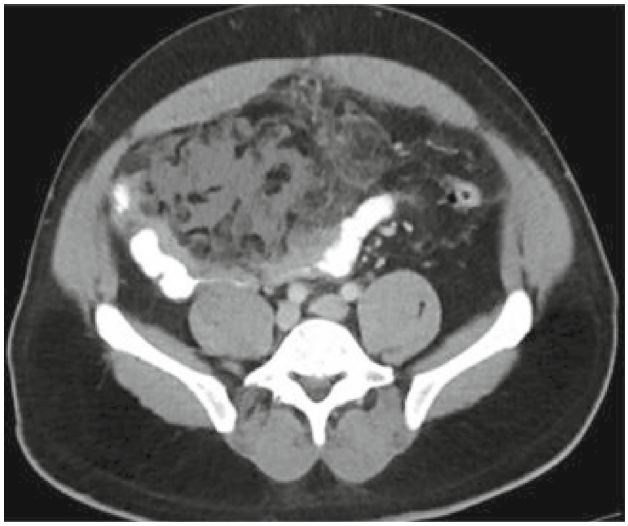
He then underwent wide local excision of the skin lesion and excision of the matted left axillary lymph nodes. The axillary skin lesion showed adenocarcinoma with mucinous differentiation and the excised lymph nodes confirmed metastatic mucinous adenocarcinoma. The immunohistochemistry (IHC) of the tumour was positive for mammaglobin, oestrogen receptor (ER), progesterone receptor (PR) and GATA-3. Hence, the initial diagnosis of metastatic primary breast carcinoma was favoured; despite no breast tissue was identified histologically from the axillary specimen. Given this diagnostic dilemma, the slides were sent for a second opinion to the histopathology experts. After further evaluation and multidisciplinary team discussion, the final diagnosis for him was PCMC.

Conclusion: PCMC is a rare tumour with challenging clinical presentation and histological diagnostic dilemma. Therefore, a multidisciplinary team approach with strong clinical and radiological correlation is warranted to differentiate PCMC from a case of metastatic breast carcinoma, as the IHC may overlap.

P451

Omental Infarction Following Robotic Assisted Laparoscopic Inguinal Hernia Repair

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Introduction: The omentum is a two-layered folding of the parietal peritoneum hung from the greater curvature of the stomach down to the pelvis. It contains fat, lymphatic tissue, and vessels. Omenal Infarction (OI) is a rare condition with an incidence of 0.001-0.3%.1

Case Report: A 44-year-old male who underwent an uneventful robotic-assisted laparoscopic left inguinal hernia repair, presented on postoperative day 16 with right lower quadrant pain, fever, and chills. He had a distended tender abdomen with guarding, WBC was 8000, and lactic acid was 1.27. CT scan revealed localized focal omental edema versus inflammation suggesting OI (Fig. 1). After the failure of conservative management, he underwent a diagnostic laparoscopy converted to laparotomy with findings of necrotic omentum overlying matted lops of the bowel. The omentum and bowel were resected. The pathology confirmed OI and ruled out any bowel perforation.

Discussion: OI can occur spontaneously with increased risk in children and morbidly obese adults due to the heavy burden of fat tissue and omental redundancy. OI can be secondary to trauma, surgery, inflammation, hernia, adhesions, or any other possible lead point. Although spontaneous OI in children and in non-surgical contexts have been reported many times, relatively few case reports and series have included patients with OI following surgeries. Since 1946 when OI was first described, there have been less than 50 cases reported of OI following surgery, but all following pancreatic, gastric, colonic, or cesarean section surgery.2,3 Regardless of the etiology, the pathophysiology consists of blood flow interruption leading to venous stasis and edema. The average time for presentation varies from weeks to months after the primary surgery. Clinically, the presentation of OI is often difficult to distinguish from other causes of acute abdominal pain, prompting potentially unnecessary surgical exploration. However, due to developments in imaging technology, CT findings can now identify OI accurately with the presence of heterogeneous fatty attenuation is highly suggestive of OI.4 Treatment options range from conservative to interventional radiology or surgical resection of the infarcted omentum.3

Conclusion: OI is a rare condition and was previously a diagnosis of exclusion. This is the first reported case of OI following robotic-assisted inguinal hernia repair. Treatment should be started with conservative management if the patient is stable; in cases of failure to improve or when the diagnosis is in doubt, surgery via laparoscopy or laparotomy is warranted.

P452

Malrotation in the Adult: A Challenging Diagnosis

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This case series presents two patients, both with malrotation discovered in their adult years requiring subsequent surgical intervention. Intestinal malrotation occurs when the rotation of the gut in embryogenesis is halted during development. As exemplified by these two cases, this can present emergently or be identified incidentally. The clinical presentation is often quite variable in the adult years, making diagnosis and management challenging.

Introduction: Malrotation is typically described in the pediatric population and discovered in the first year of life. The prevalence of malrotation in an adult is quite rare, approximately 0.2—0.5% of cases. In adulthood, this condition can present with a wide range of symptoms including abdominal pain, obstructive symptoms, or bowel ischemia; however, the majority of patients are asymptomatic.

Case Presentations: The first patient is a 34-year-old female presenting with one day of vague abdominal pain. CT scan revealed bowel malrotation with reversal of the superior mesenteric artery (SMA) and superior mesenteric vein (SMV), as well as intestinal volvulus. The patient emergently underwent a diagnostic laparoscopy, reduction of volvulus, division of mesenteric bands, replacement of small bowel and large bowel, and appendectomy. The second patient is a 32-year-old female with 6 months of frequent belching, shortness of breath and abdominal distention. EGD was performed and revealed a fibrous band overlying the duodenum, leading to a partial gastric outlet obstruction. Upper GI series revealed intestinal malrotation. She underwent a robot-assisted diagnostic laparoscopy, lysis of adhesions, division of Ladd's bands, and appendectomy. Both patients underwent uncomplicated postoperative courses and were discharged without incident.

Discussion: Clinical presentation in adults with malrotation is variable. Most patients are asymptomatic, those who present with symptoms present in an acute or chronic manner. Acute presentation usually is secondary to an underlying volvulus. The chronic subset is more prevalent and is characterized by intermittent crampy abdominal pain and bloating over months to years. Often diagnosis is made incidentally with routine imaging or abdominal pain workup. CT scan has a diagnostic accuracy of 80%, revealing SMA and SMV reversal of their anatomic locations. The lack of specific presentation leads to a delay in diagnosis in the adult population suffering with malrotation.

Conclusion: The incredibly low incidence of intestinal malrotation in the adult population makes recognition and diagnosis a challenging prospect. Further characterization of these patients and their typical presentation is essential to the development of systematic and expeditious management strategies.

P453

Blisters of Mystery: Shedding Light on Bullous Diabeticorum as a Rare Complication of Long-standing Diabetes Mellitus

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Bullous diabeticorum, a rare dermatological manifestation, presents as spontaneous serous and sterile blister eruptions mostly on acral regions in diabetes mellitus patients. We report a case of a 27-year-old female with longstanding type 1 diabetes mellitus, diabetic neuropathy, dyslipidemia, anorexia nervosa, depression, and anxiety. She presented with complaints of hematuria, burning urination, intermittent right flank pain, and bilateral lower extremity and feet blisters of varying sizes resembling burns. Upon examination, the patient exhibited fever and tachycardia. Laboratory testing was significant for an elevated HbA1c level of 11%. Urinalysis revealed hematuria, bacteriuria, and leukocytosis, with E. coli growth in urine cultures. Immediate intervention was initiated for the urinary tract infection. However, the enigma in this case stemmed from the presenting blisters. Initial concerns of self-infliction arose due to the patient's psychiatric history. However, a comprehensive psychiatric assessment confirmed her stability and denied any evidence of self-harming behavior. Deeper history-taking revealed that these self-resolving blistering episodes have been recurrent for three years. Patient was instructed to follow up with Dermatology upon discharge, where they will perform a biopsy to rule out blistering disorders. If histological samples are inconclusive with negative immunofluorescent staining then the diagnosis of Bullous Diabeticorum can be confirmed. This intriguing presentation of unclear etiology resembles bullous diabeticorum, a rare diabetic complication characterized by abrupt, noninflamatory, painless, self-resolving blisters, often on acral regions, hands, and feet. This case report underscores the diagnostic challenges of Bullous Diabeticorum and emphasizes the rarity of this complication. It serves as a poignant reminder of the significance of unbiased evaluation, especially for patients with a psychiatric history. Bullous diabeticorum, an uncommon dermatological complication of diabetes, remains inadequately documented in medical literature. This report not only highlights its existence but also underscores the importance of raising awareness among healthcare professionals. In conclusion, this case reinforces the significance of a multidisciplinary approach in managing complex diabetes presentations, warns against medical bias, and emphasizes the importance of further research and case documentation to enrich our understanding of rare diabetic complications, ultimately advancing more informed and effective patient care.

P454

REporting quality of PilOt Randomized controlled Trials in Surgery according to the CONSORT checklist (REPORTS CONSORT): A Methodological Survey

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Background: In 2016, the Consolidated Standards of Reporting Trials (CONSORT) extension to randomized pilot and feasibility trials was published. Previous methodological reviews have evaluated the completeness of pilot and feasibility randomized trials reporting in the fields of chronic kidney disease and psychiatric illness using the CONSORT extension to randomized pilot and feasibility trials;

however, a review of this nature has yet to be conducted in surgery. As such, our aim is to perform an evaluation of the completeness of reporting in surgical pilot and feasibility randomized trials, as per the CONSORT extension to randomized pilot and feasibility trials.
Methods: Medline, Embase, and CENTRAL databases were searched from January 1, 2011 to December 31, 2011, and January 1, 2021 to December 31, 2021. Studies were included if they were pilot or feasibility randomized trials evaluating a surgical intervention. The primary outcome was overall adherence to the CONSORT statement extension to randomized pilot and feasibility trials checklist. Secondary outcomes included completeness of reporting according to the CONSORT statement extension to randomized pilot and feasibility trials for each individual trial. We conducted a Poisson regression to explore the association between research factors and reporting completeness, as measured by the number of reported CONSORT items per study.
Results: After screening 1,991 citations, 38 studies from 2011 and 34 studies from 2021 were included. Trials mostly pertained to general surgery (n = 19), orthopedic surgery (n = 11), and urologic surgery (n = 10). The mean number of CONSORT items reported in the studies published in 2011 and 2021 was 19.4 (standard deviation [SD] 5.8) and 23.9 (SD 6.2), respectively. Upon adjusted analysis, studies registered in a clinical trial registry (incidence rate ratio [IRR] 1.29, 95% confidence interval [CI] 1.12-1.48, $p < 0.001$) and studies randomizing more than 50 patients (IRR 1.16, 95%CI 1.04-1.30, $p = 0.01$) were associated with a significantly higher number of CONSORT pilot items reported. Being published in 2021 (vs. 2011) was not significantly associated with a higher number of CONSORT pilot items reported (IRR 1.01, 95%CI 0.89-1.15, $p = 0.876$).
Conclusion(s): The reporting quality of current surgical pilot and feasibility trials is low and has not significantly improved after the publication of the CONSORT extension to pilot and feasibility trials. Further endorsement of the CONSORT statement is required, and the registration of clinical trials should be encouraged to improve reporting completeness.

P456

Metastatic Carcinoid Tumor Arising from Mature Kidney Teratoma: An Exceedingly Rare Case Report

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Introduction: Primary carcinoid tumors and mature teratomas arising from the kidney are rare entities that compose only a small portion of genitourinary tumors, with carcinoid tumors of the kidney composing less than 1% of neuroendocrine tumors. Rarer still is a combination of the two neoplasms, a primary carcinoid tumor arising from a mature teratoma. To date, only 7 prior cases of such a neoplasm have been published.
Case Description: This case is even more unique as we believe this is the only case reported in the literature in which the mature teratoma has not only given rise to a primary carcinoid tumor, but that tumor also spread to peri-aortic lymph nodes and metastasized to the liver. These neoplasms, including this case, present with non-specific symptoms in all reported cases; fever, abdominal pain, constipation, etc. Additionally, none of the reported cases exhibited signs and symptoms of carcinoid syndrome.
Discussion: The goal of this report is to highlight the diagnostic and therapeutic challenge this rare neoplasm presents and the clinical course of a patient with said neoplasm and metastases. The seven previous reports of similar neuroendocrine tumors from mature renal teratomas all remained local and were cured with definitive surgical excision. However, this case is unique in that the patient presented with liver masses correlating with metastasis from this neuroendocrine tumor within this mature teratoma. The immunohistochemical characteristics of both the metastases and primary were very similar to each other, and also in line with previously described carcinoid tumors arising from mature renal teratomas.
Conclusion: Given that lanreotide was approved in 2014 for advanced neuroendocrine tumors, and there were no targetable mutations, lanreotide was the first line treatment. Given this treatment and nephrectomy, she has thus far been generally in good condition and no new or recurrent symptoms or discomfort have been reported during over 1 year of follow-up.

P457

Retrospective Review of Patients Receiving Gastric Pacemaker for Medically Refractory Gastroparesis

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Introduction: Gastroparesis is a condition characterized by impaired gastric motility. Gastric pacemakers are an intervention meant to improve the symptoms for patients who are refractory to lifestyle interventions and medical management. However, there is minimal available data on long-term outcomes and satisfaction rates on patients with gastric pacemakers.
Methods & Procedures: To investigate these measures, our objectives included identifying common characteristics within the population of patients requiring gastric pacemakers as well as to analyze long-term outcomes and complication rates. The method was a retrospective chart review spanning 10 years and including 125 patients.
Results: Notably, the population was largely Caucasian (61%) and female (84%) with a predominantly idiopathic (55%) etiology. The average BMI was 28.6 which is overweight. Additionally, 58% of patients had a psychiatric diagnosis.
Overall, 27% of patients required revisions and 24% of patients underwent removal. Amongst those who required revisions, it was largely for the gastric pacemaker flipping in the pocket (26% of revisions), dysfunctional device (21%), impedance out of range (18%), or lead erosion into gastric wall (18%). The most common reasons for removal included lack of symptom improvement (37% of removals) and device dysfunction (20%).

Only one serious complication was observed, which was small bowel ischemia. 42% of patients would require additional procedures after gastric pacemaker placement, including pyloroplasty, g or j tube, or gastric bypass.
Conclusions: This retrospective review highlights how poorly understood gastroparesis is. Additionally, gastric pacemaker may not help patients with symptoms to refractory to lifestyle modifications and medical management. Further analysis is warranted to understand the prevalence of psychiatric conditions as well as the relatively high rate of revisions and removal.

P458

Surgeon vs. Multidisciplinary Tumor Board Decisions: Experience from a Tertiary Care Hospital in Pakistan

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Introduction: Cancer is the leading cause of morbidity and mortality in our country. The management of cancer is complex, requiring input from multiple departments before proceeding with a definite plan. In Pakistan, multidisciplinary tumor board for individual case discussions have not yet been started nationwide but individual departments have started conducting these meetings within their settings. Such data in our part of the world is scarce. This means that there is limited data available about how MDT decisions are influencing cancer management. This study aimed to investigate the impact of multidisciplinary tumor board (MDT) decisions compared to individual surgeon decisions in the context of cancer management.
Methods: A retrospective observational study was conducted over two years at our tertiary healthcare setting. All diagnosed cancer cases discussed in MDT meetings were included in the study (n = 221). Ethical approval was obtained, and data analysis was performed using SPSS 24.0. Descriptive statistics were employed to explore frequency distributions of malignancy regions and tumor staging for both genders. Moreover, we examined the final decisions made by comparing the recommendations of individual surgeons to those of the multidisciplinary tumor board. The results of this analysis were visually presented in the form of a pie chart, allowing for a clear depiction of proportions and decision dynamics.
Results: Among the 221 cases analyzed, an almost equal gender distribution was observed. Esophageal cancer cases were predominant (49.3%), with a significant proportion in advanced stages (46.2%). Our findings suggest that in 40% of cases, the MDT recommendations were implemented, often involving additional diagnostic steps or investigations that had not been initially suggested by individual surgeons. In 36% of instances, both MDT and surgeons concurred on the same decisions. Importantly, in 24% of cases, MDT decisions took precedence over those of individual surgeons, highlighting the substantial influence of multidisciplinary expertise.
Conclusion: In conclusion, our research affirms the pivotal role of multidisciplinary tumor boards (MDTs) in the decision-making process for cancer management. These collaborative decisions, enriched by the expertise of specialists from various disciplines, demonstrate their significant value when compared to decisions made by individual surgeons. Future investigations should focus on assessing the long-term effects of MDT implementation on patient outcomes and cost-effectiveness, with the aim of advancing and optimizing cancer management practices.

P459

A Rare Case of Breast Cancer Metastasis to the Gallbladder

Kelly Fening, DO; Robert Carman, DO; UPMC Central Pennsylvania

Breast cancer is the most common cancer affecting women. Metastasis is common and most frequently involves the bone, brain, lung, and liver. Metastasis to uncommon locations, such as the gallbladder, are extremely rare but a few cases have been reported. This case highlights an example of breast cancer metastasis to the gallbladder. The patient is a 62-year-old female with a history of stage IV triple positive right invasive ductal carcinoma with metastasis to the lung and bone managed on Herceptin and Xeloda who presented to the emergency department with epigastric pain, nausea, and vomiting. CT of the abdomen and pelvis showed moderate biliary sludge with fine gallstones, mild gallbladder wall thickening, and no significant pericholecystic fluid or ductal dilation. Ultrasound of the abdomen revealed cholelithiasis without evidence of pericholecystic fluid or ductal dilation. She was discharged home and followed up for an outpatient cholecystectomy. She underwent an uncomplicated robotic assisted cholecystectomy and was discharged home later that day. Final pathology revealed metastatic adenocarcinoma invading the muscular layer, compatible with a primary breast origin.
Given the findings of metastatic breast cancer to the gallbladder, patient had a CT of the chest, abdomen, and pelvis to evaluate for other evidence of metastasis. This scan showed no evidence of new metastatic disease but did note stable sclerotic osseous metastatic disease without new bony lesions. She also underwent a bone scan that showed improved appearance of the osseous metastatic disease. She required no further surgical intervention and will follow up for a repeat CT scan to look for disease recurrence.
Breast cancer metastasis is not uncommon but spread of disease to the gallbladder has been described in only a few case reports. This case report details one of the rare examples of breast cancer metastasis that was incidentally found after cholecystectomy was performed.

P460

Surgeons' Neuro-Musculoskeletal Disorders, Burnout, And Job Satisfaction

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Introduction: The main purpose of this study is to explore neuro-musculoskeletal disorders (NMSDs), burnout, and job satisfaction among surgeons.
Methods and Procedures: An electronic survey was sent to the surgeons across an academic hospital system (47 questions). This abstract focuses on demographics, NMSDs, job satisfaction, and burnout. Logistic regression was used to investigate the associations between variables (significance level of 0.05).
Results: The results included 47 surgeons. Dominant surgical modalities were 3 endoscopic, 14 laparoscopic, 22 open, and 8 da Vinci robotic surgeons; surgical specialties included 7 breast, 7 colorectal, 15 gynecology, and 18 general surgeons. The mean (standard deviation) of their age and body mass index were 47.2(9.4) years and 25.8(4.5) kg/m2, respectively. 24(51%) surgeons had experienced at least one NMSD. Surgeons' responses to job satisfaction and burnout questions were categorized as less frequent (never, a few times a year, once a month) and more frequent (every day, a few times a week, once a week, a few times a month) (Table 1).

Table 1 Surgeons' responses to job satisfaction and burnout questions

	Less frequently	More frequently
I feel burned out from my work	21(45%)	26(55%)
I feel fatigued when I get up in the morning and have to face another day on the job	22(48%)	24(52%)
I feel used up at the end of the workday	8(17%)	38(83%)
I feel satisfaction from my work	6(13%)	41(87%)

The results showed that more frequent feeling of burnout was positively correlated with more frequent feelings of fatigue when getting up in the morning and facing another day on the job ($p < 0.0001$), more frequent feelings of being used up at the end of the workday ($p = 0.0001$), and having NMSDs ($p = 0.0275$); however, this was not significantly associated with feeling of satisfaction from their job ($p = 0.1211$). Job satisfaction was not significantly associated with having NMSDs or the other burnout questions.

Conclusions(s): Our results revealed that burnout and NMSDs were highly prevalent among the studied surgeons and were highly positively correlated. Despite these issues, surgeons mostly felt satisfied with their job (at least a few times a month). While some factors keep surgeons relatively satisfied with their job, this should not diminish the importance of the need for mitigating NMSDs and burnout symptoms among surgeons.

P461

Unshackling the Bowel: A Rare Case of Disseminated Leiomyomatosis Causing Small Bowel Obstruction

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Introduction: Small bowel obstruction is a significant cause of acute abdomen, with over 300,000 cases in the US annually. It can result from various factors, including previous surgeries and hernias, as well as less common causes such as Crohn's disease, radiation therapy, bezoars, volvulus, and more. Identifying the specific cause often requires surgical exploration due to its diverse etiology, here we present one as such

Case Report: A 49-year-old female presented to the emergency department with severe right lower quadrant abdominal pain, nonbilious emesis, and a two-day absence of gas and bowel movements. Examination revealed tenderness, abdominal distension, and guarding. Past medical history included uterine fibroids, duodenal ulcer, and prior fibroid surgery

Abdominal CT with contrast indicated dilated small bowel loops, free pelvic fluid, and no clear obstruction. Laboratory tests showed normal white blood cell counts, electrolytes, creatinine, and a lactate level of 0.5. Management involved IV fluids, nasogastric decompression, nil-per-os, and serial abdominal exams. When her condition worsened, diagnostic laparoscopy was performed

Intraoperatively, hemorrhagic ascites was drained, and multiple white peritoneal and serosal intestinal implants were discovered, intraoperative consult suggested endometriosis. A biopsy was taken. Adhesions were released, and the bowel examined for peristalsis and decompression. A drain was left in place. The patient recovered well, had negative tumor markers, and fully restored bowel function on postoperative day 2. She was discharged and remained complication-free during follow-up. The final diagnosis by pathology was disseminated peritoneal leiomyomatosis (DPL)

Discussion: DPL is a rare and benign condition that often resembles peritoneal carcinoma or metastatic disease It afflicts women in their reproductive years and carries a low risk (2–5%), of malignant transformation. There are currently no established treatment guidelines for its management

DPL is characterized by the widespread proliferation of peritoneal and sub-peritoneal lesions, primarily originating from smooth muscle cells. Rare cases of malignant transformation into leiomyosarcoma have been documented. Iatrogenic DPL may occur due to unconfined morcellation during surgical procedures, leading to the dissemination of small myoma fragments onto various organs or into port sites. The overall incidence of DPL following laparoscopic uncontained morcellation is estimated to range from 0.12% to 0.95%. Treatment for DPL involves surgical resection of myomas and regular follow-up. Given the rarity of DPL and its diverse clinical presentations, individualized treatment plans are typically tailored in consultation with a multidisciplinary medical team

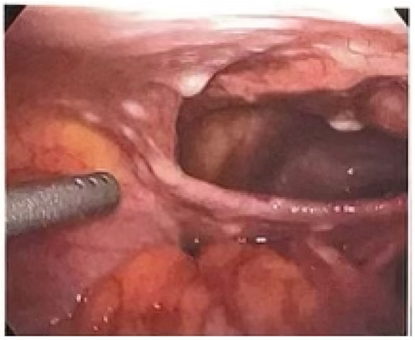


Image 1: Peritoneal seedings during Laparoscopy.

Image 1 Peritoneal seedings during Laparoscopy

P462

Central Congenital Diaphragmatic Hernia Presenting as Intestinal Obstruction in a 73 Year Old

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Presentation of congenital diaphragmatic hernia (CDH) in adulthood is rare. Further, most cases are attributable to Bochdalek (posterolateral) and Morgagni (parasternal) hernias with central tendon hernias being particularly uncommon.

This is a case of a 73 year old woman who presented to the emergency department with abdominal pain, nausea, vomiting, constipation and dyspnoea. An antero-posterior radiograph of the chest showed haustrations in the right hemithorax suggestive of large intestine in the chest. A subsequent computed tomography confirmed herniation of the hepatic flexure of the colon as well as the right lobe of the liver into the right hemithorax through a defect in the central tendon of the diaphragm.

The patient underwent laparotomy with reduction of the herniated structures into the abdomen and primary repair of the diaphragmatic defect. The post-operative course was uneventful; her symptoms had resolved by the second post-operative day and she was no longer requiring supplemental oxygen. Post-operative radiograph of the chest showed no signs of gastrointestinal structures in the chest.

On follow up, 6 weeks post-operativey, she had recovered well with no gastrointestinal or respiratory symptoms.

Presentation of CDH is almost always in the neonatal period as it often results in pulmonary hypoplasia and persistent pulmonary hypertension of the newborn. Herniation of abdominal structures is usually towards the left hemithorax. Presentation in adulthood is very unusual but when it does occur most often causes abdominal and/or chest pain, vomiting, dysphagia or dyspnoea. Central CDH is particularly uncommon and there have been just two such cases presenting in adulthood reported to date.

P463

Use of ICG Imaging During Laparoscopic Splenectomy

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The splenic artery has 3 to 4 branches before it enters the hilum of the spleen. This anatomy creates a problem during laparoscopic splenectomy (LS). To know if one has a ligated main artery or one of the branches, ICG dye is injected. NIR imaging will detect the green color spleen if partial ligation is done or complete. If incomplete, surgeons search for the remaining arterial branches and then target the spleen safely. Bleeding is prevented near the hilum. controlling bleeding near the hilum can damage the pancreatic tail. This is a very useful technique to prevent bleeding while LS and prevent associated complications

P464

Takotsubo Cardiomyopathy Precipitated by Anaphylaxis to Ketorolac Following Laparoscopic Cholecystectomy: A Case Report

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Introduction: Drug-induced anaphylaxis with subsequent Takotsubo cardiomyopathy (TCM) is a rare and potentially fatal complication in the perioperative setting. TCM, also known as stress-induced cardiomyopathy or "broken heart syndrome", is characterized by acute systolic heart failure with left ventricular dilation in the absence of acute coronary syndrome. Most frequently in perioperative TCM, hypokinesis is seen affecting the ventricular apex, followed by the basal, and rarely mid-chamber segments. However, some data suggests apical sparing variants may be more common in women of premenopausal age. Majority of cases seen in the literature occur upon emergence from anesthesia or during the first 24 h post-operatively in non-cardiac surgical patients. Treatment of anaphylaxis with epinephrine has been described previously as a cause but no known reports describe non-steroidal anti-inflammatory drug-induced anaphylaxis leading to TCM. Our case describes the unique occurrence of anaphylaxis after Ketorolac administration causing mid-ventricular variant TCM following outpatient minimally invasive cholecystectomy.
Case: A 28-year-old previously healthy female underwent an uncomplicated elective robotic-assisted laparoscopic cholecystectomy. Shortly after extubation, she experienced flash pulmonary edema and hypotension. She was re-intubated and treated with high dose vasopressor and inotrope support. In the intensive care unit, transthoracic echocardiogram revealed reduced left ventricular function with an estimated ejection fraction $< 30\%$. There was normal motion at the base and apex of the left ventricle, however, mid-chamber hypokinesis was present. Electrocardiography showed sinus tachycardia without ST segment changes or any other indicators of acute coronary syndrome or myocardial infarction. High sensitivity troponin was elevated and peaked at 227 ng/L on post-operative day one. Additional workup showed decreased systemic vascular resistance with adequate fluid resuscitation indicating distributive shock. There was no evidence of infectious or neurogenic causes and the shock responded well to epinephrine and high dose steroid treatment. Upon review, Ketorolac was the only new medication administered during the perioperative period. Guideline directed medical therapy for heart failure with reduced ejection fraction was initiated and the patient was discharged home in stable condition with resolution of symptomatic cholelithiasis on hospital day 6.
Conclusion: This case demonstrates several unique features of TCM. We believe this to be the first report of TCM in a patient undergoing robotic assisted laparoscopic cholecystectomy precipitated by anaphylaxis to Ketorolac. Additionally, this represents a rare case of mid-chamber TCM in a premenopausal patient. In patients with unexpected acute perioperative hemodynamic instability and flash pulmonary edema, this is an important reversible etiology to consider.

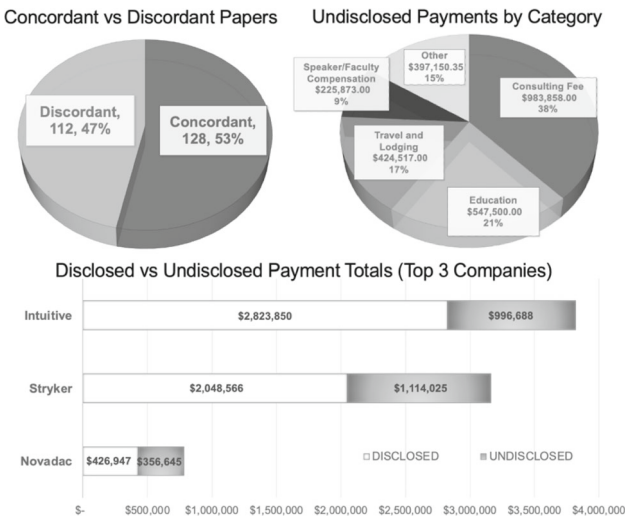
P465

Indocyanine Green and Near-infrared Guided Surgery Publications: An Analysis of Conflict of Interest Statements and Industry General Payments

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Background: The use of indocyanine green and near-infrared (ICG-NIR) guidance in surgery is expanding. To promote their technology, medical device companies pay surgeons with cash or in-kind general non-research payments, which can result in potential conflicts of interests (COIs) and bias. We hypothesized that there would be underreporting of ICG-NIR COIs in surgical literature.
Methods: We searched for ICG-NIR related articles in the top 100 highest impact surgery journals between 2018-2023. Articles with at least one U.S.-author affiliation were included. Authors were queried in the U.S. Centers for Medicare & Medicaid Services Open Payments Database for industry general payments related to ICG-NIR products in the preceding two years from publication. The amount, product, company, and nature of payments, and the article COIs statements were analyzed.
Results: We found 240 articles related to ICG-NIR technology in high impact surgery journals published between 2018 and June 2023, of which 46.7% had discordant (112/240) and 53.3% had concordant (128/240) potential COIs reporting rates. 158 articles explicitly stated no potential COIs existed, but we found underreported COIs in 43% of these articles (68/158); on the other hand, 82 articles stated potential COIs existed, but we found further underreported COIs in 53% of these articles (44/82). Plastic surgery articles accounted for 33.3% (80/240) of articles, with a higher concordant COIs reporting rate (77.5%, 62/80; $p = < 0.05$). When excluding plastic surgery articles, the concordant COIs reporting rate was lower for surgery ICG-NIR related articles (41.3%, 66/160; $p = < 0.05$). We found a total of $8,089,060 in ICG-NIR related non-research industry general payments, of which $2,567,825 were underreported payments with inaccurate COIs statements by authors, and $5,521,235 were reported accurately. The top 3 ICG-NIR related companies making payments were Intuitive ($3,820,538), Stryker ($3,162,591), and NOVADAQ ($783,593; later acquired by Stryker). SPY/PINPOINT (Stryker/NOVADAQ) and Da Vinci (Intuitive) were the top ICG-NIR products making up to 96% of payments ($7,766,722). Among underreported payments with inaccurate COIs statements, the top nature of payments were 238 consulting fee payments, 272 education payments, 1,387 travel & lodging payments, and 115 speaker/faculty compensation payments which made 38.3% ($983,858), 21.3% ($547,500), 16.5% ($424,517), and 8.5% ($225,873) of the total underreported amount paid, respectively.
Conclusions: Between 2018-2023, ICG-NIR related publications underreported industry related COIs disclosures and general payments. Industry-surgeon collaborations are essential for the

advancement of surgery, but standardized measures to accurately disclose potential COIs are urgently needed in high impact surgery journals.



P466

The Use of Preoperative Tamsulosin for the Prevention of Postoperative Urinary Retention Following Inguinal Hernia Repair in Men

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Postoperative urinary retention (POUR) is a frequently encountered complication following inguinal hernia repair in men and leads to increased length of stay and patient dissatisfaction. This retrospective study explores the role of tamsulosin in preventing POUR, defined as the need for intermittent catheterization, placement of foley catheter or prolonged postoperative hospitalization due to urinary retention.

A comprehensive retrospective analysis was conducted between January 2017-December 2022 encompassing cases of inguinal hernia repair at our tertiary academic health center. Exclusion criteria included patients without documented post operative urinary function in EMR and females (n = 81). Urinary retention rates in patients who were started on a daily dose of 0.4 mg tamsulosin (administered 7 days prior to operation and continued 7 days postoperatively) compared with those not receiving tamsulosin. The preoperative criteria for tamsulosin prescription were at provider discretion and included patients with a description of urinary retention, hesitancy or frequency during their preoperative assessment. Surgical techniques included open, robotic and laparoscopic approaches, such as transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) procedures. A chi squared test of independence and Fisher's exact test were performed for statistical analysis.

960 patient charts were reviewed. 614 remained for analysis after applying exclusion criteria. The surgical technique distribution was as follows: 63% TAPP, 25% TEP, and 12% open repairs.

Regarding the primary endpoint of urinary retention, tamsulosin administration (n = 32) showed a trend towards reduced rates, with a documented incidence of 3.13% compared to 8.17% but was not statistically significant $p = 0.7228$ utilizing Fisher's exact test. Although not statistically significant, we acknowledge the potential limitation of our study's statistical power. The rate of urinary retention differed based on surgical approach with 9.16% in the TAPP group, 7.79% in the TEP group, and 3.35% in the open group($p = 0.0752$) but was not statistically significant.

Furthermore, among patients with preoperative diagnosis of BPH, 8.55% experience urinary retention compared to 7.22% of patients without a documented preoperative diagnosis ($p = 0.6$). These findings emphasize that POUR is prevalent not only in patients with preexisting prostate conditions but also in those without a diagnosis.

In conclusion, the utilization of tamsulosin in the management of inguinal hernia repair in men shows promise in reducing the incidence of POUR. This study sheds light on the potential benefits of prophylactic tamsulosin administration in patients undergoing inguinal hernia operation. Next steps include a prospective study to substantiate these findings and broaden patient selection in patients undergoing inguinal hernia repairs.

P467

A Prediction Model for Thyroid Nodule Breakage During Specimen Extraction Following Transoral Endoscopic Thyroidectomy Vestibular Approach

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Introduction: Due to concerns over the optimal thyroid nodule characteristics for the Transoral Endoscopic Thyroidectomy Vestibular Approach (TOETVA) without tissue damage, we aim to develop a preoperative scoring system to identify high-risk patients for thyroid nodule breakage during specimen extraction.

Methods and Procedures: A retrospective medical record review was conducted at Police General Hospital, Bangkok, Thailand, recruiting patients who underwent TOETVA between January 2018 and October 2022. Demographics, nodule characteristics, procedures, and pathological outcomes were collected. 20% of patients received a total thyroidectomy. Therefore, this study counted each thyroid lobe individually. 70 and 30% of the samples were randomly assigned to the training and testing datasets. Stepwise logistic regression with patient clustering was performed. The coefficients from the optimal model were used to create the scoring system. Area under the curve(AUC) was calculated to evaluate the model's performance using 1,000 bootstrap resamplings. The probabilities of thyroid nodule breakage were computed for each score range using the entire dataset. All statistical analyses were calculated using STATA 17 (College Station, TX: StataCorp LLC).

Results: 434 patients with 521 lobectomies were included; 335 (64.3%) specimens were broken during extraction, causing 28 (5.4%) uninterpretable pathologic results. The training and testing datasets consisted of 362 and 179 samples, respectively. The AUC in the testing cohort was 0.74 (95%CI: 0.66-0.83). Table 1 describes the scoring system estimated from the optimal equation. The probabilities of thyroid nodule breakage for each scoring range (0-7, 8-12, 13-17, and 18-27) were 20, 41, 68, and 88%, respectively.

Conclusions(s): Our preoperative scoring system could help surgeons identify high-risk individuals with thyroid nodule breakage during specimen extraction.

Table 1 Preoperative scoring system for thyroid nodules breakage

Variables	Regression (95%CI)	Coefficient	Score
Number of thyroid nodules	Reference		0
Multiple	0.50 (-0.08 to 1.07)		2
Single			
Largest nodule's characteristic	Reference		0
	0.57 (-0.22 to 1.37)		2
Cyst	1.75 (0.94 to 2.55)		7
Cystic-solid			
Solid			
Total thyroid nodule size	Reference		0
< 2 cm	1.09 (0.24 to 1.94)		4
2 to 2.99 cm	2.15 (1.29 to 3.00)		9
3 to 3.99 cm	3.48 (2.56 to 4.39)		14
≥ 4 cm			

P468

Robotic Converted to Open Right Inguinal Hernia Repair for a Large Right Inguinal Hernia

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Introduction: Robot assisted laparoscopic hernia repairs are one of the most common surgical procedures performed. This case takes a look at a complex hernia containing small bowel and large bowel. It demonstrates that in complex hernias,sometimes there is a need to convert to open, but the robot is a powerful tool that can be used to assist a complicated operation. Ultimately patients can benefit from a combined procedure as it can lower the risk of complications.
Procedures: Patient was a 70 year old male who presented to the clinic for repair of a large right inguinal hernia. Patient had a known right inguinal hernia, which he had elected to not have repaired over the course of 10 years. During that time the hernia increased in size and became a burden to care for. Due to the size of the hernia the patient was unable to wear slacks as only sweatpants could accommodate the hernia. He was requesting a surgical procedure to improve his quality of life and avoid devastating complications later on in life such as strangulation of bowel. The patient was booked and scheduled for a robotic right inguinal hernia repair. The risks of having to convert to open were explained to the patient, given the large size of the defect. The patient elected for this procedure to improve his quality of life. Patient underwent robotic laparoscopic hernia repair converted to open right inguinal hernia repair with partial colectomy, ileocolonic anastomosis, and use of biologic mesh to repair a large defect in the inguinal canal.
Results: This case highlights the benefits of usage of the robot to assist with even complex surgical procedures. The advantage of beginning robotically was lysis of adhesions and mobilizing colon to allow for reduction of bowel into the abdomen. By doing this we were able to avoid a larger midline incision, and the complications which arise from that. Patient was able to undergo hernia repair and was discharged home on post operative day one with minimal pain.
Conclusion: 70 year old male with large complicated right inguinal hernia containing colon and small bowel which had become a burden to manage underwent a robot assisted laparoscopic converted to open right inguinal hernia repair with partial colectomy and ileocolonic anastomosis and biologic mesh placement to repair large defect in inguinal canal. Patient's quality of life improved, and a large burdensome right inguinal hernia was repaired.

P470

Semaglutide Causes Weight Loss and Symptom Improvement in Secondary Lymphedema

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Introduction: The purpose of our study is to: Understand the demographics and symptoms of patients in the Central Valley with secondary lymphedema. Investigate the effects of semaglutide in obese and/or T2DM patients with secondary lymphedema.
Methods: Patients in California's Central Valley at 6 surgical clinics with secondary lymphedema were surveyed to assess demographics and symptoms. Additional patients on Semaglutide treatment for obesity and/or T2DM were monitored for their diabetes management, weight loss progress, and lymphedema symptoms compared to patients who served as controls. The patients were followed for 9 months. Treated patients completed pre-semaglutide questionnaires and follow-up post-semaglutide questionnaires at 3, 6, and 9 months along with medical assessment. Control patients completed similar questionnaires. The questionnaires investigated patients' subjective feelings regarding their lymphedema symptoms and management using a Likert-scale; quantitative leg measurements were collected and blood work reviewed at these appointments. Paired difference t-tests, chi-squared tests, and independent sample t-tests were performed.
Results: 50 patients, aged 18-75 years, completed the surveys evaluating secondary lymphedema: 90% female, 69% Hispanic, 45% Spanish speaking, 42% disabled, 57% employed, 54% income range below 30 thousand dollars, and average BMI of 40. Both treated patients and controls, 35 patients and 15 controls, respectively, noted the most common symptoms were leg swelling ($\bar{x} = 3.2$, SD = 1.3), leg pain ($\bar{x} = 3.2$, SD = 1.6), loss of daily function ($\bar{x} = 3$, SD = 1.4), and negative body image ($\bar{x} = 4.4$, SD = 0.54). Patients in the semaglutide group receiving > 3 months of treatment compared to controls demonstrated: 55% patients in the treatment group had a 10% weight loss vs 3% in the control group (average BMI reduction by 11% vs controls by 2.5%, $p < 0.05$) and improved subjective feelings about their lymphedema symptoms: leg swelling ($\bar{x} = 2.4$, SD = 0.45 vs $\bar{x} = 3.2$, SD = 1.3, $p < 0.05$), leg pain ($\bar{x} = 2.2$, SD = 0.45 vs $\bar{x} = 3.2$, SD = 1.6, $p < 0.05$), and heaviness ($\bar{x} = 2.2$, SD = 0.45 vs $\bar{x} = 3$, SD = 1.56, $p < 0.05$). Improvement in diabetes management was demonstrated by an average of 0.9% decrease in A1C values compared to controls 0.1%, $p < 0.05$. In comparison to controls, patients on semaglutide noted 6 cm decrease in the circumference of the leg, knee, calf, and ankle compared to 2 cm in controls, $p < 0.05$.
Conclusion: Semaglutide was shown to significantly improve weight loss, T2DM management, leg circumference, and secondary lymphedema functional, physical and psychosocial symptoms. There is exciting potential to use this medication to improve the management of patients suffering from lymphedema.

P471

Sclerosing Angiomatoid Nodular Transformation (SANT) Presenting as Recurrent Splenic Cyst

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Introduction: Sclerosing angiomatoid nodular transformation (SANT) is a rare and poorly understood vascular lesion of the spleen described in 2004 and considered to be benign. Preoperative diagnosis is challenging because it is clinically and radiologically similar to other entities such as hemangiomas, hamartomas, or even malignancies and diagnosis can only be proven histologically. To date, there are only few hundred cases reported worldwide. While there are no guidelines for the treatment of SANT, splenectomy is recommended due to the potential risk of spontaneous rupture of large vascular lesions and the inability to rule out a malignancy preoperatively.
Case: A 42-year-old female patient presented to clinic with several months of intermittent left upper quadrant abdominal pain and nausea. Ultrasound (US) and CT of the abdomen/pelvis demonstrated a 10 cm hypodense splenic lesion with partial internal septations, suggestive of a complex cystic lesion. It was successfully drained percutaneously. Cytology was benign and culture was negative for infection. Two years later she returned with similar symptoms, and repeat abdominal US showed interval enlargement of the splenic lesion to 15 cm. Labs were negative for infection. She received immunization against encapsulated bacterial pathogens and underwent laparoscopic splenectomy. Intraoperatively, a large fibrotic lesion was seen on the spleen and thick adhesions between the spleen and the left diaphragm were taken down. Pathology was consistent with SANT. A few weeks after surgery, she was found to have a new and large symptomatic diaphragmatic hernia, which was successfully repaired by laparotomy and primary closure of the defect, without any further issues.
Conclusion: Our case demonstrates the diagnostic and surgical challenges associated with SANT. The reported cases in the literature support curative management with splenectomy and there are few details of postoperative complications associated with management of this pathology. We believe that initial management with percutaneous drainage may have led to the recurrence and finding of thick capsular adherence to the diaphragm. This likely contributed to the difficult dissection of the lesion during laparoscopic splenectomy and to the development of a diaphragmatic hernia.

P472

Cost-effectiveness Analysis of Laparoscopic Appendectomy vs Open appendectomy vs Non-operative Management of Uncomplicated Appendicitis in a Tertiary Private Hospital

Nina Rebecca R Kalaw, MD; Clarence Pio Rey C Yacapin, MD; Asian Hospital and Medical Center

Non-operative management (NOM) for acute appendicitis is a potentially cost-effective option compared to surgical procedures. The Philippine Universal Healthcare Law requires a Health Technology Assessment (HTA) before procedures can be included in practice guidelines and reimbursements by government health assistance. This study aimed to evaluate the cost-effectiveness of NOM of appendicitis versus the operative options of laparoscopic and open appendectomy in the Philippines.

A decision tree model using data from literature review and billing statements of a tertiary private hospital computed the incremental cost-effectiveness ratio (ICER) of NOM compared to operative options. The ICER represented the cost per quality adjusted life year (QALY) for each procedure. The study used a willing-to-pay threshold equivalent to the 2022 GDP per capita, with a payor's perspective and a one-year time horizon. Sensitivity analyses were conducted to assess the model's robustness and identify which variables affected the results. A procedure was considered cost-effective if the ICER was below PHP 197,398 ($3,555).

NOM had a negative ICER compared to both surgical options, at PHP -192,661/QALY ($3,458) and PHP -1,579,615/QALY ($28,350) for open and laparoscopic procedures, respectively. Cost of surgical procedures was found to have a bigger impact on the cost-effectiveness of NOM than probability of recurrence in the sensitivity analysis. A price threshold analysis indicated that lowering the cost of laparoscopic appendectomy to PHP 105,625 ($1,896) would make it more cost-effective than NOM.

This study suggests that NOM is more cost-effective than surgical procedures for treating acute appendicitis. Surgical procedures can become more cost-effective than NOM if their cost is significantly reduced by 54%. It is recommended to consider different economic analysis perspectives before applying NOM as a cost-effective approach in local settings.

P473

A Technique for Laparoscopic Surgery of Transabdominal Preperitoneal Repair for Groin Hernia: Nearly Invisible and Cosmetically Satisfying Surgical Scar

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Introduction: The standard technique of transabdominal preperitoneal repair (TAPP) for groin hernia, three ports are used, and single port surgery (SPS) has been reported to reduce the number of scars, however, the length of the umbilical incision tends to be about 25 mm long as a result. To reduce the number of the ports and abdominal wall damage, we use one needle forceps plus SPS with 12 mm umbilical incision.
Patients and Methods: From January 2017 to August 2023, 374 consecutive TAPP patients (319 male and 55 female, 20-99 years old) were retrospectively investigated. 29 cases were operated by open method as the same period because of respiratory or cardiovascular problems. We use two 5 mm ports (1 for the scope and 1 for the operator's right hand forceps) through an umbilical 12 mm incision and additional 2.4 mm needle instrument is pierced on the left side of the abdominal wall. A 5 mm flexible scope allows us to keep the triangular formation easily. We studied the safety and usefulness of this method from the viewpoints of operation time and the complications.
Results: Median operation time of single side hernia (305 cases) was 72 min (30-227) and the bilateral case (69 cases) was 121 min (64-249). 7 cases needed one or two additional 5 mm ports because of their obesity or post-operative adhesion, and 1 case with the history of prostate cancer surgery was converted to open method because of the venous bleeding. 5 cases of postoperative seroma requiring percutaneous drainage were counted as surgical complication. No spermatic cord injury was observed. Umbilical scars and the pierced needle instrument scars became invisible within 1 or 2 months. There were no incisional hernia nor severe wound infections in our series.
These data was comparable to the reported conventional TAPP laparoscopic hernia repairs.
Conclusions: There were no differences between our 12 mm SPS-TAPP with one needle forceps technique and conventional method in operation time and the complication rate. Our technique had better cosmesis than the conventional TAPP or ordinary SPS TAPP and was demonstrated as a less invasive approach for laparoscopic groin hernia repair.

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Enhanced Preoperative Pancreatoduodenectomy Patient Education Using Mixed Reality Technology: A Randomized Controlled Trial

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Extended reality (XR) devices have a growing role within medical education. Despite this, there has been a paucity of inquiry into XR's utility in patient education. This study aims to explore the effectiveness of XR use during pancreatoduodenectomy informed consent discussions.

A single-center randomized study of patients offered a pancreatoduodenectomy (02/2023-05/2023). Pre/post-intervention 5-point Likert scales evaluated patients' perceived understanding regarding their diagnosis and care. Controls received a standardized pancreatoduodenectomy discussion with physician-drawn diagrams. The intervention group received the same discussion while using a HoloLens device (Fig. 1). The patient's comfort level with surgery was quantified post-intervention. Mann-Whitney U tests and an ordinal regression were performed.

Ten patients were included. The median age was 65.5 years. 60% of patients had a bachelor's degree. HoloLens patients reported greater understanding both pre and post-intervention (Table 1). Median survey responses improved from 3.0 to 4.0 and 4.0 to 5.0 for control and HoloLens cohorts. A post-intervention response of 4.0 was 2.5 × more likely to be associated with HoloLens use ($p < 0.001$). HoloLens users reported more comfort with the operation (median score 4.0 vs 3.0, $p = 0.114$).

This is the first study to establish that XR technology can be effectively utilized in the consent process for complex surgeries and may result in improved patient understanding and comfort.

Figure 1. The patient visual experience while using the HoloLens device.

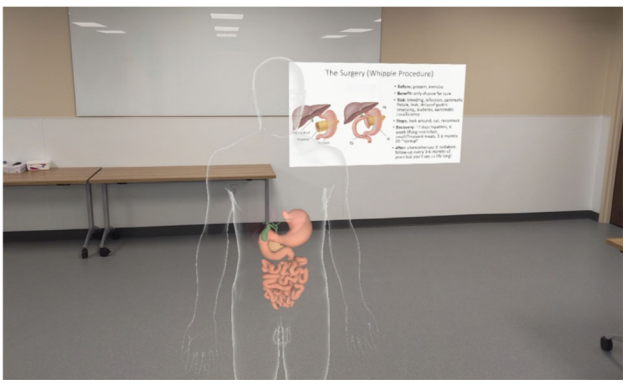


Table 1 Patient reported understanding by survey topic

	Median	
	Control (N = 4)	*HoloLens* (N = 6)
Risks		
Pre-intervention	3.0	3.5
Post-intervention	4.5	5.0
Difference	1.5	1.0
Operation		
Pre-intervention	3.0	4.0
Post-intervention	3.5	5.0
Difference	1.5	1.0
Recovery		
Pre-intervention	2.0	3.5
Post-intervention	3.5	5.0
Difference	1.5	1.0
Follow-up		
Pre-intervention	3.5	3.5
Post-intervention	4.0	5.0
Difference	1.0	1.5
Complication management		
Pre-intervention	1.0	3.5
Post-intervention	3.5	5.0
Difference	2.0	1.5

P475

Laparoscopic Management of Laterally Spreading Cecal Polyps

Katie Harding, Dr; Alicia Follett; David Pace, Dr; Memorial University of Newfoundland

Introduction: Laterally spreading polyps of the cecum can be challenging to remove endoscopically when involving the appendiceal orifice. These polyps have a low risk of harbouring malignancy when they are homogeneous, granular, and without areas of ulceration or depression. While some patients get a segmental bowel resection, recent reports suggest that a combined laparoscopic/endoscopic approach works well. The purpose of this retrospective review is to showcase that laparoscopic cecal resection without endoscopic assistance is a successful treatment option for laterally spreading polyps with low-risk features.

Methods: This is a retrospective review of two cases of laterally spreading cecal polyps (Paris IIa) managed using laparoscopic cecal resection without endoscopic assistance. Both cases are from the same institution and completed by the same surgeon.

Results: Patients were both older males with lateral spreading polyps involving the appendiceal orifice. Based upon colonoscopic findings, both polyps had a granular, homogeneous appearance measuring

between 3 and 5 cm in maximum diameter (Fig. 1). Both polyps were over a centimeter from the inferior border of ileocecal valve accommodating placement of a linear stapler. Laparoscopic wedge resection of the cecum was performed using 4 ports (one 10 mm, one 12 mm, and two 5 mm) to lyse adhesions, fully mobilize the cecum, and to staple/divide the cecum intracorporeally with a linear stapler. Both specimens were placed in a plastic bag and removed through the umbilical port site. Specimens were opened after removal to confirm clear margins (Fig. 2). One patient was discharged home on the same day of surgery and the other was discharged on postoperative day one. There were no intraoperative or postoperative complications. The final pathology report confirmed tubulovillous adenomas with clear margins in both cases.

Conclusion: Laparoscopic cecal wedge resection of laterally spreading tumors of the cecum involving the appendiceal orifice is a safe, effective management option for tumours greater than 1 cm from the ileocecal valve. Endoscopic assistance during surgery is unnecessary and a more invasive segmental resection can be avoided.



Figure 1 Colonoscopy image from Case 1 showing lateral spreading polyp near the appendiceal orifice.

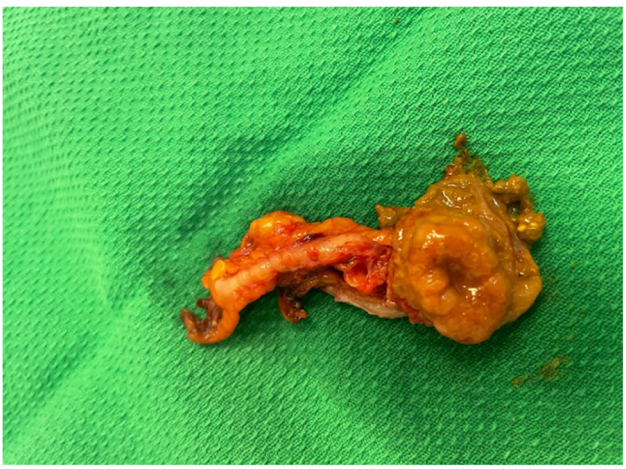


Figure 2 Gross specimen from Case 2 showing successfully resected laterally spreading polyp.

P476

Treatment of Gastro-Esophageal Reflux Disease with a Novel Implantable Device-Based Procedure: 12-19 Months' Follow-Up of 40 Patients at a Regional Hospital in Germany

Thorsten G Lehmann, Dr; Mantas Šimkus, Dr; Christoph Oehler, Dr; Klinikum Friedrichshafen

Background: The prevalence of gastroesophageal reflux disease (GERD) is increasing, particularly in the Western world, and a recent epidemiological survey estimated the total number of sufferers at more than one billion. Despite having several standard-care treatment options, the unmet need is still high. RefluxStop is a novel device to treat GERD without encircling and putting pressure on the food passageway. It utilizes an approach of restoring the normal anatomy of the gastroesophageal junction. This is a case-series report to present a minimum of 12 months' (12–19 months) follow-up results of 40 patients operated on at a regional hospital in Germany.

Methods: Between July 2021 and November 2022, a total of 80 patients underwent surgery with the RefluxStop implantable device to manage GERD. Out of this group, 40 patients recently completed at least 12 months of follow-up. At baseline, demographic and clinical characteristics were recorded. During the follow-up period, several outcomes were recorded including GERD symptoms, GERD-HRQL score, and use of proton-pump inhibitors (PPIs). Intra-operative and post-operative procedure-related and device-related adverse events were monitored.

Results: Mean follow-up was 14.5 months (min 12-max 19). Patients' mean age was 48.2 ± 14.3 years, 55% were male, and mean body mass index was 26.2 ± 4.9. Most patients (38/40, 95%) had hiatal hernia; average size was 3.3 ± 2.5 cm. Twenty-four (60%) patients had esophagitis and 7 (17.5%) patients had Barrett's esophagus. At baseline, mean GERD-HRQL score was 19.5 ± 3.8 and 39/40 patients were using PPIs. At follow-up, all except one patient (2.5%) had discontinued PPIs. Only 2 patients (5%) reported reflux as a symptom at follow-up, one of whom indicated it was mild and occasional. No patients reported regurgitation. No patients reported dysphagia, and 2 (5%) reported bloating. GERD-HRQL score change was significant from baseline with a 91.9% improvement (19.5 ± 3.8 to 1.1 ± 2.2). No intraoperative procedure-related or device-related adverse events were recorded. There were no reoperations during the follow-up period.

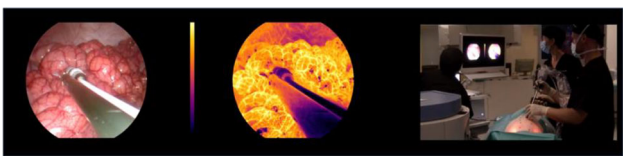
Conclusion: This case series demonstrates the effectiveness and safety of this new treatment approach for GERD patients. Prospective controlled studies are needed to validate this real-world case-series experience. Comparative studies with medical and surgical standard of care may further demonstrate the effectiveness of this new implantable device-based therapy.

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Intraoperative Hyperspectral Imaging Enables Real-time Quantitative Visualisation of Tissue Oxygenation During Surgery

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Introduction: Intra- and postoperative ischemia can precipitate complications in all surgery. Inadequate tissue perfusion can result in ischemic injury, reduced viability and impaired healing. Yet standard intraoperative color imaging techniques only provide limited visualization of borderline ischemia, so ischemia may manifest in postoperative complications. This is particularly relevant for bowel anastomoses. There is a pressing need for new technologies to inform surgeons of tissue oxygenation intra-operatively without disruption of the surgical workflow. The aim of the present study was to compare a hyperspectral imaging (HSI) system for intraoperative guidance in abdominal surgery (via live tissue oxygenation maps) with an FDA-cleared point-based tissue oximeter during laparoscopic, transanal, and open abdominal surgery in a live porcine model.
Methods and Procedures: Conventional intraoperative cameras capture just three broad wavelength ranges (bands) of light from tissue. Hyperspectral imaging (HSI) splits the light into many more bands, collecting far more comprehensive spectral information. This can be used to determine the concentration of underlying biological molecules, for example, oxy- and deoxy-hemoglobin, thus enabling non-invasive measurement of tissue oxygenation. Until now, the application of this technology has been limited by long image acquisition times and large spatial footprints. These challenges are overcome with a compact hand-held minimally invasive HSI system that simultaneously provides conventional color images and continuous quantitative tissue oxygenation maps, at live video rate, in standard operating conditions during laparoscopy or open surgery.
Hyperspectral visualization of tissue oxygenation was performed in > 20 tissue types in vivo including esophagus, stomach and bowel and compared to repeated probe-based oxygen saturation measurements.
Results: Dynamic HSI and color imaging were continuously accessible in a side-by-side view in real time and without disruption of the surgical workflow. Point-based reference measurements via the tissue oximeter probe were correlated with the HSI oxygenation maps providing real-time intraoperative quantitative tissue oxygenation data.
Conclusions: The validation of intraoperative optical tissue oxygenation measurements lays the foundation for first-in-human studies of HSI-guided minimally invasive surgery. Following the successful completion of these studies, HSI technology has the potential to reduce surgical complications secondary to ischemia in future.



Left: Side-by-side visualisation of live color imaging and continuous quantitative tissue oxygenation map of abdominal anatomy. Field of view also shows the probe-based tissue oximeter used to measure local oxygenation saturation information.

Right: Intraoperative hyperspectral imaging setup with side-by-side visualisation of colour and tissue oxygenation information during laparoscopic surgery.

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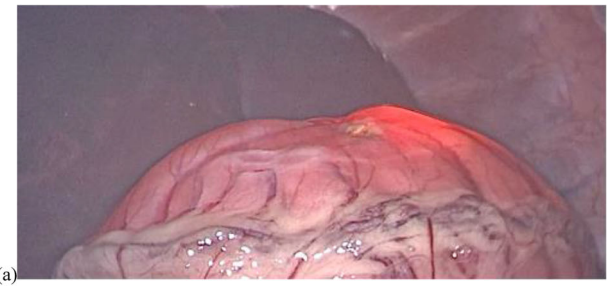
Maintaining Constant Pressure Insufflation in Endoscopic Full Thickness Resection Using the EVA15 Insufflator

Alice Moynihan[1]; Patrick Boland[1]; Silvana Perrata[2]; Bernard Dallemagne[2]; Pietro Riva[2]; Ronan Cahill[1]; John O'Dea[3]; [1]University College Dublin; [2]Research Institute against Digestive Cancer (IRCAD); [3]Palliare Ltd

Objective of the Technology or Device: Endoscopic Full Thickness Resection, EFTR, presents challenges due to the fact that a cavity being operated in, the inner cavity (e.g. the stomach), sits within another cavity, the outer cavity (the peritoneum). Once the wall of the inner cavity is breached, two cavities become a single cavity, and the task of insufflation and visualization is negatively impacted. Insufflation gas flows from the inner cavity to the outer cavity often leading to collapse of the inner cavity, rendering continuation of the procedure challenging. The objective of this work was to evaluate a new dual smart insufflation technique, to prevent inner cavity collapse after resection of the inner cavity wall during EFTR.
Description of the Technology and Method of its Use or Application: The EVA15 insufflator (Palliare, Galway, Ireland) is a new smart insufflator designed to provide a constant pressure insufflation during endoscopic procedures, in a manner similar to the insufflation paradigm employed for laparoscopic surgery. Two constant pressure EVA15 insufflators were employed (Fig. 1) in a porcine EFTR model (both cadaveric and live pigs were used). The first EVA15 was teed in intra-luminally via the endoscope instrument channel and set to deliver a constant 10 mmHg, using a modified Bioshield Irrigator (Steris Healthcare, Mentor, OH). A second EVA15 insufflator was set up to deliver the same 10 mmHg to the peritoneal cavity via a trocar or veress needle. For the purposes of the demonstration, a laparoscopic scissors was deployed via a trocar to resect the stomach wall. A minimal incision, the width of the scissors, was first made, followed by a larger incision approximately 20 mm in diameter. The outer wall of the stomach was observed to assess the degree of deflation of the stomach after the incisions were made.
Preliminary Results: As seen in Fig. 2, satisfactory insufflation of the stomach was maintained for both minor and significant incisions in both porcine models.
Conclusions/Future Directions: This initial application of this balanced insufflation technique offers promise in addressing the insufflation challenges of EFTR. Further work will evaluate similar efficacy during EFTR in the colon.
Figure 1 Use of two insufflators to simultaneously inflate the stomach and peritoneal cavity at the same constant pressure setting

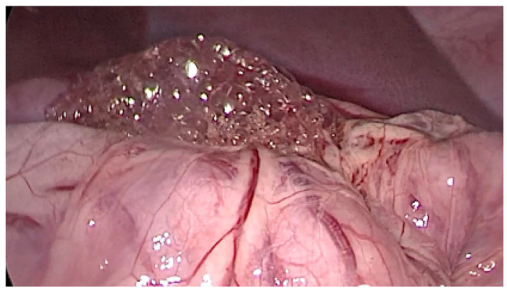


Figure 2 Inflated stomach after (a)small and (b)large (20 mm) incision created with a laparoscopic scissors in the presence of a pre-established pneumoperitoneum including (c)laparoscopic view of the latter

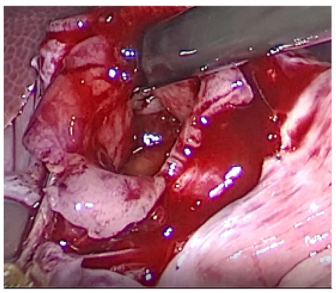


2(a)

2(b)



(c)



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Real-time Intestinal Perfusion Assessment as a Red Flag Technique for Anastomotic Site Selection Using PerfusiX-Imaging

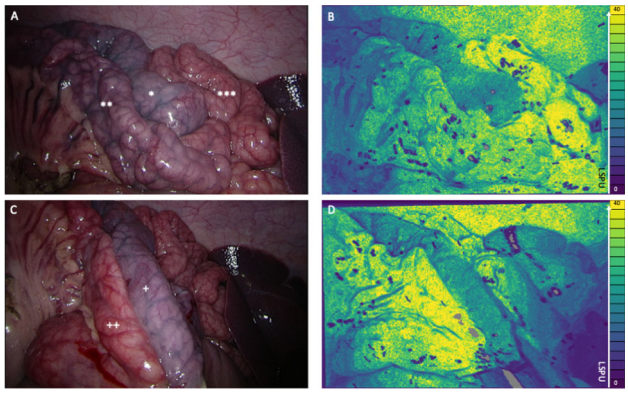
Danique Heuvelings[1]; Mahdi Al-Taher[2]; Joost Calon[3]; Manisch Chand[4]; Adrian Park[5]; Laurents Stassen[1]; Tim Lubbers[1]; Kevin Wevers[1]; Luigi Boni[6]; Nicole Bouvy[1]; Wido Heeman, PhD[7]; [1]Maastricht University; [2]IRCAD Strassbourg; [3]ZiuZ Visual Intelligence; [4]University College London; [5]Johns Hopkins University School of Medicine; [6]Fondazione IRCCS Cà Granda Ospedale Maggiore Policlinico di Milano; [7]LIMIS Development

In this study we explore the usability and applicability of PerfusiX-Imaging, a novel perfusion imaging system, in gastrointestinal surgeries to assess real-time intestinal perfusion. The study aims to determine if PerfusiX-Imaging, based on laparoscopic laser speckle contrast imaging (LSCI), can provide valuable feedback for identifying the state of tissue perfusion and assess anastomotic perfusion. Additionally, we study the usability of the device.

Three differently perfused porcine small bowel loops were created (Fig. 1), and five senior surgeons were asked to identify ischemic loops and assess perfusion differences using PerfusiX-Imaging feedback. The results demonstrated a high accuracy in identifying compromised perfusion and detecting perfusion differences between loops using the PerfusiX-Imaging system. Moreover, the study evaluated the impact of PerfusiX-Imaging on decision-making for anastomosis creation. All surgeons recommended against creating an anastomosis based on additional visual feedback provided by PerfusiX-Imaging, indicating its potential to guide surgeons away from poorly perfused tissue segments. A usability questionnaire revealed that the senior surgeons were highly satisfied with PerfusiX-Imaging as a perfusion imager, particularly in terms of its ability to accurately represent blood flow patterns, high display quality of data, ease of use, efficient setup, minimal latency, and real-time visualization of tissue perfusion.

In conclusion, PerfusiX-Imaging can provide valuable real-time feedback on intestinal tissue perfusion during surgery, enabling surgeons to select optimal tissue segments for anastomosis. However, further research is required to validate the efficacy of PerfusiX-Imaging in clinical settings and its impact on surgical outcomes in human patients.

Fig. 1A The white light image of the three differently perfused loops. * Indicates the ischemic loop, ** indicates the compromised loop and *** indicates the healthy loop. B: The PerfusiX-Imaging perfusion image with the three differently perfused loops. Blue indicates low perfusion and yellow indicates high perfusion. C: The white light image of the anastomosis with a bad perfused segment indicated by + and an uncompromised segment indicated with ++. D: The PerfusiX-Imaging perfusion image of the anastomosis. Blue indicates low perfusion and yellow indicates high perfusion



P480

Transformative Strategies for Hemorrhoid Management- A New Era of Preserving Anatomy, Physiology, and Function-Retrospective Longitudinal Consecutive Case Series

Dr. P. B Patel; Shiv Shraddha Nursing Home

Background: Hemorrhoids, anatomically anal cushions, play a pivotal role in maintaining precise automatic continence and controlled defecation. Excisional Hemorrhoidectomy (EH), Laser Hemorrhoidoplasty (LHP), and sclerotherapy use ablative techniques, resulting in either excision or submucosal fibrosis. Stapler Hemorrhoidopexy (SH) decreases rectal compliance, while Doppler-guided Hemorrhoidal Artery Ligation (DGHAL), Infrared Coagulation (IRC), and emborrhoid reduce vascularity but do not address multifaceted pathophysiology. Except EH, external hemorrhoids are not addressed. Secondary and circumferential hemorrhoids also remain unaddressed by all. The management of highly vascularized hemorrhoids presents a formidable challenge across all methods. Existing approaches either control or cure with the trade-off of high recurrence rates or increased complications. Fibrosis induced by EH, LHP, sclerotherapy, and SH may impair function. Compromised air and water-tight seals, anal lip integrity due to mucosal fixation, and sensory deprivation are significant challenges patients currently face.
Objective: This study explores the "5PF" strategy, aiming to reduce hemorrhoidal plexus distensibility through precise fibrosis without harming mucosa and submucosa.
Method:
Inclusion criteria
concurrent internal (grade III and IV) and external hemorrhoids, associated with one or more of the following—secondary, Circumferential, circumferentially protruding, highly vascular, and complicated hemorrhoids.
Retrospective study involving 187 patients with a follow-up ranging from 13 + years, minimum follow-up of 1 year. 123 males and 64 females. 6 were unreachable, 1 expired, and 2 not possible to communicate resulting in a final sample of 178 patients. Physical examinations were conducted for 32 patients, while 156 were interviewed on the phone.
patients were interviewed over phone.
Results: All patients experienced post-operative pain, discharge, and pruritus. Pain ranges from an average duration of 8 to a maximum of 21 days in one patient. There were no reported cases of primary or secondary hemorrhage, Occasional spotting 3 to 4 times in a year in 3 cases, itching in 5 cases, and pliable skin tags in 11 cases., There was no prolapse or soiling.
No case of recurrence, reoperation, stricture, or incontinence.
HD's impact on daily activity significantly improved from 7-10 to 0-1, while treatment satisfaction consistently scored very high at 9 and 10.
Conclusion: Innovative strategies that prioritize the preservation of anatomy, physiology, neurophysiology, and function in the management of hemorrhoids introduce a fresh perspective to care. The research outcomes indicate promising results associated with the 5PF procedure, indicating potential advantages in addressing intricate hemorrhoidal cases. Subsequent investigations with more extensive participant groups and extended monitoring periods are merited.

P481

Identification of Gastric Conduit Perfusion Deficits Using Motion Stabilized Laparoscopic Laser Speckle Contrast Imaging

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Introduction: The aim of this study is to determine the feasibility of laparoscopic Laser Speckle Contrast Imaging (LSCI) for perfusion assessment of the gastric conduit, compared to the surgical eye and Indocyanine Green (ICG) Fluorescence Imaging in the laparoscopic setting.
A commonly accepted pathway for development of Anastomotic Leakage is hypoperfusion on the anastomotic site. To date, a robust and objective indication of per-operative tissue perfusion is lacking, implying the clinical need for one. PerfusiX-Imaging is a new and promising dye-free laparoscopic LSCI technology, developed for visualization of tissue perfusion.
Methods: Thirty patients undergoing an esophagectomy will be included in this prospective, observational monocenter study. PerfusiX-Imaging of the gastric conduit, esophageal stump and anastomosis will be compared with the standard-of-care for perfusion assessment (i.e., ICG-fluorescence and the surgical eye). Post-operative analysis will be performed on the location of the watershed area for each assessment and on the percentage of change in location of the anastomosis by both involved (surgery performing) surgeons and non-involved surgeons, based on the LSCI, ICG and whitelight images. In addition, the required time to acquire LSCI and ICG images is registered, and post-operative patient progress is monitored.
Results: (Inclusion of patients in ongoing at the time of writing. Therefore, results are preliminary.) The PerfusiX-Imaging derived additional visual feedback showed imminent perfusion differences at the gastric conduit (Fig. 1). Tissue perfusion was visualized in real-time, and both involved and non-involved surgeons were able to identify the watershed area (the transition area between well and poorly perfused tissue. Although there was 80% concordance in the indicated watershed area, a shift over time was seen using ICG. With LSCI, the location remained unchanged. 37.5% of surgeons would change the location of resection proximally with 1.3 cm on average. LSCI-imaging was significantly faster than ICG and could be repeated without limitation.
Conclusion: The laparoscopic motion-stabilized Laser Speckle Contrast Imaging device 'PerfusiX-Imaging' is a promising alternative to the surgical eye and ICG in esophageal surgery, showing stable and real-time imminent perfusion differences without the requirement of any intravenous dyes or extra operating time.

P482

Robotic Purse-String Suture Technique to Conduct Intracorporeal Anastomosis for DST in Totally Robotic Resection of Rectal and Sigmoid Cancer

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Background: Intracorporeal anastomosis (ICA) in colorectal cancer surgery has the advantages of cosmetic and minimal invasiveness, such as minimizing the range of movement and incision length, early recovery of intestinal peristalsis, and reduced pain. Since robotic surgery was indicated for colon cancer in Japan, many institutions have introduced ICA for right-sided colon surgery. However, there are few reports regarding left-sided ICA. We herein report a simple and novel procedure of robotic purse-string suture (RPSS) to conduct ICA for DST in left-sided colorectal surgery.
Methods: From January 2023 to September 2023, RPSS technique were performed in 10 patients who diagnosed with rectal or sigmoid cancer. After the tumor-specific mesorectal excision (TSME) or total mesorectal excision (TME), the specimen is extracted from the umbilical wound. The anvil is placed into the body cavity at the same time. The oral colonic stump is robotically cut off and hand-stitched with 3-0 proline in all layers and circumferentially. After the anvil being inserted into the stump, the intestinal wall of colon is completely sewn up on the central rod of the anvil. The reconstruction is anastomosed with DST.
Results: Gender: 5 males, 5 females; age: 71 years (36-82); BMI: 22 (15-35); tumor localization: S in 4 cases, RS in 3 cases, Ra in 2 cases, and Rb in 1 case. The surgical operation: sigmoidectomy in 4 cases, anterior resection in 3 cases, and low anterior resection in 3 cases. The operation time was 287 min (182-488), bleeding was small in all cases, it took 3 days to start eating (2-9), postoperative hospital stay was 7 days (7-16). Although chyle was observed in 1 case (Clavien-Dindo GradeI), there were no complications related to the anastomosis.
Conclusions: RPSS technique could be performed safely without prolonging the total operative time. That may be a useful modality in future total robotic colorectal surgery.

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Investigating the Efficacy of Robot-Assisted Natural Orifice Intracorporeal Anastomosis and Extraction of Sigmoid Colon

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Background: Sigmoidectomy is considered a mainstay of treatment for colon cancer, recurrent uncomplicated and complicated diverticular disease. Examples of available techniques for colectomies include open, laparoscopic, natural orifice specimen extraction (NOSE) with extracorporeal anastomosis, and natural orifice intracorporeal anastomosis and extraction of specimen (NICE).
Objective: To determine in adult patients with diverticular disease or colon cancer if robot-assisted transrectal natural orifice-assisted intracorporeal anastomosis with extraction (NICE) is the most efficacious method of sigmoidectomy in comparison to other techniques in regard to hospital length of stay, operative time, and readmission.
Methods: This was a retrospective chart review study that identified 312 colon surgeries performed robotically by three surgeons from Hackensack University Medical Center between 2014 -2019. Participants were patients with diverticular disease or colon cancer who underwent elective left-sided colectomies. 161 participants were excluded because they did not meet criteria or were urgent or emergent. 151 participants met the criteria; 31 of which were performed robotically using the NICE method and 120 were robotic sigmoidectomies with transabdominal specimen extraction. The data examined operative time of the procedure in minutes, postoperative LOS in days from admission to discharge, and rates of readmission within 30 days.
Results: The median operative time for the robotic sigmoidectomies utilizing the NICE technique was 351 min, while the median operative time for robotic sigmoidectomies with transabdominal specimen extraction was 355 min. Mann-Whitney U test p value of .333 for operative time. The median length of stay with the NICE technique was two days, while the LOS for transabdominal specimen extraction was three days. Mann-Whitney U p value $< .05$. Of the 151 patients who underwent a robotic sigmoidectomy using the NICE technique, no patients were readmitted within 30 days after their procedure, whereas five patients in which the specimen was extracted transabdominal were readmitted. Fisher's exact test p value of.58 for readmissions.
Conclusion: Ultimately, the NICE technique has the potential to be an efficacious means of robotic sigmoid resection. The NICE technique's efficacy was statistically significant in achieving a decreased LOS. By demonstrating shorter LOS, the NICE method has potential to decrease hospital acquired infections, medical costs, and possibly improve patient quality of life. Moving forward, future studies with larger sample sizes could impact preferred method of sigmoidectomy for minimally invasive surgeons for patient benefit. Future studies should investigate other variables such as postoperative pain, rate of conversion, postoperative complications, and overall hospital cost.

P484

Inducing Artificial Gastric Peristalsis in Mouse Models

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Introduction: This study aims to induce artificial gastric peristalsis through electrical stimulation of the gastric smooth muscles. Gastroparesis is a chronic gastrointestinal disorder characterized by delayed gastric emptying without mechanical obstruction. Current treatments primarily alleviate symptoms like nausea and early satiety through pharmaceutical interventions and gastric electrical neuromodulation. Under physiological conditions, myogenic, neurogenic and hormonal inputs are required to trigger peristalsis. This experimental design focuses on the myogenic response elicited by external electrical stimulation to promote peristalsis.
Methods and Procedures: The experimental device consists of a mechanism to deliver current uniformly distributed through the stomach. Several device strips were created using different materials for optimal electrical conduction and biocompatibility, and ultimately a carbon fiber and silicone composite was chosen. The resistance across several strips with varying ratios of carbon fiber to silicone was measured. For testing, four murine gastric models were harvested within 1 h of death. The stomachs were submerged in Phosphate-buffered saline (PBS), and tested in both PBS and Krebs solution. The device was downsized to fit mouse stomachs and successfully sutured it in place. Various stimulation methods, including sinusoidal and square waveform generators, audio amplifiers and DC voltage outputs, were supplied using direct wire connections. Experiments used an Arduino-powered system allowing regulated fluid flow and

controlled electrical impulses for precise stomach stimulation in a mouse model.
Results: Square wave stimulation at 1 Hz and 0.5 Hz frequencies produced rapid esophageal contractions, with increasing voltage leading to heightened amplitudes. Effective stimulation required a minimal voltage of 1.25 V, with square waves and a maximum frequency of 1 Hz to effectively observe contractions. Subsequent repetitions of the experimental setup produced similar results, with visible esophageal contractions.
Conclusions: While contractions of the stomach were not observed macroscopically, the experiment elicited contractions of the esophagus. Repeating the experiment with a microscope and histological analysis would be beneficial. The findings suggest alternative and broader indications for the device, possibly addressing esophageal or intestinal disorders

P485

What Should I Use? Impact of Adhesion Barriers on Postoperative Abdominal Adhesions: A Systematic Review

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Introduction: Abdominal adhesions can cause small bowel obstructions, which may lead to readmission, morbidity, and reoperation. Adhesion barriers in abdominal surgery may be a cost-effective tool to minimize postoperative complications. This review aims to analyze the different types of adhesion barriers and determine their effects on postoperative outcomes in patients undergoing abdominal surgery.
Methods: 14,038 articles including adhesion barriers in abdominal surgery, and reporting postoperative outcomes, were retrieved from PubMed, EMBASE, and Scopus databases. Two reviewers independently screened titles/abstracts and full-text articles using Covidence to determine inclusion eligibility. The ROBINS-I tool was used to assess the quality of the included studies. Included articles were analyzed for adhesion barrier type, procedural details, and postoperative outcomes. Study protocol registered to PROSPERO: CRD42023458230.
Results: We included 76 studies, with no overall high risk of bias, with 185,478 patients receiving different forms of barrier adhesion. The table illustrates the barrier adhesion types and the respective patient outcomes. Most studies showed an equivocal benefit for adhesion barriers and no significant benefit of the newly developed adhesion barriers. Many studies demonstrated that barrier adhesions increased surgery time, as well as increased risk of complications such as infections.
Conclusion: In patients with significant abdominal adhesions, spray adhesion barriers or polypropylene meshes may be effective in minimizing the risk of postoperative bowel obstruction ($p < 0.001$ and $p < 0.05$, respectively). The laparoscopic approach has been shown to decrease postoperative adhesions.

Table 1 Patient outcomes based on adhesion barrier types

Adhesion Barrier Type	Patient Outcomes
Bioresorbable Membrane (e.g. Seprafilm, Prevadh)—48 studies	4 studies*
	20 studies**
	24 studies***
Spray Adhesion Barrier (e.g. SprayShield, SprayGel, AdSpray)—7 studies	3 studies*
	1 studies**
	3 studies***
Hyaluronic Acid Based Adhesion Barrier (e.g. Ventralight STTM, Intergel)—5 studies	3 studies**
	2 studies***
Polypropylene Mesh (e.g. EasyProsthes, DynaMesh)—3 studies	1 studies**
	2 studies***
Starch-based Medical Device (e.g. 4DryField)—2 studies	2 studies**
Other (e.g. Surgiwrap, Guardix-SG, Adept)—11 studies	2 studies*
	1 studies**
	8 studies***

* Decrease in postoperative adhesions ($p < 0.001$)
** Decrease in postoperative adhesions ($p < 0.05$)
*** No decrease in postoperative adhesions

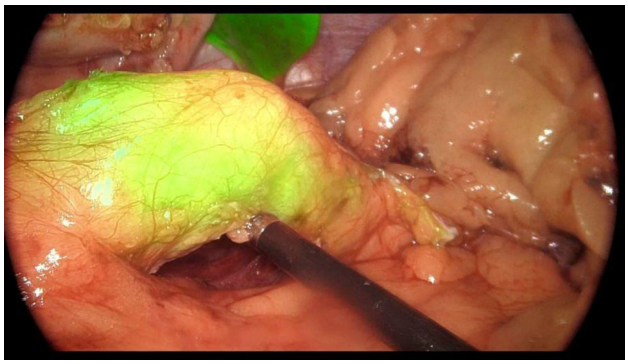
P486

Transfusion Free Laparoscopic Pancreatectomy Utilizing ICG Fluorescence in Jehovah's Witness Patients

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Background: Pancreatectomies often require blood transfusion despite the improvement in surgical technique and preoperative preparation. Jehovah's witness patients' refusal for transfusion places the surgeon in an ethical and moral dilemma during intra and perioperative care of these patients. Bloodless surgery protocols have been implemented, however minimizing risk is the most effective modality. We sought to assess the feasibility of continuous ICG infusion to minimize blood loss during laparoscopic pancreatic surgery at a tertiary referral center
Methods: We retrospectively analyzed outcomes of 6 Jehovah's witness patients who underwent laparoscopic distal pancreatectomy and splenectomy diagnosed with PNET (2), IPMN with high grade dysplasia (3) and MCN (1). ICG infusion was started after mobilization of the stomach from the spleen at 0.5 mg/min and pancreatic

dissection was started after visualization of the pancreatic parenchyma
Results: Mean operative time was 107 min (75–150), time to vascular visualization was 1 min, and 5 min for parenchymal visualization. Parenchymal fluorescence was present after discontinuation of the infusion. Mean blood loss was 30 ml (10–80). No patients were converted to open and there was no perioperative mortality
Conclusion: Continuous low dose ICG infusion facilitates the visualization of the pancreatic parenchyma and small blood vessels without interference from intrabdominal adipose tissue. This approach improves the precision of dissection and prevents violation of surgical planes and tissues, and in our case series have been instrumental in achieving minimal blood loss



P487

An Overview of Laparoscopic Surgical Training Modalities—How Does Augmented Reality Simulation Compare?

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Background: Laparoscopic surgery is known to require intensive training to gain the required skills and with the increasing popularity of laparoscopic surgery over open surgery requires novel and efficient ways of training
The traditional ways of training as an apprenticeship model usually require a prolonged learning curve. Augmented reality emerged as a solution for the rapidly requiring laparoscopic surgery training
AR is a novel introduction to laparoscopic surgical training and can superimpose digital images and physical models with the unique advantage of combining visual realism with true-to-life haptic feedback
Methods: Compare different types of laparoscopic training modalities and assess how AR compares to the education system using the apprenticeship model on patients and alternative training modalities, including human cadavers, box trainers, and virtual reality (VR) simulators
31 papers were systematically reviewed, and the findings were compiled. Results Both the available products as well as the technology as an educational modality were evaluated
Results: Studies reported relatively increased speed of learning, improved ability to multitask, procedural accuracy, hand–eye coordination and bimanual operation in a reduced practice time and increased success rate with AR in healthcare education. One of the limitations of AR it doesn't reflect the non-technical skills required in the operation
Compared with other modalities AR provided faster skill acquisition and was widely preferred, except when compared against a human cadaver model for straight laparoscopic colorectal skills acquisition. Currently, not enough information is available to draw a decisive conclusion
AR tends to have a higher initial purchasing cost but does not require the costly specialist facilities or services that cadaver or animal models do, 150 trusts in the NHS preliminary data is showing an estimated annual saving of £117 m
Conclusion: AR simulation has the potential to become the new gold standard for laparoscopic surgical training, and beyond, pending further development of literature to increase knowledge of the technology and its capabilities, on top of technological evolution to increase clinical realism

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Short Term Outcomes of Laparoscopic Donor Nephrectomy from a Tertiary Care Center of India

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Introduction: Laparoscopic donor nephrectomy (LDN) has now become the standard of care in the current era of predominant live renal allograft transplants with evidence showing better surgical outcomes of LDN in terms of shorter hospital stay, lesser post-operative pain and earlier return to daily activity. Our objective was to assess the short-term outcomes of Laparoscopic Donor Nephrectomy in terms of intra-operative complications, hospital stay, post-operative pain, and re-admissions
Methods: This is a retrospective analysis of a prospectively maintained database of all the Laparoscopic Donor Nephrectomies performed at our tertiary health care center between January 2015 to March 2023. Patients were followed up for a period of at least 6 months post-operatively
Results: Out of 486 donor nephrectomies, 377 (77.57%) were performed laparoscopically. Seven of them were laparoscopically assisted Right Donor Nephrectomy while the rest were Laparoscopic Left donor nephrectomies. The mean age of the population was 46.28 (± 0.92) years with a female predominance of 81% of the donor. All the cases were completed laparoscopically with no requirement of open surgery. Intra-operative complications were noted in 34 cases (9.04%) with splenic injury (3.97%), and lumbar vein injury (3.44%) being the most common. One case had an injury to IVC, and one case had a diaphragmatic injury
The mean hospital stay was 3.41 days (range: 2 to 10 days) with a mean VAS pain score of 3.96 (± 0.96) at recovery room – immediate post-op, 2.96 (± 1.07) at 6 h and 2.89 (± 0.95) at 24 h in post-operative period. The mean pre-operative hemoglobin was 12.2 (± 1.41) with a mean post-operative hemoglobin of 11.01 (± 1.75). The mean pre-operative Serum creatinine was 0.73 (± 0.23) and the mean post-operative Serum creatinine was 1.33 (± 0.29)
Post-operative complications were noted in 35 patients (9.28%) with Urinary Retention requiring re-catheterization in 20 patients (5.30%) being the most common followed by urinary tract infection. Fifteen patients required re-admission (3.98%) with urinary tract infection being the most common cause
The post-operative mean VAS score was 2.35 (± 0.97) at 1 week, 1.67 (± 1.00) at 2 weeks and 0.74 (± 0.84) at 6 months follow-up post-operatively

Conclusion: In experienced hands, Laparoscopic Donor Nephrectomy is a minimally invasive procedure with a lesser complication rate, shorter hospital stay, lesser post-operative pain, and minimal conversion rate, complications or re-admissions offering live donors an earlier and better post-operative recovery

P489

Laparoscopic Magnetic Compression Anastomosis with Immediate Lumenal Patency in a Porcine Model

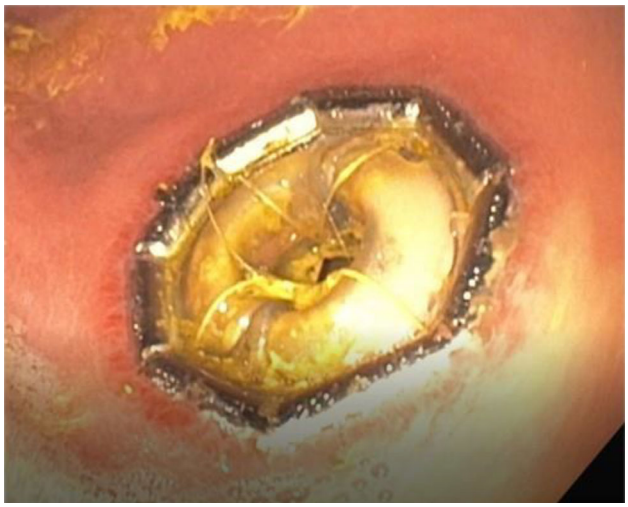
Joshua P Landreneau, MD, MSc[1]; Marvin Ryou, MD[2]; Walter Medlin[3]; Erik Askenasy, MD[4]; Erik Wilson, MD[4]; Matthew Hutter, MD, MBA[5]; [1]University of Missouri; [2]Brigham & Women's Hospital; [3]Bariatric Medicine Institute; [4]UTHealth Houston; [5]Massachusetts General Hospital

Introduction: Magnetic compression anastomosis (MCA) systems represent a promising technology which may allow for faster and safer anastomoses between the intestine or other viscera than traditional stapled or sutured techniques. One of the pitfalls with previous MCA systems is the lack of enteric continuity during magnetic anastomotic maturity, preventing immediate flow of nutrients and enteric contents. We designed a novel self-forming magnetic (SFM) system which contains an immediately patent lumen prior to maturation of the compression anastomosis. We aimed to evaluate this novel technology in a porcine model

Methods: We utilized a novel endo-intracorporeal anastomosis (EIA) system with a patent central lumen that allows for both introduction of SFMs and allows for early passage of enteric contents. The in vivo performance of the EIA implant and 25 mm SFM system was testing in a porcine model during small bowel to small bowel MCA. Intracorporeal anastomoses were performed with a laparoscopic approach. Each animal was maintained on a liquid diet, which started immediately following the procedure and continued until the planned sacrifice. Fluoroscopy was utilized to monitor the passage of the EIA implant and SFM system. Endoscopy was performed at pre-planned timepoints to assess the anastomosis. Following animal sacrifice, necropsy was performed to assess the anastomoses for gross anatomy, endoscopic patency, and histological characteristics

Results: Fifteen porcine subjects underwent laparoscopic division of the jejunum with subsequent side-to-side MCA using the EIA-SFM anastomotic system. Technical success was achieved in each subject. Each animal was maintained on a liquid diet, which started immediately following the procedure and continued until the planned sacrifice on day fourteen. In each case, fluoroscopic evaluation confirmed successful SFM-EIA complex migration from the anastomosis following MCA maturation. During necropsy, each anastomosis was well-healed, with no animals developing obstruction or visceral distension. Each animal survived until the planned sacrifice with complete tolerance of diet. In each case, necropsy demonstrated well-formed anastomoses with appropriate remodeling to the lumenal size of the subjects' small bowel. Histology demonstrated continuous lining of the mucosa with replacement of the muscularis mucosa with mature granulation tissue

Conclusions: Utilization of the EIA implant resulted in efficient deployment of SFMs in a safe and reproducible manner with procedural success in each case. The functional lumen of the EIA device provided immediate patency of the anastomosis site during the remodeling phase, allowing for early enteral nutrition. Human studies are warranted to confirm these preliminary results in a porcine model



P491

Augmented Reality's Role in Surgical Training Mastery: A Bridge to Sustainable Development Goals in Line with Kirkpatrick's Pyramid

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Introduction: A novel augmented-reality-based surgical simulator offers promise in surgical training, yet its comprehensive evaluation across Kirkpatrick's pyramid levels is pivotal. Kirkpatrick's pyramid, a hierarchical framework that evaluates training effectiveness through reaction, learning, behaviour, and results, offers a comprehensive structure to assess the impact of these simulators. Another aim of this study is to align with the Sustainable Development Goals (SDGs) set forth by the United Nations, thereby contributing to broader global advancements in healthcare, education, and sustainable development

Methods: A holistic assessment of AR-based surgical simulators across Kirkpatrick's levels was executed through multiple studies encompassing four main modalities. A pilot study (n = 11) and a multi-centre study (n = 6) scrutinised junior trainees' performance in appendectomies and vaginal cuff closures, emphasising completion time and distance travelled metrics (Level 2)

A concurrent study evaluated self-confidence scores pre- and post-AR training, showcasing a mean improvement of 3.82 (Likert,p = 0.018), indicating enhanced morale and skill translatability (Level 1,3). Health economics review exhibited potential cost savings (Level 4)

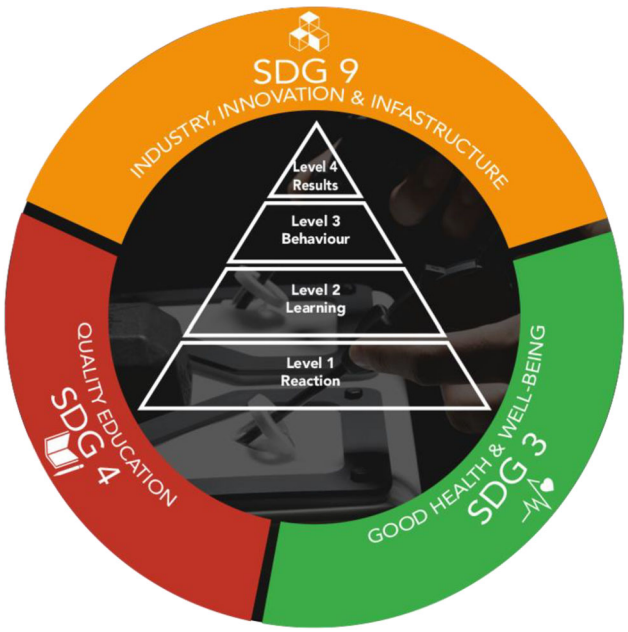
An independent systematic review (n = 26) of pertinent literature across the four modalities was conducted

By adopting a dual framework of Kirkpatrick's pyramid and SDGs, this research aspires to not only capture the immediate training outcomes but also to underscores the lasting implications on trainees, healthcare systems, and society at large

Results: Statistically significant reductions in completion time and distance travelled ($p < 0.001$,n = 6 and $p < 0.05$,n = 6, respectively) underscore the skill enhancement via AR training (Level 2). This SDG 3 (Good Health and Well-being) (UN2023), promoting enhanced healthcare delivery through improved surgical skills and reduced procedural times. Self-confidence improvements suggest elevated morale and skill translatability (Level 1,3). This level resonates with SDG 4 (Quality Education) (UN2023). A health economics review highlighted potential per-patient savings of up to £455 through AR-based surgical training, demonstrating organisational benefits (Level 4). These outcomes resonate with SDG 9 (Industry, Innovation, and Infrastructure) (UN,2023), as the study's focus on skill transferability mirrors the broader objectives of leveraging technological innovation for societal progress

Conclusion: The novel AR-based surgical simulator showcased positive outcomes spanning Levels 1 to 4, elevating trainees' morale, satisfaction, confidence, and skill translatability (Levels 1, 3) while yielding substantial organizational savings (Level 4). Findings can be extrapolated to wider specialisations

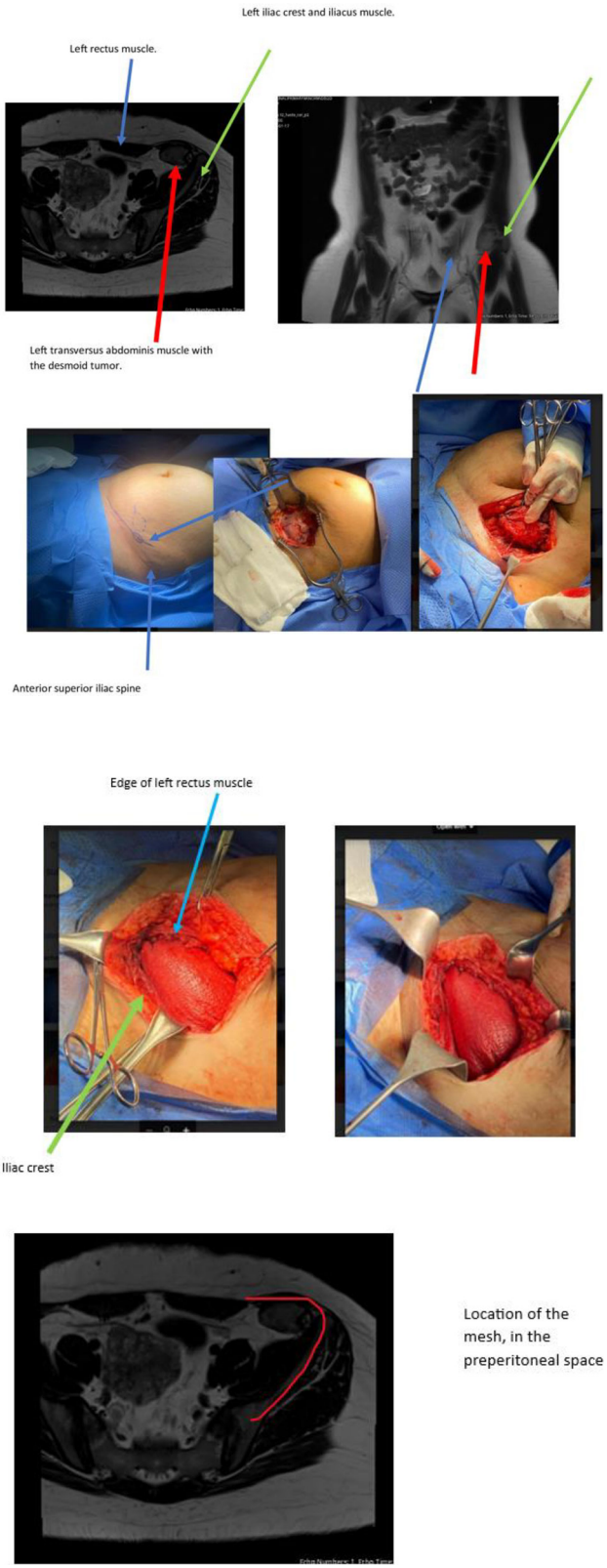
AR-based surgical training significantly reduced completion time and distance traveled, emblematic of enhanced skill acquisition (Level 2). These findings endorse AR's transformative role in surgical training, aligning with Kirkpatrick's goals and Sustainable development goals 3,4 and 9



P492

Abdominal Wall Reconstruction Using Biological Mesh After Resection of Desmoid Tumor Arising from Transversus Abdominis Muscle

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Introduction: Desmoid tumors are rare benign neoplasms with a strong tendency to local invasion and recurrence. They usually rise from muscles and aponeurosis and could be challenging for medical treatment. We here report the case of a patient requiring the excision

of part of transversus abdominis muscle followed by abdominal wall reconstruction using OviTex® biological mesh
Case Summary: 40-year-old female presented to our clinic due to a painful lump in the left lower quadrant of her abdomen. She underwent magnetic resonance imaging (MRI) and a computed tomography (CT) biopsy who showed the presence of a desmoid tumor arising in the left transversus abdominis muscle on the lateral side of the abdominal wall. She underwent surgical excision of the mass along with part of the external oblique, internal oblique, and transversus abdominis muscle and an abdominal wall reconstruction using preperitoneal approach with placement of OviTex® 1S mesh in the preperitoneal space and used to close the defect. It was fixed inferiorly to the iliac crest, laterally to the edges of the remaining transversus abdominis muscle, and medially to the lateral edge of the rectus abdominis muscle
Discussion: Desmoid tumors are rare neoplasms rising in many anatomical spaces and requiring challenging decisions. A radical resection with free margins remains the principal determinant of outcome. Non-surgical approaches and adjuvant therapy may be useful for patients with unresectable lesions
Conclusion: The optimal treatment strategy for desmoid tumors remains unclear. A multidisciplinary approach is always the best strategy to establish the correct treatment. OviTex® mesh can be safely used to reconstruct the abdominal wall after resecting muscular tumors to strengthen the abdominal wall and prevent hernia occurrence in the future

P493

A Systemic Review and Meta-analysis of the Effects of Preserving the Hepatic Branch of the Vagus Nerve in Upper Gastrointestinal Surgeries

Jia Dong James Wang[1]; Yong'an Matthew Tham[1]; Ansari Ahamed Fahim Shaik[1]; Yu Yin Liu[2]; Kon Voi Tay[3]; [1]Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore; [2]Division of General Surgery, Department of Surgery, Kaohsiung Chang Gung Memorial Hospital, Taiwan; [3]Upper GI and Bariatric Division, General Surgery Department, Woodlands Health, Singapore

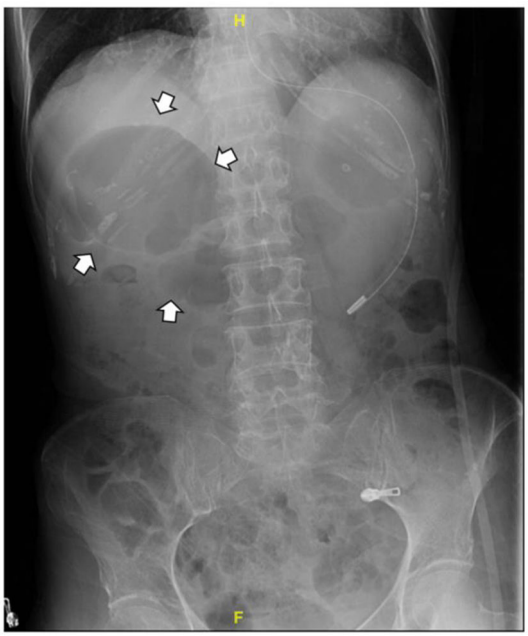
Background: Upper gastrointestinal surgeries encompass a broad spectrum of procedures designed to address conditions affecting the esophagus, stomach, liver, pancreas, and gallbladder. During these surgeries, it is customary to dissect the hepatogastric ligament to access the surgical field. The preservation of the hepatic branch of the vagus nerve is not common practice, primarily due to limited understanding of its role
However, it is imperative to acknowledge that the hepatic branch plays a pivotal role in innervation of the liver and gallbladder, overseeing critical functions like digestion, bile synthesis, secretion, and glucose metabolism. Consequently, recent surgical studies have explored if preserving the hepatic branch yields better outcomes for the gastrointestinal system and overall patient health compared to non-preservation. This systematic review and meta-analysis aim to consolidate and synthesize findings from such studies
Methods: We conducted comprehensive searches across multiple databases, including PubMed, EMBASE, Scopus, and Cochrane, with a focus on cohort studies and randomized control trials centred on upper gastrointestinal surgeries. These surgeries encompassed gastrectomy, antireflux procedures, and bypass surgeries. Our primary objective was to compare outcomes between surgeries that preserved the hepatic branch of the vagus nerve and those that did not. Furthermore, we reviewed reference lists of included articles and any prior systematic reviews to identify additional studies. Two independent reviewers screened all abstracts and full-text reviews, extracted relevant data, and performed quality assessments
Results: A total of 13 studies were included. In our meta-analysis, we observed that preserving the hepatic branch was associated with a reduction in appetite loss (OR 0.04, 95% CI 0.01–0.18), esophagitis (OR 0.16, 95% CI 0.06–0.43), gallstone formation (OR 0.25, 95% CI 0.09–0.69), and long-term cardiac complications (OR 0.15, 95% CI 0.04–0.54). However, it is worth noting that preserving the hepatic branch increased the incidence of Clavien-Dindo Grade 2 complications (OR 1.73, 95% CI 1.01–2.96) in gastrectomies
Conclusion: Our findings suggest that preserving the hepatic branch offers significant advantages in terms of post-surgical metabolic functions, particularly in preserving appetite. This effect may be attributed to the role of the hepatic branch in facilitating bidirectional communication between brain and liver, which regulates various homeostatic processes, including appetite control and glucose metabolism. The reduced incidence of gallstones may be attributed to preservation of gallbladder function and motility through retention of parasympathetic innervation to the gallbladder
Additionally, our results indicate a decrease in reflux symptoms experienced by patients, which merits further investigation into the underlying pathophysiological mechanisms

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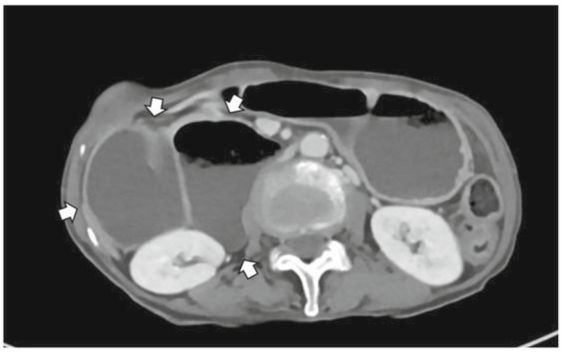
A New Laparoscopic Approach to an Obstructing Right Paraduodenal Hernia A Case Report

Khalid Alghamdi; Abrar Filfilan; Amjad Banjar; Ahmad Gadah; Esam Batayyah; Al-Noor Specialist Hospital

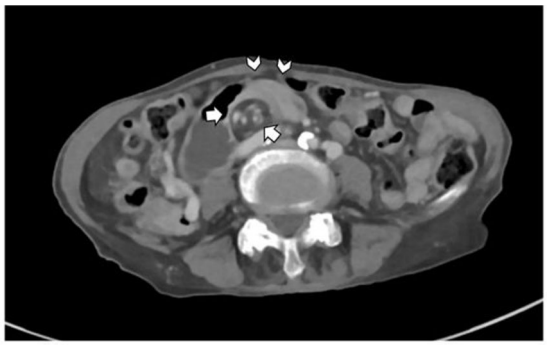
Introduction: paraduodenal hernia (PDH) is a rare variety of hernia, The diagnosis of it is not easy to establish. a high index of suspicion is required and an accurate diagnosis may be established by a CT scan
Case Presentation: 63 year old female patient, presented with diffused abdominal pain. associated with anorexia, bilious vomiting with obstipation, similar attack happened 3 months back resolved spontaneously. examination revealed tenderness and fullness at epigastric area. Labs were unremarkable CT shows swirling sign behind the SMA and inferior to third part of duodenum at Waldeyer's fossa, consistent with right PDH



Anteroposterior plain abdominal radiograph shows dilated saclike small bowel loops (arrows) noted at the right upper abdomen.

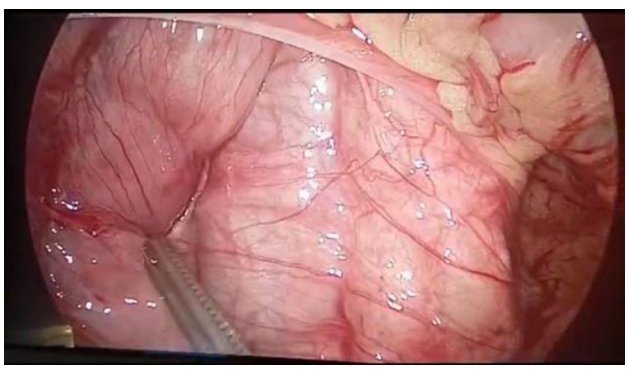


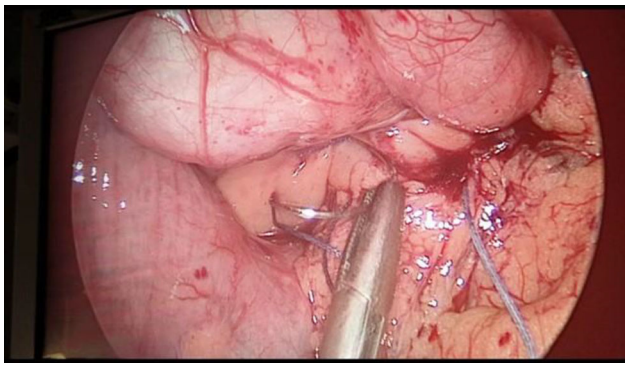
Axial contrast-enhanced computed tomography image shows a saclike severely dilated duodenum (arrows), in which crowded at the right upper quadrant.



Axial contrast-enhanced computed tomography image shows swirling sign (arrow), transitional zone is noted with associated distal collapsed small bowel loop (arrow head).

laparoscopic exploration done. stomach and duodenum were hugely distended, after retracting the omentum and transverse colon exposing ligament of Treitz. The defect was identified proximal jejunum twisted on itself in a loop. The herniated loop then pulled out and obstruction relieved. bowel was healthy with multiple diverticula. The hernial orifice closed by two interrupted sutures







Discussion: PDH poses a significant diagnostic and therapeutic challenge because of its rarity and the fact that it can present with non-specific symptoms ranging from digestive disorders and chronic abdominal pain to symptoms of intestinal obstruction. which carries higher lifetime risk of strangulation and bowel obstruction. Surgical management is necessary after diagnosis.
Conclusion: Due to the rarity of the cases still there is no clear approach for the repair and a laparoscopic approach is an excellent choice as it gives a clearer picture and up to the surgeon wither to continue or convert to open

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The Comparison of ArtiSential® versus Conventional Single Port Surgery in Laparoscopic Totally Extraperitoneal Inguinal Hernia Repair: A Propensity Score-Matched Study

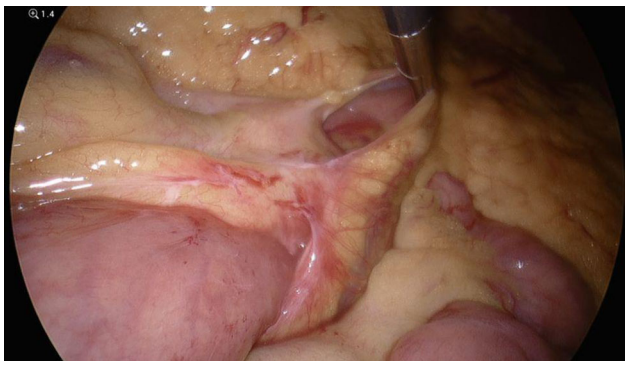
Chul Seung Lee, PhD, MD; Kyung Rak Kim, MD; Jung Sub Kim, MD; Gwan Chul Lee, MD; Dong Woo Kang, MD; Choon Sik Chung, PhD, MD; Dong Keun Lee, PhD, MD; Hansol Hospital

Background: Single-port laparoscopic totally extraperitoneal (SP TEP) is a safe and effective technique. Multi-joint mechanics and ergonomics are advantages of robotic systems; however, they are less cost-effective. Several laparoscopic articulating tools have been introduced as alternative to robotic systems. The ArtiSential® (LIVSMED Inc., Republic of Korea) is an 5 mm diameter pistol-handle instrument that has complete articulating function like human wrist and intuitive controllability. This study aimed to compare surgical outcomes between SP TEP using ArtiSential® and conventional laparoscopic TEP(CL TEP) inguinal hernia repair
Methods: From September 2018 to December 2023, the medical records of patients who underwent SP TEP for primary inguinal hernia at Hansol Hospital were reviewed. Patient inclusion criteria

were age > 12 years, admission in the Surgery Department and cases of inguinal hernia only (direct:indirect:mixed). Exclusion criteria were age < 12 years, American Society of Anesthesiologists physical status classification IIII or worse, and emergency repair for outlet obstruction or strangulation. Patients returned to the outpatient department on the seventh day after discharge for an evaluation of their general condition. Of the 1291 patients with inguinal hernia, 32 underwent SP TEP using ArtiSential® (group A) (Fig. 1), and 1261 underwent CL TEP (group B). To adjust for the baseline differences and selection bias, baseline characteristics and postoperative outcomes were compared using propensity score matching

Results: Thirty-two patients were evaluated in each group. There was no significant difference in the baseline characteristics between group A and B. Patients with bilateral inguinal hernia were six (18.8%) in each group. Patients with previous prostate cancer surgery were no difference between the two groups (A: 3(9.4%) vs B: 4(12.5%), p = 0.689). Mean operative time was no difference between the two groups (A: 56.8 ± 22.3 vs B: 46.6 ± 27.6 day, p = 0.110). Mean length of hospital stay (LOS) after surgery was no difference between the two groups (A: 1.0 ± 0.18 vs B: 1.1 ± 0.35 day, p = 0.657). Postoperative complications were similar between the two groups. Re-operation and re-admission within postoperative 90 days were not occurred in each group

Conclusion: Laparoscopic SP TEP using ArtiSential® can achieve acceptable clinical outcomes including patients with previous prostate cancer surgery



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Untangling the Knot: An Innovative Technique to Left Paraduodenal Hernia Repair

Ameer Aboud; Narayan Osti; Shamon Gumbs; Stephen Carryl; Department of Surgery, Columbia University College of Physicians and Surgeons, Harlem Hospital Center

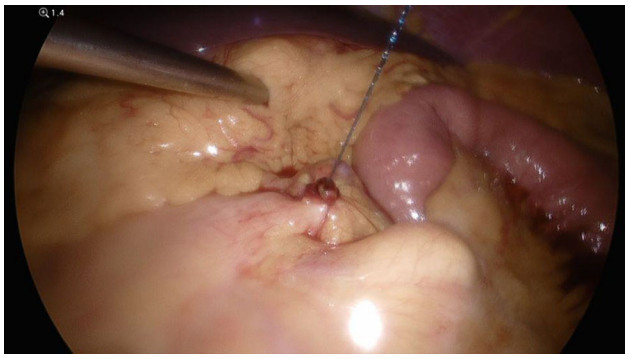
We present a compelling case of a left paraduodenal hernia in a 31-year-old female-to-male patient with no significant prior medical history. The patient's presentation included severe abdominal pain, nausea, vomiting, elevated lactate levels, and an increased white blood cell count. Computed tomography imaging suggested the possibility of volvulus or internal hernia, leading to the suspicion of a left paraduodenal hernia and the decision to perform diagnostic laparoscopy

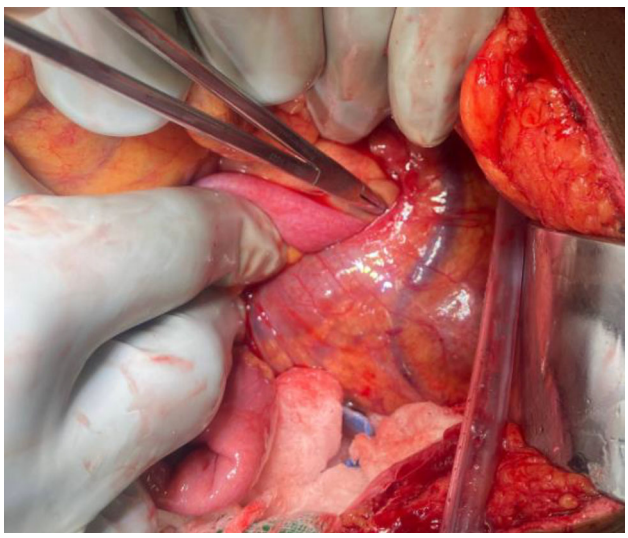
Methods and Results: During laparoscopic exploration, a left paraduodenal hernia was confirmed, with most of the small bowel contained within the hernial sac. However, there was no compromise to the bowel's blood supply. The fossa of Landzert was closed using a running 3–0 maxon suture, and the bowel was found to be within normal limits. The patient experienced an uneventful postoperative course, with the resolution of abdominal pain, diet tolerance, flatus passage, and discharge on postoperative day 1

However, on POD 2, the patient returned to the emergency department with similar complaints and was diagnosed with a recurrent left paraduodenal hernia via a repeat CT scan. An open repair was chosen, revealing a recurrent left paraduodenal hernia with significant adhesions trapping 20 cm of proximal jejunum. The hernial sac was meticulously dissected, and the incarcerated jejunal loops were freed. The defect was closed using multiple interrupted 3–0 silk sutures, securing the duodenojejunal flexure within the transverse mesocolon. These radially oriented simple interrupted sutures were used to recreate the ligament of treitz without sacrificing the IMV, or risking stenosis of the duodenojejunal junction

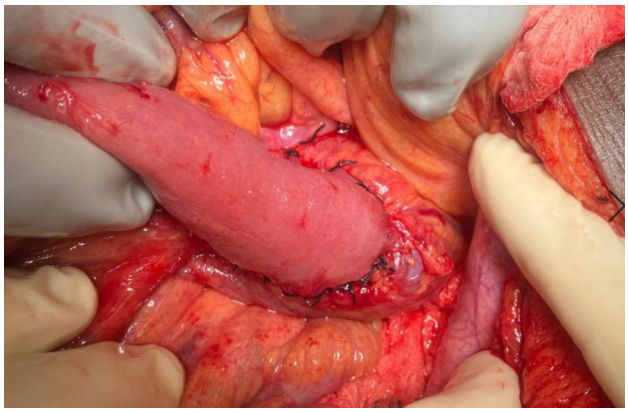
Following this repair, the patient's recovery was favorable. They were gradually transitioned to a regular diet,and the patient was discharged uneventfully on POD 2. The patient remains in good health upon follow up in the clinic several weeks later

Conclusion: This case underscores the diagnostic challenges and surgical management complexities associated with left paraduodenal hernias. Prompt recognition and appropriate surgical intervention are essential for a successful outcome. It also highlights an innovative technique for repair which is not well standardized in the management of this pathology. This case also highlights the the potential need for open repair in cases of recurrent hernias with dense adhesions where an incarcerated loop of trapped proximal jejunum can masquerade as the ligament of treitz, resulting in inadequate lysis of adhesions for the unwary during a laparoscopic approach. Future studies on the management of this very rare condition can contribute to improved outcomes for affected patients









P500

Predicting Factors of Serious Postoperative Complications After Laparoscopic Whipple Procedure. Single-center Study

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Background: Five hundred laparoscopic pancreatoduodenectomies (LPDE) were performed by single surgical team
Objective is to identify the risk factors for developing of clinically relevant postoperative complications (CRPOC)(Clavien-Dindo grades IIIa-V)
Methods: 500 patients underwent LPDE during last 16 years. Postoperative complications of grades 3A and higher including pancreatic fistula (PF) and biliary leak (BL), delayed gastric emptying (DGE) and postpancreatectomy hemorrhage (PPH) were analyzed. Multivariate analysis, using the technique of Cox regression, was performed in order to identify risk-factors of developing these complications
Results: Among 500 patients 302 were females and 198 were males. Mean age was 62 years (range 29–82). Mean operative time was 397 (range 240–875) min and mean blood loss was 300 (range 10–2100) ml. The incidence of CRPOC was 32% (160 pts). Among them IIIa – 18,8%, IIIb – 7%, IV – 0,4%, V – 5,8%. Clinically relevant PF were diagnosed in 13,4% of patients, among them 11% were classified as grade B POPF and 2,4 as grade C. The BL was diagnosed in 14 patients (2,8%). DGE was diagnosed in 7% of patients. PPH complicates the postoperative course of 30 patients (6%). Multivariate regression analysis identified predictors of CRPOC as follows HR and 95% CI): the age $\geq$ 65 HR 1.164 (0.627–2.163), male sex HR 1.471 (0.872–2.482), the soft pancreatic tissue HR 3.181 (2.566–3.796), high intraoperative blood loss ($\geq$ 400 cc) HR 1.325 (0.876–2,046), high BMI ($\geq$ 30) HR 1.400 (0.802–2.444), diagnosis other than pancreatic adenocarcinoma HR 1.854 (0.994–3.688), were independent risk factors for having serious complications
Conclusion: age $\geq$ 65, male sex, the soft pancreatic tissue, absent of pancreatic hypertension, high intraoperative blood loss ($\geq$ 400 cc), high BMI ($\geq$ 30), diagnosis other than pancreatic adenocarcinoma were independent risk factors for having serious complications

P501

Use of Intraperitoneal Prophylactic Drain After Distal Pancreatectomy: Results from an Italian Survey

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Background: Intraperitoneal prophylactic drain (IPD) use in distal pancreatectomy (DP) is still controversial
Methods: In June 2022 an online survey was sent to the Italian community of pancreatic surgeons through institutional emails, Twitter, and Facebook accounts of the Italian Association for the Study of the Pancreas (AISP) and the Italian Association of Hepato-biliary-pancreatic Surgery (AICEP). The survey was designed to investigate surgeons use of IPD in DP patients through 23 questions and one clinical vignette. For the clinical scenario, respondents were asked to report their regret of omission and commission regarding the use of IPD elicited on a scale between 0 (no regret) and 100 (maximum regret). The threshold model and a multilevel mixed regression were applied to analyze respondents' attitudes
Results: One hundred six surgeons completed the survey. The median age of respondents was 46 years (36 to 57). Ninety-four (89%) respondents were attending surgeons, while 12 (11%) were HPB fellows. Seventy-four (70%) surgeons worked in an academic center. One hundred five (99%) respondents confirmed using at least one IPD. Most surgeons (81%) prefer placing a passive drain. All surgeons performing minimally invasive DP declared not changing their policy based on the surgical approach (open vs. MIS). Ten respondents (9%) declared a change in IPD strategy in patients at low risk of clinically relevant postoperative pancreatic fistula (CR-POPF), and thirteen (12%) respondents changed their strategy in high-risk POPF situations. Only 35 (33%) surgeons routinely apply an early drain removal strategy by removing the IPD within postoperative day 3 in the absence of POPF. The choice in number and type of drain, and the use of a selective drain management strategy was mostly related to surgeon experience and institutional volume of pancreatic surgery performed. The median regret due to the omission of IPD, which proved to be the wrong decision, was 80 (50 to 100, IQR). The median regret due to the commission of IPD, which turned out to be

useless, was 2.5 (1 to 20, IQR). The CR -POPF probability threshold at which drainage omission was the less regrettable choice was 7% (1 to 50, IQR)

Conclusion: Drain management policies after DP remain very heterogeneous among surgeons. The regret model suggested that IPD omission could be performed in low-risk patients, leading to low regret in the case of the wrong decision, making it an acceptable clinical decision

P502

Clinical and Economic Consequences of Postoperative Pancreatic Fistula following Pancreatic Surgery: A Survey of the Literature

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Background: Postoperative pancreatic fistulas (POPF) are a major concern following pancreatectomies and pancreaticoduodenectomies. Leakage of pancreatic fluid can lead to numerous secondary complications including sepsis and hemorrhage. Due to these secondary complications, POPF is associated with mortality rates as high as 40%, extended length of stay, and a substantial economic burden. This review of the existing literature aims to examine the clinical and economic impact of POPF

Methods: We conducted a non-systematic review of the existing literature to summarize the reported sequelae of POPF. Our review summarized the morbidity and mortality rates, rates of secondary complications, reoperation rates, ICU admissions, length of hospital stay, and hospitalization costs associated with POPF. Prospective and retrospective cohort studies, systematic reviews, and meta-analyses were included

Results: Tables 1 and 2 summarize the clinical and economic consequences of POPF. Notable observations include higher morbidity (13–50%) and mortality (10–40%) in POPF patients, as well as an increased risk of postoperative pancreatic hemorrhage and sepsis. Additionally, POPF patients had reoperation rates as high as 13% and more frequent ICU admissions. Patients with POPF had a longer overall hospital stay (2–4 times longer than non-POPF patients, depending on POPF Grade) and substantially higher hospital costs (on average, 2–3 times higher than patients without POPF). Various research articles emphasized that timely detection of POPF can help improve patient outcomes

Conclusion: POPF remains a significant postoperative complication in the setting of pancreatic surgeries, with a high potential for life-threatening secondary complications. Not only does POPF present a significant burden at the patient and healthcare provider level, but also at the level of medical systems more broadly. Timely detection of POPF is of utmost importance and serves as an important area for future research, innovation, and development

Table 1 – Clinical Consequences of Postoperative Pancreatic Fistula (POPF) following Pancreatic Surgery

Consequence	Reference	Finding
Morbidity & Mortality	(Nahm *et al.*, 2018)	The morbidity rate associated with postoperative pancreatic fistula (POPF) ranged from 13% to 41%.
	(Pedrazzoli, 2017)	The mortality rate for grade C postoperative pancreatic fistula (POPF) after pancreaticoduodenectomy was reported to be 25.7%.
	(Khobragade *et al.*, 2018)	Overall mortality was reported at 2.8% in a population of 592 Whipple patients, while the mortality rate associated with Grade C POPF was 38.7%.
	(Shrikhande and D'Souza, 2008)	Mortality from Whipple procedures is between 3-5% at high-volume centers with a postoperative morbidity of between 30-50%. POPF is reported as the most significant cause of morbidity.
Postoperative Pancreatic Hemorrhage (PPH) & Intraabdominal Sepsis (IAS)	(Nahm *et al.*, 2018)	POPF was associated with morbid sequelae including IAS and hemorrhage, which accounted for 1% mortality risk for all patients with POPF and 25% mortality risk for patients with Grade C POPF.
	(Khuri *et al.*, 2021)	PPH was registered in 18/347 Whipple patients. Significant association was found between the severity of late hemorrhage and vascular pseudoaneurysm as the cause of the bleeding ($p = 0.001$). All pseudoaneurysm related bleeding occurred in cases complicated by POPF ($p < 0.001$).
	(Asari *et al.*, 2016)	The overall incidence of PPH was 6% among 553 pancreatic resection patients. The in-hospital mortality of PPH was 20% (7 of 35). Four of these deaths were due to the other complications associated with prolonged POPF.
	(Darnis *et al.*, 2013)	Pancreatic fistula (24 vs 8 % p = 0.028) was a significant predictor of PPH.
	(Behrman and Zarzaur, 2008)	16% of 196 pancreatic resection patients developed postoperative IAS. POPF was found to be a significant risk factor for IAS development (p = 0.02).
Reoperation Rate	(Veillette *et al.*, 2008)	Reoperation was required in 6.7% of patients that developed POPF vs. 2.2% in non-POPF patients (p = 0.04).
	(van Hilst *et al.*, 2018)	Reoperation was required in 13% of patients with clinically relevant POPF (Grade B or Grade C) vs 3% in an uncomplicated non-POPF group.
ICU Admission	(Veillette *et al.*, 2008)	ICU stay in POPF patients was reported at 20 days (SD 26.7) in comparison to 17 days (SD 3.4) in non-POPF patients.
	(van Hilst *et al.*, 2018)	2% of non-POPF or Grade A POPF patients, 4% of Grade B POPF patients and 59% of patients with Grade C POPF were admitted to the ICU.

Table 2 – Financial Consequences of Postoperative Pancreatic Fistula following Pancreatic Surgery

Consequence	Reference	Finding
Length of Stay (LOS)	(Cameron *et al.*, 2006)	LOS for POPF patients was 23.6 days in comparison to non-POPF patients who had a LOS of 8.7 days ($p < 0.001$).
	(van Hilst *et al.*, 2018)	Median LOS was 7 days for non-POPF or Grade A POPF patients, 9 days for Grade B POPF and 29 days for Grade C POPF.
	(Topal *et al.*, 2007)	Median LOS for POPF patients was 26 days in comparison to 14 days for non-POPF patients ($p < 0.001$).
Cost of Hospitalization	(Jajja *et al.*, 2022)	Mean cost for POPF patients was $54,727 compared to $23,024 in non-POPF patients ($p < 0.001$). The cost was significantly associated with the Grade of the POPF, with Grade A POPF costing $32,883, Grade B POPF costing $50,263 and Grade C POPF costing $107,484 ($p < 0.001$).
	(Enestvedt *et al.*, 2012)	Mean cost for POPF patients was 1.3-fold higher than patients without POPF. POPF was found to be an independent predictor of significant added costs on multivariate cost analysis with a cost differential of $15,701 (Standard Error $6881, p = 0.0242).

P503

Laparoscopic Internal Drainage of Collection Post Pancreatitis—An Experience from Tertiary Care Centre of India

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Introduction: Internal drainage is considered as standard of care in the management of walled of necrosis (WON) and pseudocyst of pancreas. The emergence of laparoscopy and the advancement of techniques and instrumentation has led to the acceptance of laparoscopic internal drainage as standard surgical treatment for symptomatic patients. However, the literature is scarce regarding outcomes following laparoscopic drainage. Most of the studies have a small number of patients with limited follow-up. This study describes our experience of laparoscopic internal drainage of walled of necrosis and pseudocyst of the pancreas over the last 17 years
Materials and Methods: This is a retrospective analysis of a prospectively maintained database. All patients with symptomatic pseudocyst and WON undergoing laparoscopic internal drainage between January 2005 and December 2022 were included. The primary outcome measure was successful drainage. Secondary outcome measures included morbidity, hospital stay, re-intervention rate, and mortality. Post-operative follow-up at 1 week, 4 weeks, 3 months, and then annually was done. Cyst resolution was documented via periodically done ultrasonography
Results: 190 surgical drainage procedures were performed for symptomatic pseudocyst/walled of necrosis. Out of 190, 162 underwent laparoscopic drainage i.e. laparoscopic cystogastrostomy (91.9%) and laparoscopic cystojejunostomy (8.02%). The majority of the patients were male (male:female = 5.5:1) with a mean age of 36 ± 12.9 years (range 15–58 years). The mean operative time was 92 min (range 64–148 min). There were ten conversions because of intra-operative bleeding, dense adhesions, and collapsed cysts. The overall post-operative morbidity was 8.2%. The average hospital stay was 4.4 days (2–19 days). The mean duration of follow-up was 5.1 years (range 6 months–13 years). Complete cyst resolution was achieved in 95.6% (n = 155) patients. Necrosum of more than 10% was seen in 110 patients(67.9%). 9 patients (8.1%) in this group had a residual collection in post-operative period which manifested as fever and recurrent vomiting. Seven patients out of nine needed endoscopic reintervention. No post-operative morbidity or residual collection was noted in patients with necrosum less than 10%. There has been no mortality till date
Conclusion: Laparoscopic internal drainage is an effective and safe technique for management of pseudocyst and WON

P504

Perioperative Ketamine Can Worsen Postoperative Pain Control for Whipple Procedures

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Introduction: With its roots in colorectal surgery, enhanced recovery after surgery (ERAS) has been widely utilized in other surgical fields such as hepatopancreaticobiliary (HPB) surgery given the less opioid usage, quicker recovery, and smaller financial to both patients and institutions alike. Many medications can be utilized in the ERAS protocol, with one being Ketamine. The impact of perioperative Ketamine in Whipple patients remains a topic of discussion due to dearth of data
Methods: This is a retrospective cohort study patients who underwent open Whipple procedure from 2019 to 2021 at a high-volume non-university tertiary care center. Only surgeries that underwent ERAS protocol were included. Per institutional protocol, acetaminophen and regional anesthesia (e.g. TAP block) were routinely utilized; however, drugs such as ketamine were variably utilized at the anesthesiologists' discretion. Postoperative outcomes such as pain scores (out of 10) and morphine milligram equivalents (MME) were compared between patients who did and did not receive ketamine. Mann–Whitney-U test was utilized to compare means for this nonparametric data
Results: Out of 138 patients who qualified for this study, 57 patients received perioperative ketamine, while 83 patients did not. Ketamine doses ranged from 25 to 100 mg per anesthesiologists' discretion, with median dose being 50 mg. Intraoperatively, Ketamine group received less intraoperative opioid (MME) compared to their counterpart (35.1 versus 42.3, $p = 0.005$). However, patients who did receive ketamine had higher pain scores on both postoperative days 1 (3.78 versus 3.09, $p = 0.43$) and 2 (3.62 versus 2.81, $p = 0.011$). Ketamine recipients also had higher total opioid usage (MME) on post operative days 1 (152 versus 94, $p = 0.046$) and 2 (108 versus 55, $p = 0.016$). There was no statistical difference in hospital length of stay between the ketamine group and the non-ketamine group (12 days versus 10.6 days, $p = 0.42$)
Conclusion: While perioperative ketamine can decrease intraoperative opioid usage, patients who received ketamine had poorer pain control post operatively days 1 and 2 as a potential sequela of prior intraoperative undertreatment of pain. Utilization of Ketamine should be further investigated for HPB ERAS protocol

P505

Robotic vs. Laparoscopic vs. Open Distal Pancreatectomy for Adenocarcinoma Confined to the Pancreas: Is there a Value Advantage of the Robot when the Spleen is not Preserved?

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Background: Laparoscopic distal pancreatectomy (LDP) is regarded as the gold standard for benign pancreatic tumors and is regarded as a safe and effective treatment for small tumors. Robotic distal pancreatectomy (RDP) is increasingly being utilized and has been found to have superior outcomes in cases of splenic preservation. However, the benefits of RDP, in cases of malignant disease where the spleen is not preserved is not established. We sought to investigate whether RDP offers advantage over LDP in malignant disease where splenic preservation is not a goal
Materials and methods: The National Cancer Database (NCDB) 2020 was utilized as the dataset. The study was constructed as an intention to treat analysis. Selection criteria were: patients with tumors confined to the pancreas (T1-T2) and complete data for comorbidity, stage, tumor size, extension, surgical approach (RDP vs LDP), hospital stay, 30- and 90-day mortality, margin status, unplanned readmission, and chemotherapy. Binary logistic regression models were utilized for mortality, conversion to open, margin status, and unplanned readmission. A linear regression model was utilized for hospital stay
Results: 3741 patients met the criteria. Mean age was 60.1 years, 51.3% were female, 53.4% were T1. 911 (24.4%) RDP, 2830 (75.6%) LDP. Conversion rate was 10.6% for RDP, 11.2% for LDP (OR 0.873, $p = 0.431$). 30-day mortality was 0.5% for RDP, 0.7% for LDP

(p = 0.143). 90-day mortality was 1% for RDP, 1.3% for LDP (p = 0.221). Hospital stay was 5.6 days for RDP, 5.95 days for LDP (p = 0.54). Unplanned readmission was 8.6% for RDP, 7.7% for LDP (p = 0.81). R1 margins were 5.0% for RDP, 5.7% for LDP (p = 0.622)

Conclusion: In patients with T1 and T2 pancreatic ductal adenocarcinoma, RDP is associated with similar lymph node yield and similar R0 resection rate, hospital stay, and readmission rate as compared to LDP and there were no differences in 30- and 90-day mortality. The data suggest no increase in surgical value for RDP compared to LDP, therefore the benefits of RDP need to be weighed against the higher total and operative costs

P507

Total Laparoscopic Spleen Sparing Distal Pancreatectomy in Solid Pseudopapillary Neoplasm Of Pancreas: A Rare Case Finding

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Background: Distal pancreatectomy is usually performed for benign tumours with a low malignant potential, endocrine tumours & even chronic pancreatitis affecting the tail of the pancreas. Spleen sparing distal pancreatectomy is often performed for benign tumour of distal pancreas. It has a benefit of avoiding immunodeficiency and thrombocytosis. Also the potential risks of post splenectomy infections,sepsis & necessity anticoagulant medical therapy is also minimized

Materials & Method: A 15 years old female with no prior history any medical illness presented with the chronic abdominal pain accompanied with episodes of vomiting. On examination, per abdomen was soft with no palpable organomegaly or any obvious lump. Computed tomography revealed a 4.3 × 5.5x4.5 cm heterogeneously enhancing lesion mostly arising from the tail of pancreas with non-enhancing area (necrosis/ cystic component) – possibly a solid pseudo papillary tumour (SPT) of the pancreas/ mucinous cystadenoma. Routine biochemical & haematological investigations were within normal range including CA 19–9

The patient was taken up for total laparoscopic distal pancreatectomy sos splenectomy in supine position. Total laparoscopic spleen sparing distal pancreatectomy was done under general anaesthesia. Nasogastric tube was removed immediately postoperatively. The patient resumed on oral diet on postoperative day 2 and diet was advanced as tolerated. abdominal drain was removed on postoperative day 5. The postoperative period was uneventful and the patient was discharged on postoperative day 7

Results: The first follow-up visit was 15 days after discharge and the patient was tolerating a regular diet without any episode of abdominal pain. Histopathology examination revealed features suggestive of Solid Pseudo Papillary Epithelial Neoplasm

Conclusion: pancreatic pseudo papillary tumours are rare neoplasms with malignant potential. Timely resection on diagnosis provides long-term survival. A laparoscopic approach is technically demanding and time consuming, but it can be performed safely thanks to accumulated experience. Such a minimally invasive approach would help to improve patient quality of life by minimizing treatment-related discomfort

P508

Robotic Surgical Resection of a Pancreatic Dermoid Cyst: Case Report and Review of Literature of an Extremely Rare Neoplasm

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Mature Cystic Teratomas, also called Dermoid Cysts, are benign, well-differentiated tumors originating from cells of all three dermal layers. Pancreatic dermoid cysts are extremely rare with the first published case by Kerr in 1918 and only 55 subsequent published cases since. Here we present the case of a 72-year-old male with history of left nephrectomy for a benign kidney cyst that during surveillance imaging, a pancreatic mass was identified. He was referred to us for this incidental finding of a possible pancreatic tail cyst that increased in size during surveillance. Computerized tomography (CT) scan revealed a cystic focus at the pancreatic tail measuring 5.1 × 3.6 cm. Endoscopic ultrasound (EUS) revealed an anechoic lesion suggestive of a cyst with an overall impression of an intraductal papillary mucinous neoplasm – branch duct (IPMN– BD) and further fine-needle aspiration (FNA) pathology was consistent with amorphous material consistent with cyst contents with no lining epithelial cells identified. The patient underwent a robotic-assisted distal pancreatectomy with splenectomy. Pathology was consistent with a 5.5 cm dermoid cyst of the pancreas, negative for malignancy. Our case presents a report of a robotic distal pancreatectomy with splenectomy for pancreatic dermoid cyst. Robotic distal pancreatectomy with splenectomy is safe and feasible in patients with cystic lesions and prior history of ipsilateral retroperitoneal surgery. Further research should focus on pre-operative work up for proper diagnosis and further identification of incidence and prevalence

P509

Laparoscopic Stapled Cystogastrostomy Versus Hand Sewn in Management of Pancreatic Pseudocyst in Tertiary Care Centre in Central India: A Randomised Comparative Study

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Introduction: Pancreatic pseudocyst is a complication of pancreatitis for which cystogastrostomy is a common operative method for internal drainage

Objectives: The outcomes of Laparoscopic stapled cystogastrostomy vs hand sewn cystogastrostomy are compared. Various intra-operative parameters and post-operative outcomes in patients with pancreatic pseudocyst undergoing cystogastrostomy is evaluated by this randomised control trial

Materials and Methods: It is a randomised control trial in which patients who underwent laparoscopic cystogastrostomy either by hand sewn or using endo GI stapler (Green cartridge 45 mm) were included. Cases were compared in terms of intra-operative parameters, duration of surgery and post-operative outcomes

Inclusion Criteria:

Cases of uncomplicated pseudocyst of pancreas
Persistent pseudocyst not amenable to conservative treatment
Single solitary enlarged pseudocyst

Exclusion Criteria:

Cases with end stage liver disease
Portal Hypertension
COPD

Cases unfit for General Anaesthesia
Statistical Analysis: Data was analysed using statistical software. Chi square test was applied for categorical data. P value < 0.05 was be considered significant. Results were analysed by using SPSS 26.0 software
Results: Thirty patients in each group of hand sewn and of stapler used in LCG were enrolled. Stapled LCG was associated with significantly shorter operative time than hand sewn LCG. There was no significant post-operative pain and fever in both groups, no leak, no recurrence, no fistula in both groups
Both groups had shorter duration of postoperative hospital stay. Patients were followed up in OPD for 6 weeks. Cyst resolved in all patients. Endo GI stapler is costlier than Hand sewn method, and considering poor patients in our settings, stapler LCG was not cost effective
Conclusion: Endo GI stapler is costlier than Hand sewn method, and considering poor patients in our settings, stapler LCG was not cost effective

P510

Lap-Assisted Whipples Pancreatoduodenectomy- Early Experience from a Tertiary Care Centre

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Introduction: Laparoscopic and minimally invasive surgeries have been suggested to enhance postoperative recovery when compared to their open counterparts. However, there are concerns about the extensive learning curve due to their complex nature, which could increase the risk of complications. Laparoscopic assisted pancreaticoduodenectomy (LAPD), a hybrid procedure combining laparoscopic resection and reconstruction under a small incision, may serve as an alternative on the road to matured application of TLPD
Material and Method: Data was collected retrospectively through an electronically maintained patient database. Data collected included demographic profile, imaging characteristics, and FNAC-proven pancreatic or cholangiocarcinoma requiring Whipple's procedure. The patient underwent diagnostic laparoscopic dissection, and then the resection was done laparoscopically. After complete resection, an upper midline incision was made from the xiphisternum to the supraumbilical port, and the specimen was delivered. Reconstruction was then performed, including a pancreaticogastrostomy with an isolated loop GJ and HJ. The data was analyzed and outcomes assessed
Results: 17 cases have been performed since 2020, with the majority being female. The mean age of presentation was 53 years. Histopathology revealed: ampullary variety: 8 (47.0%), CA head of pancreas: 5 (29.4%), distal CBD Cholangio CA: 2 (11.76%), SPEN: 5.88%, and gastrinoma of the head of pancreas: 5.88%. The average hospital stay was 14 days. 23.7% developed a burst abdomen; 17.6% developed a surgical site infection; and 2 patients had chyle leaks. Two patients underwent re-exploration for bleeding. Within the first 30 days of operation, there was one death. None of the patients developed a pancreatic fistula
Conclusion: The potential advantages of LAPD include more precise mobilization and dissection compared with OPD, and more precise reconstruction and haemostasis compared with TLPD, which will possibly lead to a more favourable postoperative recovery

P512

Unraveling the Enigma of Pancreatic Solid Pseudopapillary Neoplasms: Updated Insights of 416 patients from the Surveillance, Epidemiology, and End Results (SEER) Database

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Introduction: Pancreatic solid pseudopapillary neoplasia (SPNs) or Frantz tumor, first discovered in 1950, makes up 1–2% of pancreatic tumors. Usually, SPNs are slow growing, but metastatic cases have been reported. SPNs mainly affect young women in their 20 s or 30 s, with the reason for this trend still under investigation. Symptoms are often vague, and the tumor is discovered unexpectedly on imaging for other diagnoses. While its origins are unclear, some genetic mutations do exist. Surgery remains the treatment of choice, offering the highest survival rates. The current study describes the largest cohort of patients with SPNs from the Surveillance, Epidemiology, and End Results (SEER) database to better identify the demographic, clinical, and treatment modalities that impact clinical outcomes
Methods: Demographic and clinical data were abstracted on 416 patients with SPNs from the SEER research plus database (2000 – 2018)
Results: A total of 416 cases of SPNs were identified, comprising 353 (84.9%) female and 63 (15.1%) male patients. Most of the patients were of Caucasian decent 283 (68.0%), and the mean age of diagnosis for the female was 35.2 years and 45.1 years for male. When information regarding tumor staging 338 (81.3%), grading 89 (21.4%), metastasis 318 (76.4%), and tumor size 204 (49.0%) was available, most of the tumors were localized 218 (64.5%), well differentiated 62 (69.7%), showed no metastasis 307 (96.5%), and were more > 4 cm in size 131 (64.2%). Also, where the treatment information was available, most of the patient received surgery alone 347 (83.4%). The overall 5-year survival was 93.3% (89.2–95.9) and highest in those who received surgery 98.0% (94.9–99.2), while addition of chemotherapy decreased the overall survival rate 72.7% (46.3–87.6). Multivariable analysis through cox survival regression analysis identified age > 40 hazard ratio (H.R) 9.279 (0.001) and distant stage H.R 4.267 (0.015) as factors that were associated with decreased mortality, p-value < 0.05
Conclusion: SPNs preferably affects Caucasian female in the 3rd decade of life and show low metastatic potential. Surgical resection remains a treatment choice as it significantly increases 5-year survival. Although chemotherapy alone decreases survival, more extensive studies are needed to investigate the proper role of chemotherapy for SPNs, given the limited number of cases who received chemotherapy in the current study

P513

Psychometric Development of a New Patient-Reported Outcome Measure to Assess Recovery After Abdominal Surgery: The Recovery After Abdominal Surgery (RAAS) Questionnaire

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Introduction: The aim of the present study was to psychometrically develop and test a new patient-reported outcome measure (PROM) of recovery after abdominal surgery using Rasch measurement theory (RMT). PROMs currently used to assess recovery after abdominal surgery were not established according to optimal scientific standards and have limited evidence supporting their measurement properties. To address this gap, we initiated an international research program to develop a conceptually relevant and psychometrically sound PROM; the Recovery After Abdominal Surgery (RAAS) questionnaire. After establishing a patient-centered conceptual framework of recovery and developing preliminary items, this step of our program focused on using RMT to assess RAAS' underlying domains, refine items, and optimize scoring procedures

Methods and Procedures: Adult patients undergoing abdominal surgery at three university-affiliated hospitals completed the preliminary RAAS 59-item pool preoperatively and at postoperative days 1, 7, 30, and 90. RMT was used to assess whether the items fit the Rasch model (i.e., a model defining the ideal delineation of items that fit hierarchically into a unidimensional linear continuum, analagous to a ruler). Items were modified or eliminated based on standard RMT statistics, i.e., item/person fit residuals, threshold ordering, reliability (person separation index [PSI]), differential item functioning, targeting and local dependency. Repeated measures were addressed via anchoring. Analyses were performed using a partial credit model via the RUMM2030 software

Results: Between October 2021 and September 2022, 192 patients were screened for eligibility, 151 met inclusion criteria, and 100 consented participation (mean age 57 ± 14.7, 49% female, 59% laparoscopic, 66% major procedures). After adjusting and/or eliminating misfit items, RMT supported that three distinct RAAS domains adequately fit the Rasch model: symptom experience (11-item bank focused on pain and visceral symptoms, Chi2 $p = 0.07$, PSI = 0.75), physical recovery (19-item bank focused on physical function and role participation, Chi2 $p = 0.14$, PSI = 0.92), and mental recovery (14-item bank focused on mental health, energy and drive, and sleep function, Chi2 $p = 0.23$, PSI = 0.83)

Conclusions: As surgery enters the era of patient-centered care, it is advocated that postoperative recovery be measured using PROMs. In the present study, RMT supported that RAAS scores focused on postoperative symptom experience, physical recovery, and mental recovery provide psychometrically sound measures of recovery after abdominal surgery. The next steps of our research program include (1) futher assessment of RAAS'measurement properties (i.e., construct validity, responsiveness) and (2) development of user-friendly electronic platforms for data collection using computer adaptive testing (RAAS web portal and mobile app)

P514

Emergency General Surgery Transfer of Low-Risk Patients to Lower Acuity Facility: Survey of Patient Experiences of the Process of Care and Perceptions of Safety

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Background: Prior work has demonstrated the benefits of a triage strategy to offload surgery patients from a Level I Trauma Center (TC). Transferring patients from TC and free-standing emergency department (FS-ED) to an affiliated community hospital (CH) saves TC bed days and OR time. Patient experiences and perceptions of safety are unknown. The aim of our study was to evaluate general surgery patients with low-risk conditions about processes of care and perceptions of safety during their surgical care episode. We hypothesized that patients who present to a CH ED or FS-ED will report better perception of the process of care and safety compared to those transferred from a TC. Those undergoing transfer to CH will report greater satisfaction with postoperative experiences

Methods: From May–August 2023, patients undergoing non-elective laparoscopic cholecystectomy or appendectomy were prospectively identified. Data was collected from EMR review to include patient demographics, ED length of stay (LOS), OR characteristics, and 30-day outcomes. Patients were contacted by telephone post-discharge and asked to participate in a survey using a five-point Likert scale. Univariate analysis was used to compare the differences

Results: 76 patients meeting selection criteria were identified, 20 participated in the post-discharge survey. There were no differences in demographics between the three groups. 59% and 41% of patients underwent appendectomy and cholecystectomy respectively. ED LOS at FS-ED was significantly shorter than those being kept at the same hospital or transferred from TC-to-CH (Median (IQR) in hours, 3.9(3.5–5.2), 6.6(4–11), 6.7(4.8–8.1), $p = 0.008$). There was no difference in operative time, AAST grade or ASA classification. 11% of patients had a 30-day hospital encounter (ED visit, observation or inpatient admission). Those undergoing transfer from FS-ED and TC-to-CH reported higher satisfaction with post-op instructions including descriptions of prescriptions, over-the-counter medications, and activity restrictions than those remaining at their original hospital, although none of these results were statistically significant ($p = 0.35$, 0.56, and 0.78 respectively). Only one patient interviewed had safety concerns during the transfer process. There were no differences in the preparedness for discharge among those undergoing procedures at CH vs TC ($p = 0.788$)

Conclusions: Transferring patients from FS-ED and TC-to-CH for low-risk operative patients remains a viable strategy to decrease high patient volumes seen at TC with minimal safety concerns for patients. Further patients are needed to better evaluate patient reported outcomes

P515

A New Objective Scoring System to Clinically Assess Fecal Incontinence

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Introduction: Several scoring systems are used to assess fecal incontinence (FI), among which the most commonly used are Wexner and Vaizey's scoring systems. However, there are significant lacunae in these scoring systems, due to which they are neither accurate nor comprehensive. The aim was to develop a new scoring system for FI that is accurate, comprehensive, and easy to use

Methods: A pro forma was made in which six types of FI were included: solid, liquid, flatus, mucous, stress, and urge. The weight for each FI was determined by asking a group of patients and laypersons to give a disability score to each type of FI from 0 to 100 (0 m least, 100, maximum disability). The disability was assessed on a modified EQ-5D + (EuroQol) description system, 4D3L (4 dimensions and 3 levels) for each FI. The average score of each FI was calculated, divided by 10, and rounded off to determine the weight of each FI type. The scores for the three levels of frequency of each FI were assigned as never = 0 (No episode of FI ever), occasional = 1 ($\leq$ 1 episode of FI/ week),, and common = 2 ($>$ 1 episode of FI/ week), and was termed as frequency score. The score for each FI would be derived by multiplying the frequency score and the weight for that FI type. In the second phase of the study, a group of colorectal surgeons was asked to rank the six FI types in order of severity, and their ranking was compared with the patient and laypersons' rankings

Results: Fifty patients and 50 laypersons participated in the study. After a detailed statistical analysis, the final weights assigned to solid, liquid, flatus, mucous, stress, and urge FI were 8, 8, 6, 6, 5, and 7, respectively. and a new scoring system was formulated. The maximum possible score was 80 (total incontinence), and the least 0 (no incontinence). The surgeons' ranking of FI severity did not correlate well with patients' and laypersons' rankings of FI, highlighting that surgeons and patients may perceive the severity of FI differently

Conclusion: A new scoring system for FI was formulated, which was simple, logical, comprehensive, and easy to use. It eliminated all shortcomings in the existing scoring systems (Wexner's and Vaizey's) especially assigning equal weightage to all types of FI by previous scoring systems. Patients' and surgeons' perceptions of FI severity of FI did not correlate well

P516

Could Patients Undergoing Minimally Invasive Minor Hepatectomy or Distal Pancreatectomy Be Managed Through a Future Hospital-At-Home Program? A Retrospective Cohort Study

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The objective of this study was to characterize whether patients undergoing minimally invasive (MIS) hepatobiliary (HPB) surgery could be candidates for early discharge through a hospital at home (H@H) program. H@H and same-day-discharge programs have gained momentum in the domain of surgery with safe and effective postoperative monitoring. Our centre has successfully implemented a H@H program to manage patients with cardiopulmonary conditions and complicated diverticulitis. Current literature is minimal, but suggests that early discharge following minor hepatectomy is safe in select patients. However, little is known about the generalizabity of those findings for other MIS HPB procedures

This study included adult patients undergoing MIS minor hepatectomy (MH) or distal pancreatectomy (DP) at a single HPB specialty centre form 2011–2022. Those undergoing major hepatectomies, multivisceral resections, planned or converted to open procedures, were excluded. Patient demographics, indications for surgery and postoperative outcomes were collected retrospectively. Regression analyses were performed to identify predictive factors associated with prolonged hospital stay and postoperative complications in patients undergoing either MH or DP. The primary outcome was 30-day complications, with secondary outcomes including length of stay (LOS) and emergency department visits

From 2011–2022, a total of 100 patients underwent laparoscopic MH (mean age 65.5 years ($\pm$ 12), 56.4% male, average BMI 28.9 ($\pm$ 6)), with 52 patients undergoing DP (mean age of 63.4 years ($\pm$ 15), 47% male, average BMI 26.9 ($\pm$ 4)). Patients undergoing MH and DP had an average charlson comorbidity index of 8.3 ($\pm$ 3) and 5 ($\pm$ 2) respectively.Total LOS averaged at 5.44 days ($\pm$ 4.35) for MH, and 7.15 days ($\pm$ 5.9) for DP. Post-operative complications within MH (n = 23) were most notable for transfusion requirements (n = 13), surgical site infections (SSI) (n = 4), and acute kidney injury (n = 3). Among MH patients, 10% (n = 10) presented to the ED within 30-days; the most common reason being intraabdominal collections (n = 2), and only 5 required readmission. Within the DP cohort, 25% of patients (n = 13) required an ED visit; the most common reason being poor pain control. Only two DP patients had a postoperative pancreatic leak. On multiple regression analysis, intraopearative transfusions and prolonged OR times remained independent predictors of overall LOS, with no associations to 30-day ED visits

In summary, this study provides preliminary evidence to aid in the development of patient selection criteria for enrollement in our H@H program following MIS HPB surgery. These results will be used to help launch a pilot H@H program within our centre for select MH patients

P518

Assessing the Influence of COVID-19 Positivity During Perioperative Period on Non-Urgent Gastrointestinal Surgery Outcomes

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Introduction: Most non-urgent gastrointestinal surgeries are deferred if the patient is infected with SARS-CoV-2. However, COVID-19 testing measures in the preoperatively period have relaxed. This inevitably leads to diagnoses of COVID-19 in the perioperative period. Little is known about the impact that COVID-19 positivity status has on elective surgeries when adjusting for other variables

Methods and Procedures: Using the latest American College of Surgeons-National Surgical Quality Improvement Program participant user files, we filtered and included the 10 most common gastrointestinal surgeries by CPT code. Resulting CPTs were laparoscopic appendectomy, laparoscopy cholecystectomy with and without cholangiogram, and different codes for colectomy. We then stratified for COVID-19 positivity status in the perioperative period to

compare outcomes. We performed 1:5 propensity score matching to adjust for possible confounders, including age, BMI, smoking status, heart failure, sex, diabetes and hypertension needing treatment

Results: A total of 932 COVID (+) were matched with 4660 (-) patients, achieving successful improvement in mean differences for all included covariates. Patients testing positive in the perioperative period had increased odds risk for pneumonia, failure to wean from respirator at 48 h of surgery, reintubation, septic shock, deep vein thrombosis, readmission, need for transfusion, return to the OR, and death. Full results in Fig. 1.

Conclusions Based on the Results: COVID positivity status correlates with worsening of 30-day outcomes in the most common gastrointestinal surgeries. This remains true even after adjusting for patient baseline confounders. Some infectious and respiratory complications were expected to be higher in the COVID(+) group

We anticipated an elevated occurrence of infectious and respiratory complications within the COVID(+) group. Surprisingly, our investigation revealed that COVID patients exhibited increased odds of experiencing alternative outcomes, including DVT, the necessity for a return to the operating room, reoperation, and the need for transfusion. Our findings underscore the significance of pre-surgical COVID status assessment. Clinicians must keep perioperative COVID testing in mind and delay elective surgery if feasable to avoid operating on a patient infected with SARS-CoV-2

P519

Insurance Type Significantly Impacts Operative Approach and Time to Surgery of Elective Inguinal Hernia Repairs

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Time to surgery and operative approach versus insurance type

	Private	Medicaid	Medicare	Dual Eligible	Uninsured	Other	*p*-value
Time to surgery (days, median [IQR])	34[18–66]	51[26–105]	41[20–92]	55[23–97]	38[18–110]	30[20–55]	< 0.001
Open procedure(N,%)	84(20)	85(42)	156(42)	7(42)	89(59)	13(37)	< 0.001
Minimally Invasive	341(81)	113(56)	207(57)	9(53)	61(40)	22(63)	< 0.001
Laparoscopic	173(40)	57(28)	93(26)	5(30)	54(36)	16(45)	
Robotic	168(39)	56(28)	114(31)	4(24)	7(5)	6917)	

Introduction: Annually, more than one million inguinal hernia repairs are performed by general surgeons. This study examined whether delays in elective inguinal hernia repairs were associated with insurance type. We hypothesized that uninsured and Medicaid patients would experience greater delays.

Methods: This was a single-center retrospective review of elective inguinal hernia repairs from 2012-202. Associations of timely hernia repair with preoperative characteristics, operative approach,and insurance type were examined.Analyses included univariable associations and two multivariable models:1)time-to-event Cox proportional hazard(HR; 95% CI) and 2)logistic regression predicting the odds of greater than the median number of days from clinic visit to surgery (OR; 95%CI).

Results:1206 patients underwent inguinal hernia repairs from 2012-2021(93% male,59% white,31% black,median age 57 years) with a median of 39 days from clinic visit to surgery. For Medicaid, Medicare, and uninsured patients, median time to surgery was 51, 41, and 38 days, respectively, versus private insurance at 34 days. Operative approach differed across insurance types significantly($p < 0.001$):privately insured patients were more likely to undergo minimally invasive surgery(MIS;81%) versus uninsured patients(41%). While open approach decreased overtime(60% in 2012 versus 29% in 2021),uninsured patients were still more likely to undergo an open approach(73%) versus private(18%) in 2021($p = 0.01$). The multivariable model revealed that Medicaid(0.81;0.69-0.95),other insurance(0.77;0.64-0.92),or robotic repair(0.84;0.72-0.97) had longer time to surgery. The logistic model demonstrated that Medicaid coverage(1.68;1.20-2.36),any tobacco or alcohol use(1.39;1.06-1.83), preoperative imaging(1.53;1.19-1.97),robotic approach(1.58;1.17-2.13), and increasing ASA classification(1.23;1.01-1.52)were associated with increased time to surgery > 39 days(median).

Conclusions: While MIS increased overtime,patients who were uninsured remained more likely to have open repairs.Medicaid patients and those undergoing robotic repair were more likely to experience delayed time to surgery.Inequities in access to surgery(both in time and approach)should be further investigated.

P520

Integrating Esophageal Metaplasia Screening into Standard Colonoscopy Order Sets

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Background: 22,000 new cases of esophageal carcinoma were diagnosed in the United States in 2023 causing over 16,000 deaths. Although the mortality rate of esophageal carcinoma is decreasing, prognosis is still poor due to this malignancy's late presentation and aggressive nature. Survival can be improved, however, with early identification and appropriate treatment of pre-malignant esophageal metaplasia (Barrett's Esophagus). Yet, there is inconsistent esophagogastroduodenoscopy (EGD) screening in higher-risk patients who would benefit. The primary objective of this study is to use standard criteria to identify patients undergoing colonoscopy who could have also benefited from a screening EGD for esophageal metaplasia.

Methods: Data were retrospectively collected from all patients over the age of 18 with no previous diagnosis of esophageal metaplasia or carcinoma undergoing screening colonoscopy from April to June of 2022 in the Kettering Health System. Data were collected according to either the American College of Gastroenterologists screening criteria (ACG-SC) or Baylor screening criteria (B-SC). B-SC is a recently suggested screening protocol that has the benefit of encompassing patients with esophageal metaplasia who lack reflux symptoms, which occurs in up to half of cases. ACG-SC is defined as reflux symptoms plus any three of the following: male sex, white race, BMI > 25, age > 50, family history of esophageal metaplasia or carcinoma, or smoking history. B-SC is two-fold and defined as either presence of reflux symptoms or any 5 of the previously mentioned criteria.

Results: A total of 267 patients underwent screening colonoscopy with 133 meeting ACG-SC and 158 meeting B-SC. Of those who met the ACG-SC, only 63 of the 133 eligible patients (47%) were concurrently or previously screened with an EGD. Similarly, only 68 of the 158 eligible patients (43%) by the B-SC were screened. Further

analysis of the missed screenings is in process to identify significant demographical differences between groups.

Conclusions: This study suggests that significantly more patients undergoing colonoscopy should be identified and screened for esophageal metaplasia using these standardized criteria. Although the two criteria were not compared in this study, the B-SC selected more patients for screening due to no requirement of reflux symptoms. Further analysis is needed to determine which criteria is most sensitive and specific. Given each of these patients will already be undergoing the risks of anesthesia for colonoscopy, this additional preventative screening imposes minimal risk and can increase identification of esophageal metaplasia prior to malignant transformation.

P521

Accuracy of Conflicts of Interest in Surgical Journals

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Background: Accurate reporting of industry relationships and conflicts of interest (COIs) is crucial for unbiased assessment of the conclusions of a particular study. Despite the enactment of COI laws, such as the Physician Payments Sunshine Act in 2010, prior work suggests that 10-35% of self-reported COIs are inaccurate. We sought to evaluate the accuracy of COI reported in six prominent minimally invasive and general surgical journals for the year 2022.

Methods: We utilized three public databases – Open Payments (USA), Disclosure UK, and Disclosure Australia – to assess the accuracy of COI disclosures among authors from these respective countries. We selected six journals – JAMA Surgery, Annals of Surgery, British Journal of Surgery (BJS), Surgical Endoscopy, Obesity Surgery, and Surgery for Obesity and Related Diseases (SOARD) and determined the accuracy of COI reporting for all articles published in 2022.

Results: A total of 6206 authors were analyzed across 918 articles. Of those, 5675 entries were within the countries of interest: USA (4282), UK (718), and Australia (213). Of these, 774 authors (12.47% of the total) self-reported a conflict of interest in their papers. Overall, 4055 researchers (69.07%) reported COIs accurately, while 1816 authors (30.93%) had incorrect reporting. Among the latter, 1400 authors did not self-report a COI but were found to have received funding reported in the databases, while 416 self-reported conflicts of interest that were not recorded in the public COI databases. The accuracy of COI varied among analyzed journals and ranged from 59 to 86%. US had the lowest accuracy of reporting COI at 69% as opposed to UK (93%) and Australia (96%). Inaccurate COI reporting was most common in corresponding/last authors (39%) and least common for first authors (18%). Most payments < $100 were not disclosed (98.9%), while only 10% of the payments made to authors by an industry sponsor in excess of $50,000 were reported accurately.

Conclusions: Our study shows that the accuracy of self-reported COIs in general surgery journals remains low at 69%. Additionally, majority of the large payments made to authors by industry sponsors are not disclosed appropriately. Our findings should encourage authors, who may be confused over guidelines or the relevance of their industry relationships, to overreport any possible COI because failure to report tends to raise questions over the credibility of their work.

P522

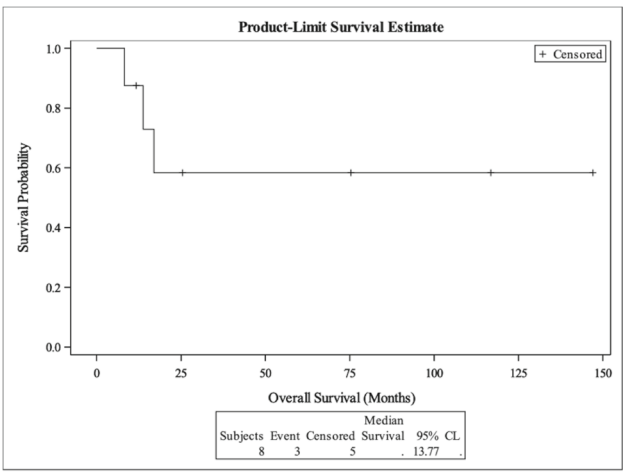
Evaluating Surgical Management and Survival Outcomes in Merkel Cell Carcinoma (MCC): A Retrospective Study at King Hussein Cancer Center (KHCC)

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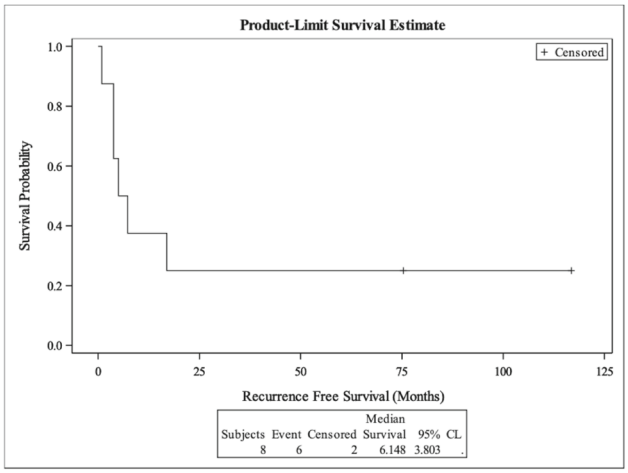
Introduction: MCC is an aggressive neuroendocrine tumor of the skin, commonly presenting on the head and neck (1). Risk factors include immunosuppression, age > 65, UV exposure, and Merkel cell polyomavirus infection (MCPyV) (2). It is a rare tumor, but the incidence of MCC has nearly doubled in the previous decade (1). Given the rarity of MCC, limited guidelines exist on its diagnostic workup and surgical management. The objective of this study is to evaluate the recurrence and survival rate of patients with MCC following surgical intervention at KHCC.

Methodology: Data was retrospectively collected from the KHCC patient portal between 2007 and 2021, including male and female patients aged 59-77 at diagnosis. The study encompassed patients with confirmed MCC pathology ascertained through diagnostic skin biopsy. Excluding non-MCC neoplastic conditions refined the cohort to eight patients. Kaplan-Meier curves were used to analyze the data.

Results: The average duration from initial complaint to diagnosis ranged from 1 month to 2 years, with a median of 1 year. Site of MCC varied from head and neck, trunk, and upper and lower limbs. Sentinel lymph node (SNL) evaluation was performed on all patients given the rapidly progressive course of the disease, with two patients' SNLs returning positive for nodal disease. There was no method of stratifying patients infected with MCPyV. 6/8 patients underwent surgery, as two patients had expired before surgical intervention due to MCC-related causes. Surgical interventions included wide local excision (WLE) ± nodal clearance. Excision margins ranged between 0.6- 7*2.5*2.5 cm according to tumor location. Adjuvant chemotherapy was given to all but one patient, and adjuvant radiotherapy was only given to half of patients. Distant recurrence manifested in 6/8 patients, with two experiencing concomitant neoplasms, namely skin cancer, and solid organ tumors. The recurrence-free survival rate for this patient cohort at 5 years was 25.00%, and the 5-year overall survival rate was 58.33%. The latter of which is significantly higher than that reported in the US by the National Cancer Institute (NCI) at 24% (3).



MCC 5-year overall survival rate at KHCC between 2007 and 2021: 58.33%



MCC 5-year recurrence free survival rate at KHCC between 2007 and 2021: 25.00%

Conclusion: This study highlights the higher overall MCC 5-year survival rate of 58.33% at KHCC following surgical intervention. The study's small sample size of eight patients and lack of controlled comorbidity profiles emphasize the need for larger cohort studies to establish comprehensive and effective surgical management guidelines for MCC. The potential impact of identifying patients infected with MCPyV for early diagnosis and targeted treatment is yet to be explored.

P523

Does Post-Operative Bloodwork In Elective Ileostomies Decrease the Incidence of Gastrointestinal Dysfunction?

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Background: Routine bloodwork is often performed post-operatively for new ileostomates but its value is questionable. Enhanced recovery pathway (ERP) guidelines do not recommend routine bloodwork, but new ileostomates often have electrolyte disturbances, which may delay recovery of gastrointestinal function. We hypothesize that early postoperative bloodwork would prevent gastrointestinal dysfunction (GID) by identifying electrolyte abnormalities. Therefore, the objective of this study is to determine the utility of postoperative bloodwork in patients undergoing ileostomy creation.
Method: This is a retrospective study from a high-volume academic center. Adult patients who underwent an elective laparoscopic ileostomy creation (with or without concomitant procedures) between 2017-2022 were included. All patients were managed by a mature ERP that did not include any routine bloodwork with target hospitalization of 3 days, but could be ordered at the treating team's discretion. All bloodwork up to post-operative day (POD) 3 were reviewed. The main outcome measure was GID, defined as failure to tolerate oral intake and/or failure of passage of intestinal content by POD4, and to assess the rate of abnormal bloodwork result. The recovery course, the incidence of GID and blood test results of serum hemoglobin and electrolytes were assessed.
Result: A total of 174 patients were included, of which 100(57%) received bloodwork and 74 (43%) did not. There were no significant difference in their demographics and comorbidities (overall mean age 58.3 years (SD 15.0), 67% male, ASA 3 + 37.9%). The most common indication for surgery was rectal cancer (80%) patient and low anterior resection was the most performed procedure (62%). In the patients with bloodwork, a total of 745 blood tests were performed, of which only 72 (10%) were abnormal in 47 patients (47%). Hypomagnesemia was the most common abnormality and was found in 20 test results (3%). Conversion to open surgery (15% vs 6%, $p = 0.04$) and increased blood less (mean 314 SD41.8vs 196 SD17.8, $p = 0.05$) were associated with abnormal bloodwork. Overall, GID occurred in 19 (11%) patients, with more in the bloodwork group (15% vs. 5%, $p = 0.04$). In patients who received bloodwork, abnormal bloodwork results was not associated with increased GID (GID 37% abnormal vs. no GID 26% abnormal, $p = 0.3$).
Conclusion: In patients undergoing elective laparoscopic ileostomy creation, bloodwork in the first 3 days after surgery is most often normal and has low clinical relevance in regards to GID. Therefore, postoperative bloodwork should only be performed when clinically indicated.

P524

Oncology Nurse Navigator: Preliminary Experience of a Novel Patient-Centered Project in a General Surgery Unit in Central Italy

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Background: The role of nurse navigator (N-N) is a specialized nurse offering personalized care to oncologic patients to help them throughout the healthcare system. In our general surgery unit in Italy, we have started such project since January 2023, aiming to enhance the diagnostic-therapeutic and assistance pathway of each oncologic patients. Primary outcomes are the time interval between the first patient contact of our team and each phase of diagnostic and therapeutic pathway.
Secondary outcomes the assessment of the number, frequency of contacts between the patient and his N-N, as well as of the quantity and type of procedures organized and patient satisfaction assessment.
Materials and Methods: Prospective cohort study has been conducted with a control group represented by the parameters measured in 2022 for the oncologic patients treated in our same surgical unit. The sample included 30 patients. Contacts have been recorded within a dedicated cell phone number. Patient Satisfaction With Cancer Care (PSCC) questionnaire has been and this was given to the patients in a blind way by third party to avoid biases.
Results: The study group included 30 cancer patients,out of them 18 had colorectal cancer, six liver mets and 6 pancreatic cancer. Average time frame from first contact to the primary diagnostic test was 8 days vs 20 days in 2022 (control group). All patients underwent MDT discussion and time to MDT was not different between the two groups. 5 patients were considered not fit for surgery and average time of referral to medical oncologist was 2 days in the study vs 10 days in the control group.
25 patients were fit for upfront surgery and average time from first contact to surgery was 23 days after ONN establishment vs 45 days in the control group.
21 patients underwent Minimally invasive procedure: 17 laparoscopic surgery, 4 endoscopic procedures
Each patient had on average 10 phone calls with ONN. For patients led to first cancer diagnosis, ONN organized an average of 4 test.

Questionnaire about patients' satisfaction reached a response rate of 100% with a mean score of 85,2/90.
Conclusions: These preliminary results showed that ONN proved to be effective and to enhance quality and outcomes of the management pathway of surgical oncology patients. Further studies are required to better the results and identify possible room for improvements within the ONN oncologic pathways.

P525

A Case Series Review of the Management of Achalasia in the Low Resource Setting of Barbados

Caroline A Haynes; Alex Doyle; Sahle Griffith; Surgical Solutions Inc

Achalasia is an uncommon disorder affecting the esophagus where failure of relaxation of the lower esophageal sphincter and abnormal peristalsis contribute to a functional obstruction at the gastroesophageal junction. Research suggests the incidence of this condition is approximately 1.6 per 100,000 persons per year with a prevalence around 10.8/100,000 persons[1]. At the end of 2022, Barbados' population was 276, 800[2]. Therefore, over a 10 year period, approximately 10-20 new cases of achalasia are expected with approximately 30 persons living with the condition.
Barbados is a low to middle income developing island in the English-speaking Caribbean with one public hospital which manages the majority of surgical cases. Due to delays and lack of resources individuals may seek surgical intervention from private facilities. The private care facility audited managed 40% of the expected number of achalasia patients between 2012-2022 and given the limitations also encountered in that setting, it would be beneficial to review the management of these cases. It was also prudent to address the feasibility of introducing newer technologies in Barbados given the island's economic limitations.
Patients presenting to the facility were either referred from a general practitioner (GP) or gastroenterologist after symptoms and subsequent investigation were suggestive of achalasia. Dysphagia was the most common presenting complaint, followed by weight loss, dyspepsia and episodic chest or epigastric pain. High resolution manometry (HRM) is unavailable in Barbados and the common modalities chosen to investigate patients were barium swallow and endoscopy.
Where nifedipine was used, it seemed to provide little to no symptomatic relief; surgical management was therefore chosen for definitive treatment. In most cases (92%) Heller's cardiomyotomy was chosen for definitive management. Serial dilation was attempted in one case due to the advanced age of that patient. However, attempts to relieve symptoms by doing so were unsuccessful and ultimately Heller's cardiomyotomy was performed. The Eckhardt score was not used but would have been useful for comparing the degree of symptomatic improvement associated with each mode of management.
In most cases post laparoscopic Heller's cardiomyotomy, patients noted symptomatic improvement and complications were limited to one case of esophageal perforation intraoperatively and one report of pneumonia in the immediate postoperative period. Some patients reported dyspepsia and one patient represented with recurrent strictures. Given patient outcomes in spite of the limitations encountered in our setting, the benefit of economic investment in new technologies at this time is debatable.

P526

Evaluation of Anastomotic Technique in Patients Undergoing Transthoracic Esophagectomy

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Introduction: Esophageal cancer (EC) is associated with significant mortality worldwide. Although surgery is curative, post-operative complications are a significant concern. Anastomotic leak (AL) is a major complication after esophagectomy and is associated with significant morbidity and mortality. Esophageal reconstructive technique varies significantly amongst surgeons. We sought to examine the impact of operative technique on anastomotic leak when esophagectomy is performed by experienced esophageal surgeons.
Methods: We queried a prospectively maintained database to identify patients who underwent esophagectomy. We then stratified by operative approach and anastomotic technique. Techniques analyzed included handsewn, EEA with sutured purse string, EEA with trans oral anvil (Orvil), and linear stapled. Patient demographics and operative outcomes were compared using Mann-Whitney U, Kruskal Wallis and Pearson's Chi-square test as appropriate. All statistical test were 2-sided and a p-value of 0.05 was considered significant.
Results: We identified 857 patients who underwent esophagectomy with a median age of 67 (28-91). There were 521 patients who underwent open esophagectomy and 336 underwent minimally invasive approach. 521 patients had handsewn anastomosis, 144 EEA, 178 Orvil, and 14 linear stapled anastomoses. There were more males with esophageal cancer in all groups, $p = 0.003$. The handsewn cohort had the highest mean BMI at 28.2 ± 5.5 compared to patients who underwent stapled technique, $p = 0.002$ however they also had the lowest ASA scores, $p < 0.001$. Neoadjuvant therapy was more often administered in stapled anastomosis compared to hand sewn, $p < 0.001$. The operative time was shorter in the handsewn technique at 253 min compared to 394 min in EEA, 289 min Orvil, and 271 min Linear, $p < 0.001$. Complications were highest in the handsewn technique at 57.4% compared to 25% EEA, 34.8% Orvil, and 21.4% linear. There were 48 (5.6%) anastomotic leaks identified in the entire cohort. Anastomotic leaks were identified in 28 (5.4%) of handsewn, 4 (2.8%) EEA, 15 (8.4%) Orvil, and 1 (7.1%) linear technique, $p = 0.17$. Length of stay was lowest in the patients who underwent linear stapled anastomosis at 9 days, and Orvil (8 days) compared to EEA (10 days) and handsewn (10 days), $p = 0.001$. There were no differences in re-operations in patients experiencing an anastomotic leak by technique, $p = 0.95$.
Conclusions: While anastomotic techniques vary among surgeons, no difference in leaks were identified among patients undergoing handsewn or stapled techniques. However, patients undergoing minimally invasive esophagectomy and stapled anastomosis were less likely to experience a complication and had shorter lengths of hospitalization.

P528

The Pen is Mightier than the Scalpel: Using Precise Documentation to Reduce Reoperation Rates

Dylan S Goto, MD; Scott Marison, MD; Rachel Lew, BA; Huseyin A Erol, MD; Angelique Fontaine; Chad Cryer, MD; University of Hawaii

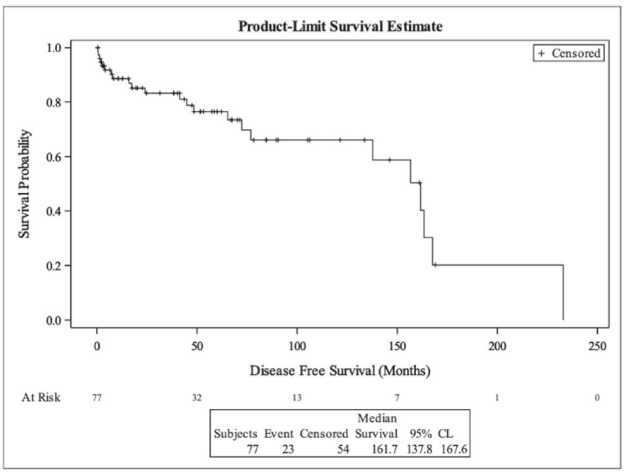
Introduction: This study aimed to assess the impact of documentation methods on unplanned return to the operating room rates at our institution by implementing a standardized postoperative phrase. Unplanned return to the operating room (RTOR) is commonly utilized as a metric within hospital quality improvement reports but is reliant upon accurate clinical documentation. Recent NSQIP reports have identified rates of unplanned RTOR at our local institution significantly higher than the national average.
Methods and Procedures: We created a standardized smart phrase to indicate planned future RTOR in all operative notes at the Queens Medical Center which became effectively mandatory in January 2023. After a 6-month period, we compared preliminary RTOR data to annual RTOR data from the 2022 NSQIP report for our institution. Chi-square and Fisher's exact tests were utilized for our analysis (alpha = 0.05).
Results: From January 16, 2023 to June 16, 2023, there were a total of 906 surgical cases at our institution, with 244 (27%) being general surgery cases, and 4 (1.6%) recorded as unplanned RTOR. In 2022, there were 2,120 surgical cases, with 550 (26%) general surgery cases, and 18 unplanned RTOR (3.3%).
Conclusions: Since instituting mandatory postoperative documentation in January 2023, the proportion of recorded unplanned RTOR at our institution has decreased over 50% compared to data from 2022. The preliminary results of our study highlight the importance of documentation in accurate assessment of hospital quality indicators and support the utility of standardized operative note templates.

P529

Survival Analysis of Dermatofibrosarcoma (DFSP) Following Surgical Intervention at King Hussein Cancer Center (KHCC): A Retrospective Study

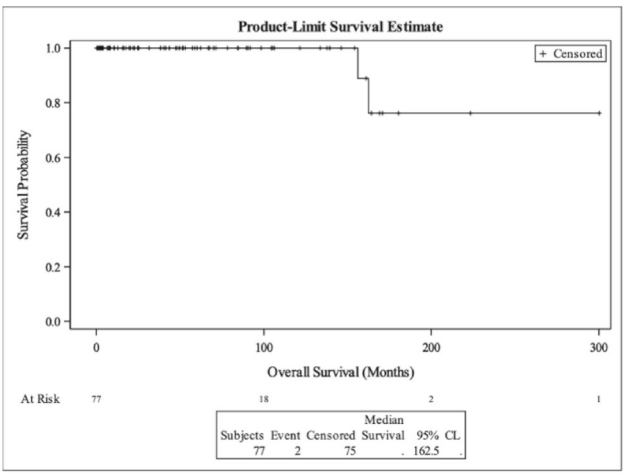
Zaina Aloul, Miss[1]; Riyad Ellati, Dr[2]; Sameer Yaser, Dr[2]; Fares Dabour[2]; Alaa Matalka[2]; [1]Cardiff University School of Medicine; [2]King Hussein Cancer Foundation

Introduction: Dermatofibrosarcoma (DFSP) is a rare cutaneous tumor with an elevated rate of diagnostic error (1). It has a favorable prognosis given its low metastatic potential, but it has a high proclivity for recurrence. Presently, the gold standard for diagnosis is pathological and immunohistochemical assessments. Surgical resection remains the primary treatment option. The objective of this study is to evaluate the overall survival and disease-free survival rate of DFSP following surgical intervention at KHCC.
Methods: Data was retrospectively collected from the KHCC patient portal between 2007 and 2021, including male and female patients aged 10-74 at diagnosis. Patients with confirmed pathology of Dermatofibrosarcoma perturbance subtype, determined via diagnostic deep tissue skin biopsies were included. One patient initially diagnosed with DFSP but was later confirmed to have deep fibrous histiocytoma following excision was excluded, refining the cohort to 77 patients. Kaplan Meier Survival Analysis was conducted to analyze the outcomes.
Results: The site of DSFP varied amongst patients and ranged from the trunk, head and neck, and limbs. Duration of complaint varied from 1 month to 20 years, with a mean of 2.5 years, and a median of 3.5 years. 60 patients underwent wide local excision of the tumor as the initial surgical management, with excision margins ranging from 0.9 mm to 8*9 mm. 22 patients underwent adjuvant radiotherapy. Among the 77 patients in the cohort, 23 experienced local recurrence, which accounts for 30% of the patient group, while none exhibited distant metastasis. Notably, only 13 patients encountered recurrence within the initial 3 years following diagnosis. This resulted in a 3-year disease-free survival rate of 83.2%, with a 95% confidence interval of [73.2, 91.3]. Eight patients in the study presented with concurrent oncological pathologies, including lymphoma, breast cancer, bowel cancer, and lung cancer. Remarkably, the 3-year overall survival rate for this patient group stood at 100%.



Obs	TIMELIST	Rate (95% CI)
1	3 years survival rate	83.2(73.2,91.3)

DFSP 3-year disease free survival rate at KHCC between 2007 and 2021: 83.2%



3 years overall survival rate	100%

DFSP 3-year overall survival rate at KHCC between 2007 and 2021: 100%

Conclusion: This study highlights the effectiveness of surgical resection and the potential utility of adjuvant therapies in managing DFSP. The absence of distant metastasis and limited early recurrences suggest a favorable prognosis, even though chemotherapy was not utilized at KHCC.

P530

Unplanned Readmission After Colorectal Surgery—A Quality Improvement Initiative

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Objective: Readmission after colorectal surgery creates a significant burden on patients and healthcare systems. Prehabilitation efforts, such as referral to pre-surgery centers to medically optimize and educate patients regarding ERAS protocols, has been shown to reduce complications and expedite recovery. However, effects on readmission rates remain unknown. In this quality improvement project, we investigate factors contributing to readmission after colorectal surgery.

Methods: A retrospective analysis of readmission data for patients undergoing elective colorectal surgery between 1/1/2018 and 12/31/2022 was performed using the NSQIP database at a single tertiary center. We analyzed the effect of the following on readmission rates: pre-surgery center (PSC) utilization, hospital length of stay (LOS), duration of surgery (DOS), post-op deep organ space SSI, post-op VTE, pre-op VTE prophylaxis, and quantity of opioids prescribed at time of discharge. Statistical significance was determined using unpaired t-test.

Results: Post-op deep organ space SSI was the only factor that was consistently found to be statistically significant for unplanned readmission ($P < 0.001$). Sub-analysis for 2020 did show that post-op VTE was statistically significant for unplanned readmission ($P < 0.02$), but this did not hold true in other years. The annual readmission rate steadily declined: 14.54% in 2020, 7.69% in 2021, and 0% in 2022. During this time period, PSC utilization remained relatively consistent, trending from 68.09% in 2020 to 66.67% in 2021, and 62.07% in 2022. However, there was no statistically significant impact on readmission from PSC utilization, LOS, DOS, pre-op VTE prophylaxis, or quantity of opioids prescribed at time of discharge.

Conclusions: Our analysis suggests that post-op deep organ space SSI is a strong independent risk factor for unplanned readmission after elective colorectal surgery. Post-op VTE may also increase readmission rates, but more data is needed to confirm this. Our hypothesis that prehabilitation efforts with PSC utilization would decrease readmission rates was not reflected in this data set. Nevertheless, we did observe a steady decline in readmission rates while PSC utilization rates remained consistent, suggesting that this may be playing a subtle underlying role that may be revealed with larger data sets. During this time period there was also a steady decrease in hospital LOS, consistent with trends in existing medical literature. Overall, our analysis indicates that targeted interventions to prevent post-op deep organ space SSI and post-op VTE may decrease unplanned readmissions and improve patient outcomes.

P531

Enhancing Patient Care: The Foregut Surgery Committee's Role in Maximizing Perioperative Outcomes for Patients Diagnosed with Upper Gastrointestinal Cancer

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Upper gastrointestinal (GI) cancers present a formidable challenge to the medical community, often requiring complex surgical interventions to achieve favorable outcomes. As the incidence of these malignancies continues to rise globally, there is an urgent need to optimize patient care and enhance treatment strategies. By following the guidelines of the inaugural Foregut Surgery Committee (FSC) at a 250-bed hospital, this abstract underscores the critical role of the committee in all hospitals performing complex foregut surgery. Ultimately, this will revolutionize the management of upper GI cancer, thus benefiting patients and healthcare systems.

The FSC represents a multidisciplinary team of experts in the field of foregut surgery, including surgeons, oncologists, nutritionists, physical and occupational therapists, case managers, and allied health professionals. This collaborative approach to upper GI cancer care will redefine the standards of treatment, leading to several noteworthy benefits:

1. Improve Preoperative Preparation for Surgery: Through comprehensive preoperative assessments, patients receive personalized strategies that optimize surgical outcomes and reduce the risk of complications. This includes preoperative education, nutritional supplementation and "pre"-habilitation, maximally optimizing the patient for surgery
2. Minimized Morbidity and Mortality: With the expertise of the FSC, there has been a significant reduction in surgical morbidity and mortality rates associated with upper GI cancer procedures. Enhanced surgical techniques, perioperative care, and postoperative support have contributed to improved patient safety and overall well-being.
3. Optimized Survivorship Care: Beyond surgery, the FSC's commitment extends to survivorship care. Patients benefit from long-term follow-up, nutritional guidance, and rehabilitation, ensuring a holistic approach to their well-being and quality of life post-treatment.
4. Cost-Effective Care: By streamlining treatment pathways and reducing complications, the FSC contributes to cost-effective healthcare delivery, easing the economic burden on patients and healthcare systems.

This abstract highlights the pivotal role of the Foregut Surgery Committee in elevating the care of patients with upper gastrointestinal cancer. The collaborative, patient-centered approach, coupled with innovation and research, offers a paradigm shift in the management of these challenging malignancies. The impact of the FSC extends far beyond the surgical suite, ultimately enhancing patient outcomes, quality of life, and the sustainability of healthcare systems worldwide.

P532

Telehealth Follow-up After General Surgery: What Do Patients Want?

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Introduction: Telehealth visits have emerged as a progressive approach to healthcare delivery, reshaping the traditional in person patient-provider interaction model. In recognition of access to care disparities, particularly in rural communities, and isolation requirements during the pandemic, telehealth utilization has significantly increased since 2020. Previous studies demonstrated the safety of telehealth follow-up after general surgical procedures, however, there are few studies evaluating patient experience. We sought to evaluate the efficacy and patient satisfaction with telehealth follow-up after general surgery procedures.

Methods: A retrospective review was conducted at a level 1A Veteran Affairs Medical Center from 2019 to 2021. All patients

undergoing umbilical hernia repair (36, 18%), inguinal hernia repairs (127, 64%), or laparoscopic cholecystectomy (37, 19%) were scheduled for telehealth follow-up approximately 2 weeks after surgery. The majority were male (182, 91%) with a mean age of 56 (range 26-84). The majority of cases were elective (168, 84%) and the remaining (32, 16%) were urgent/emergent. Patient satisfaction and the ability of a phone follow-up to meet their post-operative needs were judged on a 5-point Likert scale with the corresponding point values (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree) (Table 1).

Results: The majority of patients (153, 77%) were satisfied with their telehealth visit and many (157, 79%) would recommend a telehealth visit to a friend. Most patients (156, 78%) believed that they were able to communicate their questions and concerns during their visit (Table 1). Most patients also believe their medical needs were met during their visit (188, 94%). Patients would choose telehealth over a traditional in person visit for multiple reasons including: significant distance from residence (54, 27%), COVID-related concerns (40, 20%), convenience (30, 15%), conflicts with work schedules (26, 13%), other (23, 12%), inability to obtain transportation (16, 8%), and inability to leave house or living facility (11, 6%).

Discussion: Telehealth follow-up after common general surgical procedures is associated with high patient satisfaction (77%) in a large, Veterans Affairs system. Many patients chose telehealth visits because of concerns regarding travel distance, persistent COVID concerns, and/or conflicting work schedules. Telehealth enhances health accessibility, aiding in reducing geographical barriers to care. Telehealth should be considered as a primary option for patients after uncomplicated general surgical procedures.

P533

Using AI and Data Science to Improve Metastasis Prognosis in Colorectal Cancer

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Introduction: Although the yearly incidence and death rate of colorectal cancer (CRC) are decreasing, it remains a deadly disease with a 5-year survival of 65.1%. Additionally, CRC incidence is on the rise among younger ($\leq$ 50 years) populations and considerable disparities exist in both incidence and mortality. This study aims to utilize novel non-linear prediction models to determine whether demographics, social determinants of health (SDOH), Yost socioeconomic index, and other factors are associated with distant metastasis and 5-year mortality among early-stage CRC patients. We will then integrate these factors into a tangible risk score useful in developing individualized treatment for an increasingly complex and expanding patient population.

Methods and Procedures: We utilized the Surveillance, Epidemiology, and End Results (SEER) -Medicare database to identify patients diagnosed with Stage 0, I or II colon or rectal neoplasms between 2005 and 2019. Progression to distant metastasis was determined by ICD codes for distant lymph node or organ metastasis $\geq$ 90 days following CRC diagnosis. Cox proportional hazard and random survival forest models were constructed to examine the highest risk predictors for metastasis and 5-year mortality.

Results: Partial results examining risk of metastasis among colon cancer patients are presented at this time. Among 152,190 patients with early-stage colon cancer, 19,570 (12.9%) developed metastasis $\geq$ 90 days following diagnosis. Factors that decreased metastasis risk among our sample included being White (Hazard Ratio, HR 0.87, $p < 0.01$) and living in Pacific Coast (HR 0.87, $p < 0.01$) or Southwest (HR 0.82, $p = 0.02$) regions. Patients in the upper three quintiles of the Yost Index also had decreased risk of metastasis (HR 0.94, $p = 0.03$) (HR 0.93, $p < 0.01$) (HR 0.94, $p = 0.01$). Factors increasing metastasis risk included living alone (HR 1.07, $p < 0.01$), male gender (HR 1.19, $p < 0.01$), underweight (HR 1.49, $p < 0.01$), overweight (HR 1.43, $p < 0.01$), obese/morbidly obese (HR 1.35 $p < 0.01$) or super obese (HR 1.63, $p < 0.01$) and mental disorder diagnoses (HR 1.08, $p < 0.01$). Primary tumor locations also increased metastasis risk, including the splenic flexure (HR 1.19, $p < 0.01$), descending colon (HR 1.18, $p < 0.01$), sigmoid colon (HR 1.16, $p < 0.01$) and rectosigmoid junction (HR 1.39, $p < 0.01$).

Conclusion: Using AI analytics demonstrated that patient comorbidities and social needs have a greater impact on developing metastasis than tumor characteristics. Using novel non-linear data models enables us to extrapolate critical new information about a large number of risk factors to individualize treatment plan, reduce provider burden, and mitigate the prognosis gap between populations with varying Yost indices, SDOH, and other contributing factors.

P534

Scheduling Efficiency in Robotic Surgery: A Single Institution's Experience

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Introduction: Robotic surgery has revolutionized the field of minimally invasive surgery over the last two decades. A significant barrier to adopting robotic platforms among healthcare institutions is the substantial cost associated with adopting and maintaining a surgical robotic program. One opportunity to enhance utilization and optimize resource stewardship is through surgical scheduling. This study aims to evaluate the impact of improving scheduling efficiency on robotic surgery and its effects on case volumes, block utilization, and associated costs.

Methods: In Spring 2018, our robotic steering committee instituted an interdisciplinary robotics program that included surgeons, hospital administration, nursing leadership, and data management teams. Initiatives were implemented to increase robotic platform access, which included dedicating specific robotic operating rooms, utilizing a new scheduling paradigm, and reducing turnaround time between cases. A retrospective analysis of the electronic medical record was performed to analyze robotic case volume, case length, turnover times, and block utilization from January 2017 to May 2023. Block utilization measures how much a surgeon or service line uses the time allocated to them by the perioperative leadership team. Blocks are typically scheduled as case hours/9.5 h Monday through Friday.

Results: 9590 robotic-assisted soft tissue surgical cases were performed at our institution from January 2017 to May 2023, with a 47.9% growth in case volume over the first year of program implementation. Yearly case totals increased from 680 in 2017 to 2112 in 2022, representing a 211% growth over this time. From 2017 to 2020, there was a 12% decline in open surgery and an 13% increase in robotic surgery, with 28% of all soft-tissue operations being performed robotically at our institution in 2022. Block utilization was 27% in 2017 and increased to 60% in the first quarter of 2023. Turnaround time averaged 65 min in 2017 and decreased to 21.4 min in 2022. The average number of robotic cases performed per day increased from 3.5 in 2017 to 9.2 in 2022, with an increase in annual case hours from 1019 to 9007 over that time.

Conclusion: A comprehensive robotic surgery program focused on scheduling efficiency resulted in substantial growth in case volumes

and number of cases per day at our institution. Improving the utilization of robotic surgery platforms increases access to this surgical approach, reducing surgeon limitations in preoperative decision making. Future analysis is directed at the financial implications of increased scheduling efficiency.

P535

Quality Improvement: An Analysis of Venous Thromboembolism Rates in Post-Operative Surgical Patients

Dylan S Goto, MD[1]; Rachel Lew, BA[1]; Myah McDonald[2]; Angelique Fontaine[1]; Chad Cryer, MD[1]; [1]University of Hawaii; [2]University of New Mexica

Introduction: This study aims to identify institution-specific factors associated with rates of postoperative venous thromboembolism. Annually, venous thromboembolism (VTE) is estimated to affect up to 600,000 patients and contribute up to an additional $15,000 in hospital costs, with overall national expenses of $7-10 billion. Identifying modifiable risk factors for postoperative VTE has utility in improving hospital quality metrics and postoperative disease burden.
Methods: We performed a single-center retrospective study at a 575-bed tertiary institution in Hawaii. Twenty-one surgical patients who presented with VTE within 30 days of a procedure from December 2015 to November 2022 were identified using the NSQIP database. Patient factors, operative variables, and postoperative complications were then assessed. The Modified Caprini Score was used to stratify patients by VTE risk. Nonparametric bivariate analyses (alpha = 0.05) were utilized.
Results: Eighty-one percent of patients met criteria for high risk for VTE according to the Modified Caprini Score. Nineteen percent of patients met criteria for moderate risk. No patients met criteria for low or very low risk. The average operative time among patients was 199 min, with a range of 35 to 516 min. Only one (5%) of the 21 patients received both pre- and postoperative DVT prophylaxis appropriate for their risk group. Three patients (14%) received appropriate prophylaxis that was later held due to concerns about bleeding or other complications. Four patients (19%) received delayed prophylaxis. The remainder of patients received either no perioperative prophylaxis or failed to receive either pre- or postoperative prophylaxis when both were indicated. One patient refused treatment.
Conclusion: The majority of the patients at our institution with postoperative VTE failed to receive either timely or risk-group appropriate DVT prophylaxis. Given that our institution represents the largest hospital in the state of Hawaii, quality improvement measures targeted at improving rates of DVT prophylaxis have the potential to significantly decrease healthcare costs and postoperative disease burden in the state. Our ongoing studies into the etiologies of these findings will help to identify areas of optimization at our institution.

P537

Safety, Efficacy and Standardisation of technique of Robotic Fundoplication for GERD in Versius Robotic Platform at a Tertiary Care Centre in Northeast India

Prof Subhash Khanna, MS, FRCS, Edn, FIAGES, FALS, FAGIE, FARIS; Dr Areendam Baruah, MS, MCh; Swagat Super Specilaity Surgical Institute

Introduction: Current literature evidence suggests that both robotic and laparoscopic fundoplication are effective and safe for the treatment of GERD. Even though robotic fundoplication is associated with longer operative times and higher costs, with more collective experience of robotic surgeons and decreasing costs, this perceived disadvantage may not be relevant in future studies. Almost all the evidence today that we have on robotic fundoplication is based on the da Vinci platform. Here we present our single center data of robotic fundoplication in Versius robotic platform.
Materials and Methods: We analysed data of 27 consecutive cases of robotic fundoplication from prospectively maintained electronic and manual database. Here we also describe the standardised port position and dissection technique
Results: There was no conversion to open surgery. The average operating time was 114.5 min and the intra operative blood loss was around 15 ml. There was no intraoperative or postoperative leak. All the patients were relieved of their symptoms with no dysphagia till 30 days postoperatively but 2 patients presented with mild dysphagia to solid foods after 3 months of follow up. They responded to endoscopic balloon dilatation.
Conclusion: Our early results of this study of 27 cases shows the safety, feasibility and effectiveness of fundoplication with the Versius open robotic system. No adverse event was noted in our series with much better quality of life. Robotic fundoplication is likely to be the standard of care in the near future. This study also shows the ease of using multiple bedside units that mimic a standard laparoscopic surgery in an ergonomic position for the surgeon

P538

Cost Analysis and 1-Year Recurrence Rates of Robotic Versus Laparoscopic Paraesophageal Hernia Repair

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Introduction: Increased adoption of robotics for benign foregut surgery evokes questions regarding efficacy, safety, and cost. For paraesophageal hernia repairs (PEHR), a robotic approach has demonstrated in certain studies to decrease length of stay and 1-year recurrence rates while preserving complication and readmission rates when compared to laparoscopy. For some, the cost of a robotic approach for PEHR remains a barrier to adoption. Herein, the authors'

aim to determine the difference in cost of a robotic (R-) vs laparoscopic (L-) approach for PEHR.
Methods and Procedures: Patients 18 years old and older who underwent PEHR between July 2016 and June 2021 at a university health network were included. Variables of interest were 30-day outcomes, 1 year recurrence rates, and several cost variables (hospital length of stay, OR time, chargeable supplies and implants, non-chargeable supplies, and indirect cost). Cost data were stratified by type and presence of fundoplication, as well as elective versus urgent procedures. Data analysis included chi square tests, Fisher's exact tests, Student's t-tests, or Mann Whitney rank sum tests, as appropriate ($p < .05$ for all comparisons and no adjustment for multiple testing).
Results: There were 405 patients in the study (n = 188 for R-, n = 217 for L-). Significant differences occurred for type of anti-reflux procedure performed ($p < .001$), use of mesh (R- 70.2% vs. L- 59.0%, $p < .001$), and whether a Collis gastroplasty was performed (R- 4.3% vs. L- 10.2%, p = .023). There were no statistically or clinically significant differences in 30-day readmission or reoperation rates, Clavien-Dindo complication rates, or 1-year hernia recurrence rates. For elective cases, regardless of type of fundoplication, utilization of Magnetic Sphincter Augmentation, or absence of fundoplication, a robotic approach yielded significantly greater cost ($p < .002$). Comparing all procedures, a robotic approach produced a statistically significant increase in cost (R- $29,706.88 vs. L- $23,457.07, $p < .001$)
Conclusions: Although complication rates and surgical outcomes between a R- vs. L- approach for PEHR are similar, a robotic approach increased costs significantly. Future prospective studies should delineate which drivers of cost with the robotic platform are modifiable.

P539

Expert Assessment Does Not Correlate with Case Volume in Evaluating Robotic Proficiency

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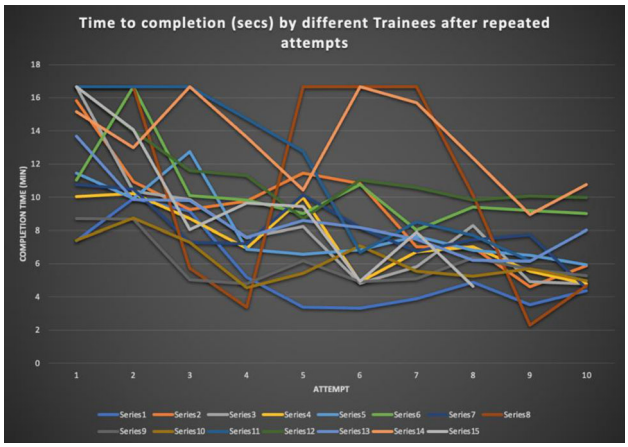
Robotic case volume is a widely used surrogate for robotic proficiency in the literature and in practice. The Global Evaluative Assessment of Robotic Skills (GEARS) scoring system is a validated tool for evaluating robotic performance. The aim of this study is to determine if case volume correlates with GEARS score when evaluated by expert surgeons.
Twenty video recordings of a simulated intracorporeal bowel anastomosis performed by surgeons and trainees of varying experience were scored by three blinded robotic colorectal surgeon reviewers (each with > 400 robotic colorectal cases performed) using a modified GEARS template. Participants who had performed > 100 robotic cases were defined as experts while those with < 100 cases were defined as novices. Expertise level, as defined by case volume, was correlated with the modified GEARS score. Inter-rater reliability was assessed using Cronbach's analysis.?
Ten (50%) surgeons were defined as experts (> 100 cases). Sixteen (80%) of the surgeons were colorectal surgery faculty, three (15%) were colorectal surgery fellows and one (5%) was a general surgery resident. Eight (40%) surgeons had more than five years of robotic experience, eight had 1-5 years of robotic experience, and four had less than one year of robotic experience.?
There was no significant difference in total GEARS score between participants defined as novices or experts (p = 0.48). There was no significant difference between experts and novices when looking at individual components of the score: bimanual dexterity (p = 0.8), depth perception (p = 0.49), efficiency (p = 0.31), force sensitivity (p = 0.76), and robotic control (p = 0.44). Cronbach's analysis yielded an alpha of 0.71 indicating acceptable inter-rater agreement.
GEARS score evaluated by expert reviewers did not correlate with expertise as defined by case volume indicating the need for alternate measures of proficiency. This has important implications for skill acquisition and training paradigms. Further research is warranted to determine how to best measure proficiency in a qualitative as opposed to quantitative fashion.

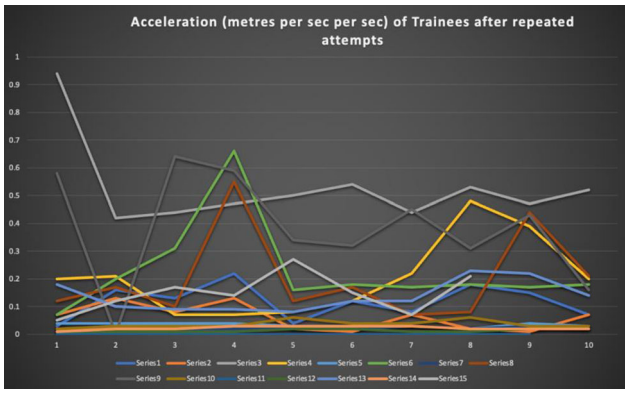
P540

Navigating the Future of Surgical Training: Augmented Reality's Transformative Effect on Surgical Skill Development and Acquisition

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Introduction: The delivery of post-graduate education, particularly in surgical skills training, has evolved significantly in the past few years. Factors such as the COVID-19 pandemic, which limited training opportunities, and the increasing emphasis on patient safety have led to a shift toward greater use of simulated technology for skill practice and assessment. The (LapAR^{TM}) is an innovative Augmented Reality-based surgical screen-based simulator and training suite. It utilizes soft tissue phantoms that replicate the physical and mechanical properties of the organ operated on, providing realistic haptic feedback on a platform which captures video and objective performance data.
The primary objective of this study was to evaluate the impact of the (AR) simulation on the acquisition and improvement of objective surgical skills among junior surgical trainees. Additionally, the study aimed to qualitatively assess the trainees' experiences with this technology at their homes.
Methodology: This study involved 15 junior surgical trainees benchmarked against two consultants across three training sites. The participants performed ten laparoscopic appendectomies interspersed with "LapPass" tasks, comprising camera holding and technical skill tasks. Objective metrics, including completion time and distance traveled, were collected, followed by interviews.
Results: The study revealed significant improvements in completion time and distance traveled during repeated laparoscopic appendectomies and related LapPass tasks. It also showed enhancements in smoothness, acceleration, and ambidexterity, although these were not the primary focus of the study. It is of interest that consultant benchmarking saw improvements largely in distance traveled, and somewhat in acceleration. Qualitative analysis indicated that AR-based training is particularly beneficial at the early stages of surgical training and should be considered for mandatory integration into surgical training. Participants expressed a desire for extended access to the technology, recognizing its utility for preparing operation lists, skill acquisition, and knowledge enhancement. Home-based training provided flexibility and convenience, complementing the high-pressure theatre environment. Although there were occasional technical challenges related to setup and reliability, the AR solution was praised for its high realism and tangible educational benefits.





Conclusion: Inovus Medical's AR solution offers a scalable platform to enhance surgical skills training, addressing common barriers faced by surgical trainees. The study provides evidence of construct validity through improvements in objective skill scores. Content validity is supported by positive feedback on the educational content from qualitative interviews. Face validity is partially supported by agreement on the realism of the appendix model, closely resembling real-life scenarios.

P541

Total Operating Room Time Shorter with Robotic Compared to Laparoscopic Cholecystectomy

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Background: Robotic cholecystectomy has grown in popularity over the past decade. However, despite numerous technical advantages of the robotic platform (improved optics, wristed instruments, near-infrared fluorescence imaging, etc.), laparoscopy remains the standard approach for cholecystectomy.
Increased time and cost for robotic cases are frequently cited as reasons to limit further adoption of the technique. To investigate these claims, we evaluated elective laparoscopic and robotic cholecystectomies performed at a tertiary care academic medical center over a three-year period.
Methods: Our study included all cholecystectomies performed at Albany Medical Center from 2017 to 2020. We excluded all cases that began open or were planned combined procedures. To control for the disproportionate number of cases done laparoscopically for acute cholecystitis, we further excluded all cases in which the patient was admitted to the hospital prior to the procedure.
Results: 747 laparoscopic and 160 robotic elective cholecystectomies were analyzed. Patient age, race, BMI, and comorbidities were not statistically different between groups. 30 day readmission rate and complication rate were equivalent between the groups.

	Laparoscopic	Robotic	p Value
Total Cases	747	160	
Average total OR time (min)	125	113	< 0.01
Conversion to open rate	4%	0.6%	0.04
Admission past POD 1	15%	6%	< 0.01
Average hospital billing	$18,012	$28,850	< 0.01

Conclusions: Our study demonstrates that the total OR time for robotic cholecystectomy is shorter than laparoscopy for similar patients. This finding is different than previously published studies. We also show improved outcomes with decreased conversion to open and postoperative inpatient admission rates.
We redemonstrate that reported billing for robotic cases is higher. However, this does not include a cost analysis taking into account the outcome differences we report here. Hospital billing likely does not reflect the true cost or reimbursement of these cases in the context of our findings.
Our study suggests that previous comparisons of laparoscopy and robotics may no longer be accurate due to changes in use patterns and may benefit from reevaluation. This change is likely due to the increased institutional expertise using the robotic platform from many high-volume years with a dedicated robotics team. Assumptions on the financial balance of these two approaches will likely change with further investigation.

P542

Using Operative Times to Analyze Instrument Motion Smoothness in Robotic Cholecystectomies

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Introduction: Technical skill in the operating room is critical for achieving optimal patient outcomes, however these are hard to measure objectively. Objective performance indicators (OPIs), metrics that can measure the precise movement of instruments in time and space during a robotic procedure, can also determine the smoothness of instrument motion, an important assessment of the quality of movements made by a surgeon. In this study, we aim to analyze smoothness metrics for robotic cholecystectomies. We hypothesize that tasks that take longer than average (i.e., are more difficult) will have less smooth movements.
Methods: The Intuitive data recorder was used to record 57 robotic cholecystectomies from 5 surgeons at our tertiary hospital center. Five smoothness OPIs, movement arrest period ratio(MAPR), normalized speed, speed peaks, non-dimensional jerk(ndjerk), and spectral arc length(SAL), were analyzed for 6 operative steps: initial exposure, dissection of Calot's triangle, ligation of cystic artery, ligation of cystic duct, gallbladder dissection off liver, and hemostasis of liver bed. The average duration for each step was calculated and

smoothness metrics were analyzed for the steps that took longer than the average plus one standard deviation. An independent samples t-test was used for statistical analysis.

Results: MAPR, normalized speed, speed peaks, and NDjerk were found to be significantly different for 5 of the steps and SAL was found to be significantly different for 2 steps. All significant results are reported in Table 1.

Steps	Left Instrument	Right Instrument
Initial Exposure	mapr ($p < .001$)	speed peaks ($p = .002$)
	norm speed ($p = .028$)	
	ndjerk ($p = .003$)	
Dissection of Calot's Triangle	SAL ($p = .049$)	SAL ($p = .012$)
		mapr ($p < .001$)
		norm speed ($p < .001$)
Ligation of Cystic Artery	speed peaks($p = .040$)	ndjerk ($p = .043$)
	SAL($p = .010$)	SAL ($p = .004$)
		speed peaks ($p < .001$)
		mapr($p < .032$)
Ligation of Cystic Duct	ndjerk ($p = .013$)	ndjerk ($p = .014$)
		normspeed ($p < .001$)
		speed peaks ($p < .001$)
Gallbladder dissection off Liver		speed peaks ($p = .046$)
		SAL($p = .049$)
		mapr ($p = .003$)
		normspeed ($p = .047$)
Hemostasis of Liver Bed	speed peaks ($p = .004$)	ndjerk ($p = .002$)
		mapr ($p = .018$)
		normspeed ($p < .001$)

Conclusion: Surgeons make rougher instrument movements when steps take longer than average. This is the first step in objectively understanding surgical movements during difficult cases. Using this data, surgeons' specific movements can be targeted and improved through OPI based feedback.

P543

Understanding the Landscape and Perspectives of Canadian Surgical Trainees on Robotic-Assisted Surgery: A Nation-Wide Study

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Introduction: The aim of our study is to explore the perspectives and exposure of general surgery residents and fellows across Canada to robotic surgery. The uptake of robotic surgery has been favoured globally in the last decade due to better intra-operative ergonomics, enhanced visibility, and more technical degrees of freedom. Similarly, Canada has witnessed an expansion of robotic surgery platforms across many surgical specialties. However, despite its increased adoption, a standardized training curriculum for surgical trainees is currently lacking and trainees' exposure and experience with RAS may be occurring at different paces throughout the training programs, especially in general surgery.

Methods: We conducted a cross-sectional nationwide survey of Canadian general surgery residents and subspecialty fellows. We distributed the survey via email with the help of program directors and coordinators across Canada in August 2023.

Results: To date, we received forty-three responses, of which 58% (n = 25) were from general surgery residents and 42% (n = 18) from surgical fellows. Seventy-seven percent (n = 33) of trainees showed interest in becoming proficient in robotic surgery or getting introduced to robotic surgical techniques however, 79% (n = 34) reported very low technical knowledge (< 10 case) in robotic surgery. More than 70% of trainees responded positively to the availability of RAS systems at their hospital (n = 31) and accessibility for practice (n = 43) in the training program. However, only 40% (n = 17) of trainees have used a robotic-assisted surgical system, mostly in the capacity of an observer (n = 20) or assist (n = 15). Sevent-nine percent (n = 34) of trainees wished to get trained in RAS but, 94% (n = 32) reported the lack of an official curriculum in the program. Sixty-three percent (n = 27) responded that RAS should be a part of surgical training in Canada within the next five years for general surgery residents and 98% (n = 42) expressed it should be part of a fellowship training.

Conclusion: Surgical trainees have expressed high interest in learning about robotic-assisted surgeries but, despite its availability at most training hospitals, training opportunities for surgical trainees are lacking. With the emerging need for training future general surgeons, the focus and efforts need to shift towards integrating robotic-assisted training curricula in surgical programs of Canada.

P544

Robotic Heller Myotomy for Esophagogastric Junction Outlet Obstruction with Paraesophageal Lipoma: Case of Impedance Planimetry Affecting Intra-Operative Decision Making

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The patient is a 50-year-old female with a history of constipation, Barrett's esophagus, and a known 3 cm hiatal hernia who presented with dysphagia to solids and liquids. Barium esophagram showed delayed emptying of the esophagus with a severe esophageal stricture. Manometry was significant for a mean integrated relaxation pressure of 47.1 mmHg and a mean distal contractile integral of 2879.5 mmHg-cm-s. Her preoperative workup was consistent esophagogastric junction outlet obstruction (EGJOO). She was treated twice with endoscopic Botulinum toxin injections with unsatisfactory results.

The decision was made to proceed with laparoscopic, robotic assisted repair of hiatal hernia with possible Heller myotomy and fundoplication. During dissection of the large hiatal hernia, there was noted to be a large lipoma at the gastroesophageal junction (GEJ) and this was resected. Impedance planimetry was performed at this stage which showed a distensibility index of 0.4 mm^2/mmHg at a balloon pressure of 40 mmHg, significant for persistent EGJOO. Thus the decision was made to proceed with Heller myotomy and Toupet fundoplication in addition to hiatal hernia repair. Impedance planimetry was again performed at the conclusion of the procedure showing a distensibility index of 2.1 mm^2/mmHg at a balloon pressure of 40 mmHg, suggesting resolution of EGJOO.

The case illustrates how impedance planimetry is a useful intraoperative adjunct to foregut procedures and can alter intraoperative decision making. During the procedure, the patient's dysphagia symptoms were initially attributed to the large GEJ lipoma. However, despite resection of the lipoma there remained strong evidence of persistent EGJOO on impedance planimetry. We therefore altered our surgical plan and proceeded with Heller myotomy rather stopping at lipoma resection with hiatal hernia repair. This decision likely prevented persistent postoperative symptoms which could have led to unnecessary additional therapies and procedures.

P545

Short-term Outcomes of da Vinci SP versus Xi for Colon Cancer Surgery. A Propensity-Score Matching Analysis of Multicenter Cohorts

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Background: Technological advances in robotic systems have enabled surgeons to operate with a reduced number of ports using the da Vinci SP system. We aimed to compare the perioperative outcomes of robotic colon cancer surgrery between da Vinci SP and Xi.

Methods: Patients who underwent robotic surgery for colon cancer from November 2020 to December 2022 at two tertiary referral centers were included. After propensity-score matching, short-term outcomes were retrospectively compared.

Results: Of the 189 study patients, 106 patients of 53 propensity-score matched pairs were analyzed. The patients with SP had smaller total incision (5.0 cm vs. 9.4 cm, $p < 0.001$), lesser pain at 8 h (3.0 vs. 3.5, $p < 0.001$) and 24 h (2.9 vs. 3.3, $p = 0.001$), and shorter hospital stay (5 days vs. 6 days, $p = 0.002$). The rate of ovarall postoperative complication was 10.4%, which was not different between SP and Xi group (7.5% vs. 13.2%)

Conclusion: The SP robotic surgery for colon cancer is feasible and shows acceptable short-term outcomes. To compare Xi robotic system, SP robotic surgery has advantages of cosmesis, postoperative pain, and recovery for colon cancer patients.

P546

Robotic Surgery: The Changing Paradigm of Transplant Surgery Fellowship

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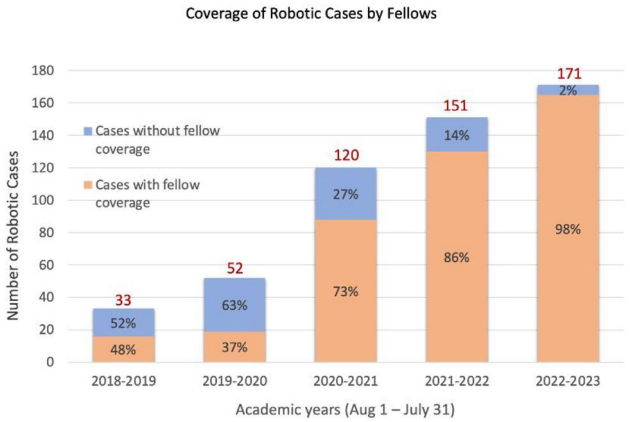
Introduction: Although robot-assisted surgery has gained significant momentum amongst transplant and hepatopancreatobiliary (HPB) surgeons, robotic case volumes vary significantly by institution and robotic-specific transplant and HPB training remains largely unstandardized. This study reviews the simultaneous growth of a robotic transplant-HPB surgery program and the development of fellow-specific robotic experiences within a single institution.

Methods: We retrospectively reviewed all robotic cases performed by the division of transplant surgery, beginning with our first robotic case in August 2018 through July 2023. Cases were categorized as either transplant or HPB and the proportion of cases with a fellow listed as co-surgeon was determined. Robotic case volume was further analyzed by academic year and by individual fellow.

Results: A total of seven fellows were included. Robotic caseload increased annually, from 33 cases in 2018-2019 to 171 cases 2022-2023. During the same time period, only one robotic console was made available for use; however, the number of senior transplant attendings performing robot-assisted operations increased from two to five. Initially, robotic case volume was composed of HPB cases only. Following the first robotic donor nephrectomy performed at our institution in 2020, robotic transplant operations have steadily increased and currently represent 50% of the robot-assisted operations performed in our division. This includes robotic kidney and liver transplants. The proportion of cases with a fellow as co-surgeon likewise increased dramatically during the study period, from 48 to 98% (Fig. 1). Annual case volume by fellow has increased from 8 cases per year to 50, with the most recent two fellows' robotic caseloads consisting of approximately 1:1 robot-assisted HPB to transplant operations.

Conclusions: As robotics have become increasingly utilized in transplant and HPB surgery, robotic-specific training in fellowship has become an essential aspect of fellow education. Identifying means of increasing robotic training for transplant and HPB fellows is

critical for trainee development and increased adoption of robot-assisted surgery in the field.



P547

Safety and Feasibility of Single-Port Robotic Left-Sided Lateral Pelvic Node Dissection for Locally Advanced Rectal Cancer: A Comparative Study of Multi-Port Robotic Approach

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Background: The da Vinci Single-port (SP) system is designed to facilitate single-incision robotic surgery in a narrow space. We developed a new procedure of lateral pelvic node dissection (LPND) using the SP platform and evaluated the technical safety and feasibility of this procedure by comparing it to a multi-port (MP) robotic approach.
Methods: We retrospectively reviewed rectal cancer patients who underwent robotic total mesorectal excision (TME) with left-sided LPND between January 2020 and May 2023. Patients' demographics, intra-operative outcomes, and postoperative morbidity were analyzed.
Results: Thirty-one and 18 patients underwent MP and SP robotic TME with LPND, respectively. No significant differences in patient characteristics and intra-operative outcomes were observed between the two groups. The mean operative time did not differ significantly between the MP and SP groups (MP vs. SP, 254.5 ± 73.2 min vs. 268.9 ± 86.8 min; P = 0.608). The average number of harvested lateral pelvic lymph nodes (LPNs) was 10.8 ± 6.4 in the MP group and 9.3 ± 4.4 in the SP group (P = 0.058). Pathologic LPN metastatic rates were comparable between the two groups (MP vs. SP, 0.2 ± 0.5 vs. 0.1 ± 0.3; P = 0.684). No complications related to urinary problems were observed in either group.
Conclusions: SP robotic TME with LPND showed its safety and comparative outcomes compared with MP robotic approach.

P548

Robotic Availability, Not Payor Status, Determines Access to Robotic Emergency Hernia Repair in California and Florida

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Introduction: Previous studies have demonstrated that access to robotic surgery is influenced by socioeconomic factors, including insurance status. We hypothesized that access to robotic repair for nonelective hernia repairs would differ between California, a Medicaid expansion state, and Florida, which has not adopted Medicaid expansion.
Methods: The 2021 California and Florida State Inpatient Databases were used to identify all emergent admissions with an ICD-10 Procedure Code for ventral or inguinal hernia repair. Elective procedures and those with concurrent unrelated abdominal procedures were excluded. Robotic use was identified with ICD-10 code. Demographics, Elixhauser Comorbidity Index, payer status, median income, and length of stay (LOS) were abstracted. Aggregation of institution data identified trauma centers and high volume robotic and emergency general surgery (EGS) centers. Multivariate logistic regression was used to investigate predictors of robotic hernia repair.
Results: There were 15,918 emergent hernia procedures of which 10.7% underwent robotic hernia repair: 14.2% in Florida and 7.5% in California. Accounting for patient- and institution-level factors, hernia surgeries in Florida were more likely to involve robotics (OR 1.36, CI 1.19—1.56, $p < 0.001$). Patients admitted to institutions with high robotic surgery and EGS volumes were more likely to undergo robotic repair while patients admitted to trauma centers were less likely. Patient insurance and income were not associated with robotic repair in either state. Robotic surgery in Florida was more likely to occur in high volume EGS centers (OR 16.4, $p < 0.001$) and less likely in Trauma centers (OR 0.18, $p < 0.001$) compared to California. Emergency hernia surgery admissions in Florida had a one day increased LOS compared to California (p = 0.003).

Robotics in Non-Elective Hernia Surgery

	California (n = 629)	Florida (n = 1070)	p-value
Medicare	**45.9%**	**40.5%**	**0.067**
Medicaid	**26.0%**	**10.7%**	**< 0.001**
Uninsured	**2.1%**	**10.5%**	**< 0.001**
Bottom Income Quartile	**24.4%**	**32.8%**	**< 0.001**
Trauma Center	**53.3%**	**21.7%**	**< 0.001**
EGS Center	**51.7%**	**94.5%**	**< 0.001**

Conclusion: In two large volume hernia surgery states with different Medicaid programs, access to robotic surgery for emergent hernia repairs is determined by institutional adoption of robotic surgery, not payer status. Florida appears to have greater market penetration of robotic surgery compared to California, which has increased access for all patients.

P549

Using Objective Performance Indicators to Assess Differences in Surgical Techniques During Robotic Proctectomy: Radiated vs Non-Radiated Patients

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Introduction: Despite the perception of increased procedure complexity in radiated patients, the absence of objective intra-operative data prevents a thorough understanding of differences in techniques required during such procedures. *Objective performance indicators (OPIs)*, machine-learning-enabled metrics derived from robotic systems data, provide objective information regarding surgeon finger, wrist and foot movements and robotic arm kinematics. In this study, we identified differences in OPIs during robotic proctectomy (RP) between rectal cancer patients who underwent preoperative radiation (XRT) and those who had surgery alone (NRT).

Methods: Endoscopic videos synchronized to robotic systems data were annotated to delineate individual surgical steps during 26 RPs. Ten patients underwent preoperative XRT, while 16 patients had surgery alone (NRT). OPIs during rectal mobilization and total mesorectal excision (TME) were analyzed. Comparisons were made using T-test/Wilcoxon Sum-Rank test for numerical covariates and Chi-square/Fisher's exact test for categorical covariates.

Results: XRT patients had lower tumors (median distance from anal verge 7.0 vs 15.0 cm; p = 0.003) and more advanced preoperative T stages (T3/T4, 100% vs 42.9%; p = 0.017) than NRT patients. TME quality was complete or near complete in 100% of both cohorts. In XRT patients, median distal margin (18.5 vs 39.0 mm; p = 0.019) and lymph node retrieval (13.5 vs 21; p = 0.002) were lower than in NRT patients. OPIs analyses revealed significant differences between XRT and NRT patients. XRT patients had the following step-specific OPI differences: during *rectal mobilization*, more step time, greater wrist roll, longer dominant and non-dominant arm path lengths, and greater dominant arm acceleration, non-dominant arm velocity and jerk; during *posterior TME*, greater energy activation time and dominant arm jerk, lower camera acceleration and jerk; during *anterior TME*, less dominant and non-dominant wrist roll and pitch, and lower dominant and non-dominant arm velocity and acceleration; during *right TME*, more energy activation time, less non-dominant wrist roll and acceleration; during *left TME*, lower step time, number of clutches, camera metrics (path length, moving time, velocity, acceleration, jerk), and wrist articulation, path length and moving time for dominant and non-dominant arms.

Conclusion: Using OPIs, we identified significant differences in surgeon techniques based on a single patient variable, preoperative radiation. It is the first study to identify step-specific OPIs that differ during RP in radiated rectal cancer patients. While our work demonstrates feasibility of utilizing OPIs to assess surgical complexity, further studies involving larger samples are needed.

Examples of differences in OPIs between XRT and NRT patients during pelvic dissection steps of robotic proctectomy

OPI	Step	XRT	NRT	p value
Step completion time [sec]	RM	172.15 [46.41 – 354.69]	77.07 [24.08 – 169.14]	**0.033**
Energy activation duration [sec]	PRD	2.50 [1.48 - 3.34]	2.01 [0.54 - 2.80]	**0.011**
Master clutch [n]	LRD	0 [0 – 2]	2 [0 – 5]	**0.025**
Camera path length [m]	LRD	0.02 [0 - 0.08]	0.07 [0.02 - 0.18]	**0.014**
Camera moving time [sec]	LRD	0.90 [0 - 3.33]	2.46 [0.78 - 7.43]	**0.010**
Dominant arm path length [m]	RM	3.70 [0.90 - 6.03]	1.43 [0.35 - 3.12]	**0.047**
Dominant arm velocity [m/sec]	ARD	0.06 [0.05 - 0.08]	0.08 [0.06 - 0.09]	**0.044**
Dominant arm acceleration [m/sec^2]	ARD	0.43 [0.32 - 0.60]	0.56 [0.43 - 0.65]	**0.010**
Dominant arm jerk [m/sec^3]	PRD	24.42 [19.89 - 30.21]	20.89 [16.99 - 29.06]	**0.033**
Primary non-dominant arm path length [m]	RM	1.96 [0.41 – 3.58]	0.64 [0.19 – 1.48]	**0.020**
Primary non-dominant arm velocity [m/sec]	RM	0.08 [0.07 - 0.10]	0.07 [0.04 - 0.08]	**0.002**
Primary non-dominant arm acceleration [m/sec^2]	RRD	0.31 [0.10 - 0.49]	0.38 [0.19 - 0.57]	**0.048**
Primary non-dominant arm jerk [m/sec^3]	RM	23.54 [18.25 - 27.02]	19.17 [12.92 - 24.65]	**0.022**
Dominant wrist roll [rad]	RM	44.87 [9.02 - 80.61]	15.84 [4.99 - 37.26]	**0.013**

All variables are presented as median with interquartile range
OPI = objective performance indicator, XRT = radiated, NRT = surgery alone, RM = rectal mobilization, PRD = posterior rectal dissection, LRD = left rectal dissection, ARD = anterior rectal dissection, RRD = right rectal dissection, sec = seconds, n = numbers, m = meters, rad = radians

P550

Impact of Transitioning to Xi On Robotic Learning Curves for Foregut Surgeries

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Introduction: Learning curves for new procedures is an important metric when it comes to surgeon's education, and can provide other surgeons a tentative extrapolated baseline for their own learning curve. This is often utilized in Robotic-assisted procedures. With introduction of the Xi System by Da Vinci, improved efficiencies from its Si counterpart led to shorter operating times. However, this upgrade's impact on learning curves has not been investigated for foregut procedures.

Methods: 85 patients who underwent robotic trans hiatal esophagectomies (RE) and 52 patients who underwent robotic heller myotomy (RHM) from 2014 to 2021 were included in this learning curve study. Both procedures were performed by the same surgeon at a high-volume tertiary community center. Robotic surgeries were transitioned to Xi at December of 2014. Cumulative sum analysis (CUSUM) of operating time generated each learning curves. The 3-phase surgical learning theory (phase I/learning, phase II/optimization, and phase III/mastery) was implemented when visually analyzing the CUSUM curve.

Results: For RHM, phase I completed at 5 cases and phase II completed at 18 cases, suggesting that true RHM mastery required 18 cases. For RE phase I completed at 18 cases, and phase II completed at 56 cases, suggesting that true RE mastery required 56 cases. Xi transition occurred in just before Phase II of the learning for both cases. Soon after Xi implementation, there was a sharp decrease in operating time for both surgeries for both RHM (linear trendline value of $y = -8.17 + 164.5$) and RE (linear trendline value of $y = -15.7 + 169.5$) potentially signaling mastery. However, upon continuation of the data, the operating time started to increase. This general uptrend continued until the 56th case where it began to decrease, followed by oscillation of the CUSUM curve, suggestive of mastery/phase III.

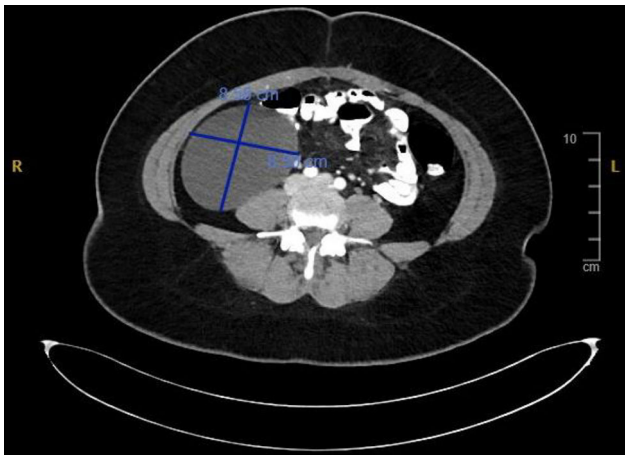
Conclusion: Transition from Si to Xi can lead to false assurance of a completed learning curve, especially for foregut procedures such as esophagectomies and heller myotomy. When establishing a CUSUM learning curves, it is crucial to gather enough data point to properly visualize the different phases of learning.

P551

Robot-assisted Laparoscopic Excision of Large Mesenteric Cyst of Mullerian Origin

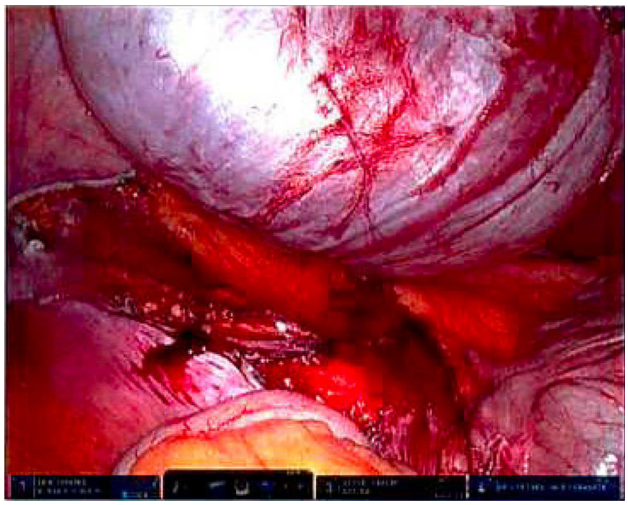
Shubham Bhatia, MD[1]; Bhakti Patel[2]; Jane Y Tian, MD[1]; Martine A Louis, MD[1]; Darshak Shah, MD[1]; [1]Flushing Hospital Medical Center, New York; [2]NYIT College Of Osteopathic Medicine

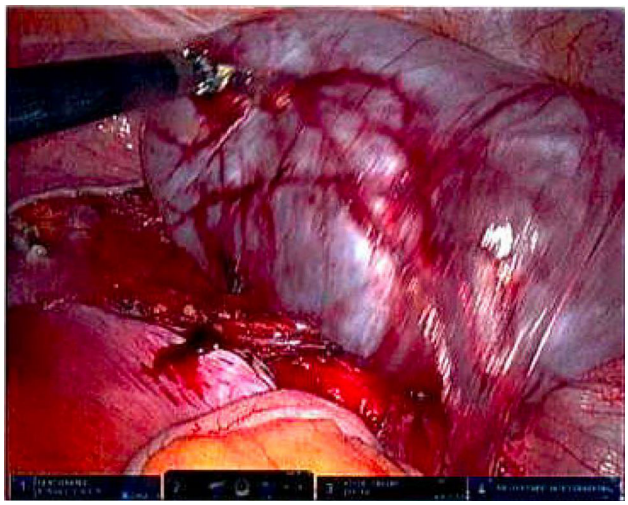
Introduction: Mesenteric cysts are rare, benign tumors of uncertain etiology presenting in 1/250,000 hospital admissions. Diagnosis is often difficult and treatment via resection is essential to avoid complications.
Case Presentation: A 29-year-old obese female presented to the ED with gradually worsening intermittent RUQ abdominal pain for one week without other associated symptoms. Patient had a history of irregular menstruation and no prior surgeries.
RUQ ultrasound showed no significant findings. A subsequent CT abdomen and pelvis revealed an 8.6 × 8.5x13.1 cm unilocular fluid density structure in the RLQ with no solid or enhancing component, distinct from appendix and right ovaries. Tumor markers LDH, AFP, CA19-9, CEA, and CA125 were within range.

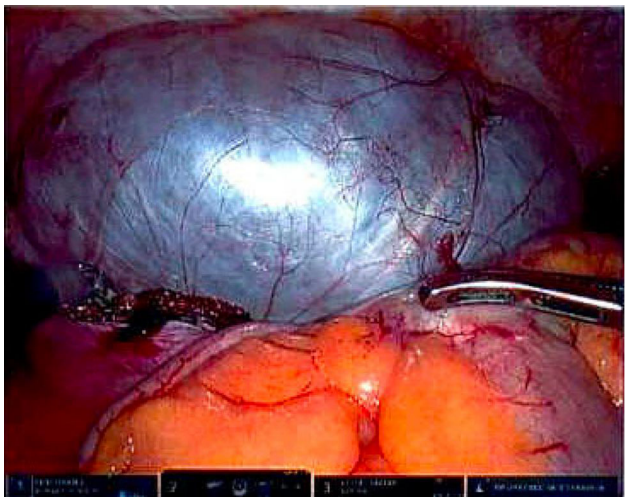




The patient underwent a robotic-assisted mesenteric cyst excision. The cyst was found in the RLQ area distinct from the right ovary, fallopian tube, cecum, and appendix. It was removed intact after blunt and sharp dissection and controlled aspiration of clear cystic fluid. Pathology results revealed a mesenteric cyst of Mullerian origin. Patient was discharged without complications.







Discussion: Mesenteric cysts are five times more common in children, with a female 2:1 to male ratio(4). They are often asymptomatic or present with nonspecific symptoms. Diagnosis may be missed even in large cysts. The most common symptom is abdominal pain, in 55-81% of patients. Abdominal tenderness can be located in a quadrant different from the cyst location Less common symptoms include a palpable mass, distention, nausea, vomiting, and diarrhea. Early diagnosis and treatment are critical to prevent complications, including infection, peritonitis from rupture, volvulus, bowel obstruction, obstructive uropathy, and transformation to malignancy in 3%

Complete excision with or without bowel resection through laparotomy is the most common approach. Marsupialization is a second-line approach Partial excision and drainage are associated with increased rates of recurrence with the latter showing increased mortality. Laparoscopic resection has increased in recent years as it is minimally invasive with a shorter hospital course, and less postoperative pain. It involves smaller more cosmetic-appealing scars, and infection risk, A 2020 series reported four successful laparoscopic mesenteric cyst excisions without recurrence.

Conclusion: Robotic assistance provides a less invasive avenue with increased precision and dexterity. As the technological advancements in robotics evolve, this approach may outpace non-robotic assisted laparoscopy for many procedures. This case further supports its use for excision of mesenteric cysts.

P552

Robot Log and its Potential for Autonomous Robotic Surgery and Skill Transfer

Munenori Uemura, PhD; Kiyoyuki Chinzei; Takeshi Urade; Nobuaki Yamasaki; Junichiro Hirata; Yasuyoshi Okamura; Kaito Nanchi; Tatsuya Hattori; Yuki Mitani; Yasuo Chihara; Seiichi Ozawa; Masato Fujisawa; Takumi Fukumoto; Kobe University

The advancement of robotically assisted surgical systems, also known as surgical robots, has been driven by rapid developments in artificial intelligence in recent years. Saeidi et al. reported an autonomous robotic system that could perform intestinal anastomosis in animal in vivo trials.

Current efforts to implement autonomy in robotic systems heavily depend on using data to learn. Such data can be classified into two types: video data and tool-tracking data.

Although video is a rich source of information for context analysis, it is prone to errors because of, for example, occlusion and saturation of illumination. Tool tracking enables quantitative analysis on a three-dimensional coordinate system. However, it requires the attachment of sensors to surgical instruments that hinder the collection of mass data in daily clinical practice.

Robot Log as a Source of Machine Learning

We propose another data source: the robot log acquired from robotically assisted surgical systems. Intuitive Surgical Inc. (Sunnyvale, USA) used the robot log from da Vinci Surgical systems to provide an assessment of, for example, a surgeon's skill. However, the robot log itself was not disclosed.

At Kobe University, we are quantitatively evaluating surgeons' surgical techniques by analyzing the robot log to visualize a surgeon's implicit skill and knowledge. The log data are generated by manipulating the hinotori™ Surgical Robot System, which was developed and commercialized by Medicaroid Corp. (Kobe, Japan). hinotori™ is a robotically assisted surgical system that reproduces a surgeon's precise hand movements, which is essential for surgery. A remarkable feature of hinotori™ is the Medicaroid Intelligent Network System (MINS™), a cloud system that stores and provides operating room data, including the robot log. MINS™ is an open platform that supports the operation of hinotori™, the safe and effective use of operating rooms, and the transfer of surgical skills.

Conclusion: We are aiming to establish technology for autonomous robotic surgery. We believe that we should focus on the value created by autonomous control, rather than the replacement of manual procedures, and implement new functions. Analyzing potential operation failures that frequently occur in robot-assisted surgery and developing a practical function that avoids such failures in the subconscious of the surgeon will lead to the realization of safe and secure surgery. We are also aware of the potential value of the robot log, in addition to associated Ethical, Legal, and Social Issues (ELSI).

P553

Remote Telepresence Versus In-Person Case Observations for Robotic Surgery Training Pathways

Andrea Pakula, MD, MPH[1]; Travis Trail[2]; Gretchen Jackson[3]; [1]Simi Valley Adventist Hospital; [2]Intuitive Surgical; [3]Intuitive Surgical & Vanderbilt University Medical Center

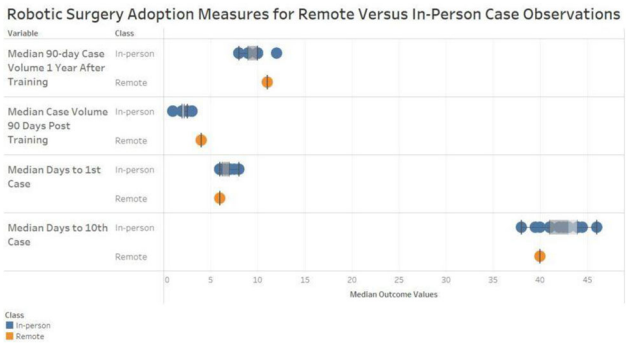
Introduction: "See One; Do One; Teach One" is a traditional paradigm for surgical training; robotic surgical training pathways incorporate case observations as a key step. The recent pandemic limited access to observing cases in-person, but telepresence technologies enabled remote case observations. The effectiveness of remote versus in-person case observations in supporting transition to practice is not known. We hypothesized that remote case observations were not inferior to in-person with respect to robotic surgery adoption.

Methods: This study compared robotic surgery adoption metrics in newly trained US robotic surgeons who did their first case observations remotely or in-person from 01/01/2017 to 03/31/2023. Surgeons who undertook both remote and in-person case observations were excluded. Surgeons in the remote cohort were matched with surgeons observing in person with the same surgical specialty, year of training, and geographic region. Since in-person greatly outnumbered remote case observations, the matching process randomly selected in-person surgeons from available exact matches. Remote and in-person groups were compared using the Wilcoxon signed rank test with median values for days to first and 10th cases, 90-day procedure volume post training, and 90-day procedure volume one year after training.

Outcome variable calculations used business days to exclude holidays and weekends.

Results: During the study period, 3492 surgeons participated in their first case observations, 364 remotely and 3128 in person. The initial matching process yielded 364 remote/in-person surgeon pairs, and 2764 unmatched surgeons. Both in-person and remote groups included 41 bariatric (11%), 33 colorectal (9%), 179 general (49%), 83 gynecologic (23%), and 28 thoracic (8%) surgeons. Median days to first procedure were 6.0 for remote and 7.0 for in-person surgeons; median days to 10th procedure were 40.0 for remote and 45.0 for in-person; median 90-day procedure volumes were 4.0 cases for remote, 2.0 cases for in-person; median cases in 90 days one year after training were 11.0 for remote, 9.5 for in person. Variances in case progression and volumes were large, so differences were not statistically significant. To enable fair representation of the larger in-person cohort, median outcome variables from 20 different randomly generated in-person groups are shown in boxplots in comparison with the remote group in Fig. 1.

Conclusions: Surgeons who participated in case observations remotely had similar or increased measures of robotic surgery adoption compared with surgeons who did case observations in-person. Telepresence technologies can expand access to case observations for robotic surgery training.



P554

Establishing Robotic General and Colorectal Surgery in a 3-Operating Room Community Hospital

Gregory Wu, MD; Sophie Lipson; Rebecca Hoffman; John Semian; Geisinger Medical Center

Introduction: The use of robotic procedures in general surgery has dramatically increased over the past decade and only continues to rise. However, access to robotic systems at community hospitals remains more limited. In the era of Covid-19 where operative volume is limited at larger/academic institutions, there has been an increasing interest in the transition of robotic surgery towards smaller institutions. This study sought to characterize patient demographics, outcomes and operative times of general surgery and colorectal robotic cases performed in a newly implemented robotic surgery program at a small rural community hospital.

Methods: We performed a retrospective review of the first year of robotic cases performed at a 3-OR/70-bed community hospital from April 2022 to April 2023. Inclusion criteria included cases in which at least one portion of the case was performed robotically. We employed descriptive statistics for patient characteristics, type of case, case duration, conversion to open, intraoperative complication, length of stay, 30-day readmission, and death. ANOVA analysis and Tukey post-hoc tests were used to compare average turnover times between robotic cases and the three possible case-types either prior to or following the robotic case: robotic, laparoscopic, and open.

Results: 97 general surgery cases and 21 colorectal surgery cases were identified. Average patient age was 58.65 years old, 100 were male and 18 were female. Average BMI was 28.91, and average ASA was 2.41. Average robotic case duration for general surgery was 108 min vs. 158 min for colorectal cases. Average length of stay was 0.13 days for general surgery cases vs. 3 days for colorectal. Four cases required conversion to open and two cases required readmission or transfer to a tertiary care facility for post-operative events. The average turnover time was 43.54 min. There was an overall significant difference in average turnover time among robot-robot, robot-laparoscopic and robot-open case transitions, with the lowest time in robot-laparoscopic case turnovers ($p < .05$).

Conclusion: Our findings demonstrate that implementing robotic surgery at smaller institutions is feasible and safe in terms of patient outcomes and can be efficiently utilized in the proper turnover arrangements. Introducing robot surgery to rural, community hospitals will improve access to care and technology to a larger subset of patients while also freeing up operative volume at higher acuity centers. There should be a consideration of increasing robotic systems to smaller facilities vs larger hospitals.

P555

Quality and Bias Assessment of Robotic General Surgery YouTube Videos

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Background: Although YouTube is used by patients and providers for self-education, the quality of content is variable. We hypothesized that robotic general surgery videos on YouTube would be poor quality and vary by procedure type.

Methods: Three robotic general surgery procedures were assessed for educational quality on YouTube: "Robotic Inguinal Hernia Repair", "Robotic Ventral Hernia Repair", and "Robotic Cholecystectomy". The top 20 videos for each procedure were scored using DISCERN criteria for education content. 15 criteria were scored to generate a total DISCERN score (DS), which was further categorized as very poor(15-26), poor(27-38), fair(39-50), very good(51-62), or excellent(63-75). We also performed a multivariable analysis of DISCERN score, which adjusted for video length, number of views, and procedure type.

Results: The top 20 videos for robotic cholecystectomy had the most views(13,913,717) and robotic ventral hernia repair had the fewest views(1,502,569). All procedure types were associated with "poor" DS scores: robotic inguinal hernia repair(33.4), robotic ventral hernia repair(29.3), and robotic cholecystectomy(27.5). DS did not vary between the groups($p = 0.054$). Bias score were poor and did not vary between procedure types($p = 0.348$). In a multivariate model of DS adjusted for video length and views, there was no relationship between procedure type and DS.

Conclusions: YouTube content pertaining to robotic general surgery deliver poor educational information to patients and are frequently biased. Despite these findings, the top videos have been streamed over 22,000,000 times. There is an opportunity to improve educational value of YouTube content, which could enhance robotic general surgery education for patients prior to undergoing these common procedures.

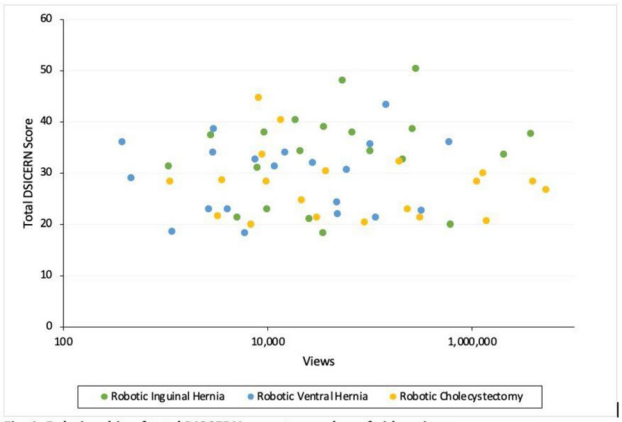


Fig. 1. Relationship of total DISCERN score to number of video views

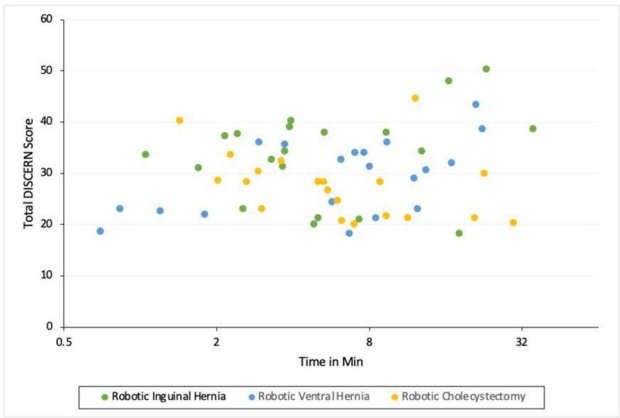


Fig. 2. Relationship of total DISCERN score to video length (in minutes)

Table 1: Summary of Results by Procedure Type

Procedure type	Avg duration	Avg views	Discern score (median + IQR)	Discern score (mean)	Bias score (Median + IQR)	Bias score (Mean)
Robotic Inguinal Hernia	08:19	378,799	34.333 (27 – 38.333)	33.417	1.333 (1-1.333)	1.417
Robotic Ventral Hernia	08:25	75,128	31 (22.833 – 34.833	29.333	1.667 (1.333 – 2)	1.783
Robotic Cholecystectomy	08:24	695,686	28.333 (21.5 – 30.167)	27.65	1.5 (1-2)	1.683

Table 2: Multivariable Analysis of DISCERN Score with Procedure Count and Video Characteristics

	Coefficient	P>|t|	95% Conf. Interval
Time (minutes)	.293516	0.143	(-.0674841 - .4545162)
Views	2994.453	0.905	(-47104.16 - 53093.06)
Procedure type			
Robotic Inguinal Hernia Repair	-326337.8	0.388	(-1077529 - 424853.9)
Robotic Cholecystectomy	ref	ref	
Robotic Ventral Hernia Repair	-628564.8	0.053	(-1266177 - 9047.829)

P556

Learning Curve of Robotic-Assisted Transabdominal Preperitoneal Inguinal Hernia Repair: CUSUM Analysis of Single Surgeon's Experience

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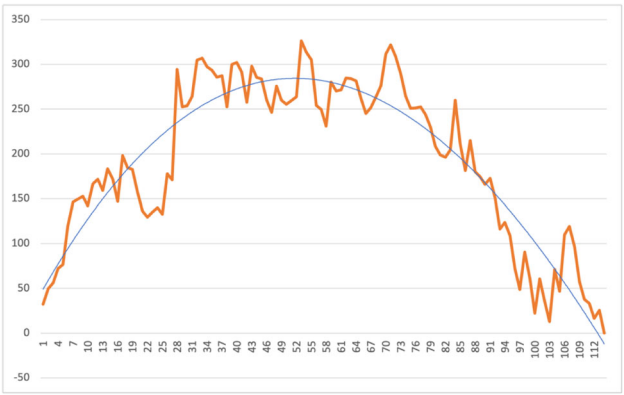
Background: The robotic-assisted transabdominal preperitoneal (r-TAPP) inguinal hernia repair (IHR) gained popularity among general surgeons for shorter recovery and ergonomics. However, very few existing studies evaluated the learning curve of r-TAPP IHR, and no consensus has been reached on how this technique should be taught to novices based on clinical outcomes and operative time. The aim of this study is to investigate the safety and efficacy of r-TAPP IHR in the early phase of the learning curve using a cumulative sum (CUSUM) analysis.

Methods: This is a retrospective cohort study (IRB#: EH23-058) of patients who consecutively underwent r-TAPP IHR by a single surgeon from August 2020 to July 2023. After accounting for the bilateral and complexity (recurrent hernia, previous prostatectomy, scrotal hernia, and incarceration) status of the procedures, a CUSUM analysis based on skin-to-skin time was performed to evaluate the clinical outcomes of early and late phases.

Results: A total of 111 patients underwent r-TAPP IHR. The mean age was 54.4 ± 17.6 years, 26.6 ± 5.2 kg/m2 body mass index (BMI), 98.2% male. Skin-to-skin time was stratified based on unilateral non-complex (68.0 ± 19.1 min, n = 51), unilateral complex (90.4 ± 30.1 min, n = 43), bilateral non-complex (95.7 ± 41.0 min, n = 3), and bilateral complex (118.5 ± 30.4 min, n = 14). The peak point of r-TAPP based on CUSUM analysis was 50 (Fig. 1), near the CUSUM inflection point of 46 [Skin-to-skin time = 0.0001(case number3)—0.0992(case number2) + 8.4957(case number) + 65.3]. No statistical difference in the baseline characteristics (age, sex, ASA score, and BMI) was observed between the early (Cases: 1-50) and late phases (Cases: 51-111). The mean operative time of the early and late phases was 88.2 ± 29.2 min and 80.2 ± 31.6 min (p = 0.173). Compared to the early phase, the late phase had more favorable estimated intraoperative blood loss (early phase: 23.4 ± 15.3 mL; late phase: 11.9 ± 6.9 mL; $p < 0.001$). Conversely, our study demonstrated no statistical difference in the 30-day complication rate (early phase: 24.4%, n = 11; late phase:12.3%, n = 7; p = 0.110) between the two groups. There were no 30-day post-operative recurrence or mortality.

Conclusion: Based on the CUSUM analysis, our study demonstrated the operative time, estimated intraoperative blood loss and 30-day complication rates slowly improved after 50 cases. Despite the promising outcomes, further studies should include multiple surgeons with various surgical knowledge and experiences to evaluate the learning curve of r-TAPP IHR.

Figure 1 CUSUM analysis of r-TAPP IHR



P558

Surgeon and Administrator Attitudes towards Surgical Video Management

Christopher G DuCoin, MD, MPH, FACS[1]; Pinja Haikka, PhD[2]; Roma Vichhi, MSc[2]; Carole Addis, PhD[2]; [1]University of South Florida; [2]Medtronic

Introduction: Attitudes and current usage of surgical video recording and management were gathered from a survey of surgeons and surgical administrators. Recent technologies offer improvements to the management of surgical video footage, potentially freeing up hours of surgeons' time per month.
Methods: 201 surgeons and 102 surgical administrators completed an online survey to determine their current recording practices and attitudes towards a recording and video analytics solution.
Results: 80% (N = 82) of administrators work in a facility where videos are recorded and 62% (N = 125) of the surgeons record their cases. Surgeons estimate recording 31.5% / 50% of their laparoscopic / robotic cases, while administrators estimate that 50% of both laparoscopic and robotic cases are recorded in their facility. The main reason for recording surgical videos is for teaching purposes (N = 98; 78% of surgeons and N = 62; 76% of administrators). For surgeons, other major reasons are self-reflection (N = 76; 61%) and conferences (N = 71; 57%), while administrators believe other major reasons for their surgeons to record to be supporting quality improvement at their hospital (N = 56; 68%) and protection against of medico-legal challenges (N = 53; 65%).
83% (N = 252) of all respondents find the presented video recording solution appealing (N = 93; 91% for administrators and N = 159; 79% for surgeons) and 90% (N = 186) of respondents who currently record their cases believe it would make recording easier than their current solution (N = 73; 89% for administrators and N = 113; 90% for surgeons).
94% (N = 193) of respondents who currently record believe that the proposed video recording solution would save them time in managing videos (N = 77; 94% for administrators and N = 116; 93% for surgeons). Most respondents (N = 74; 36%) estimate saving 5-15 min per video on tasks like uploading laparoscopic footage to a computer, finding sections of interest, editing the video, and sharing it with others. Currently, most surgeons (N = 42; 34%) estimate spending 30 + minutes per video on these tasks while most admins (N = 36; 44%) believe their surgeons spend 15-30 min per video. On a monthly basis, surgeons spend on average of 176 min working on videos and estimate that the proposed solution could save them up to 120 min.
Conclusions: Equipment for surgical video recording is widely available for surgeons, who record between a third to a half of their cases, mostly for educational purposes. Managing surgical videos using novel solutions like the one presented here could bring considerable timesaving to surgeons and be a step forward in enabling video derived surgical insights and analytics.

P559

Suturing with Senhance® Surgical System: An Analysis Showing the Benefit of Articulating Instruments

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Objective: The study evaluates the Senhance® Surgical System's articulating needle driver, a robotic-assisted laparoscopic instrument with additional degrees of freedom compared to the Senhance® straight needle driver.
Methods: An experienced general surgeon with prior knowledge of Senhance® straight needle driver (STR) and Senhance® articulating needle driver (ART) received 20 h of intensive training on both instruments. Training involved knot-tying, running suturing, needle control, and quadrant suturing. Time and accuracy were measured for knot-tying and suturing tasks. Needle control involved suturing at different angle planes (30°, 60°, 90°), with actions and time recorded. A quadrant suture task was performed using a circular pad with ten quadrants.
Results: In knot-tying, there were no significant differences between groups. In horizontal running suturing, the ART was significantly faster. In needle control, the ART need less time and less actions on 30° angle plane. In the quadrant suture task, the STR faced difficulties at the fifth and tenth quadrants, while the ART allowed successful completion in six attempts.
Conclusions: The ART excels in horizontal running suturing and 30° plane horizontal needle control, offering advantages in challenging suturing angles. Its design reduces the need for needle repositioning, improving efficiency. With two extra degrees of freedom, it enhances needle handling and positioning, particularly beneficial for reconstructive techniques.

Table 1 Results of Running suturing task and needle control task

		Straight needle driver	Articulating needle driver	*p* Value
Running suturing Horizontal	Times (s)	409.4 ± 102.7	292.3 ± 76.1	**0.0124**
Needle control Horizontal 30°	Times (s)	95.2 ± 50.1	51.4 ± 7.3	**0.0357**
Needle control Horizontal 30°	Actions (n)	2.0 ± 0.0	1.0 ± 0.0	**0.0179**

Image 1 Tips of Senhance® straight needle driver(STR) and Senhance® articulating needle driver(ART)

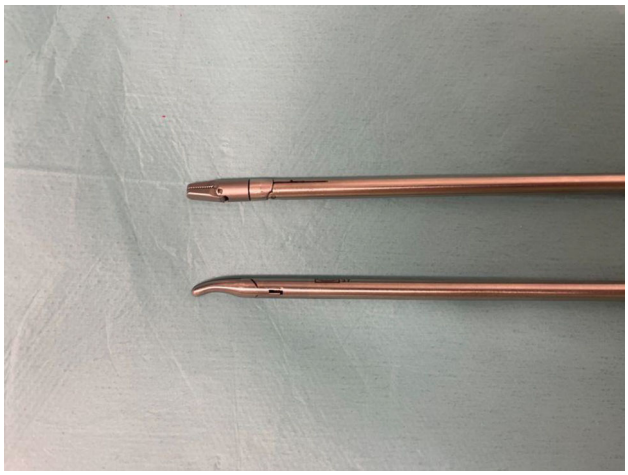


Image 2 Setup of suture task of Senhance® manipulator arms and cockpit

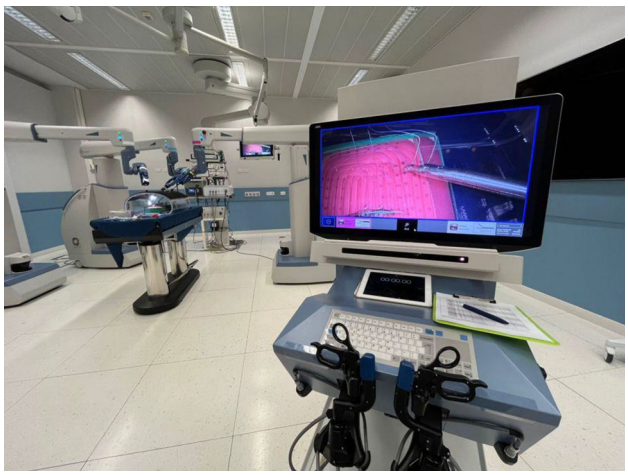
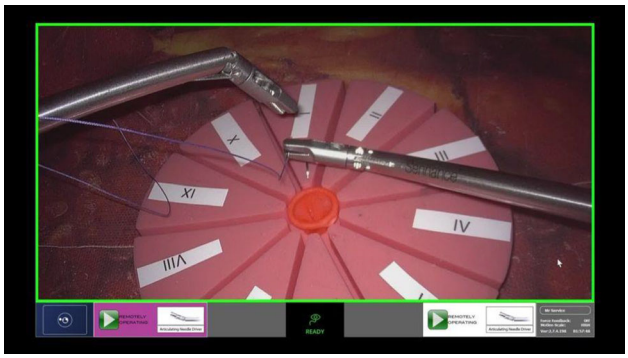


Image 3 Suture and tying with articulating needle holder in horizontal direction



Image 4 Quadrant suturing with Articulating needle driver



P560

Differences Between Faculty and Residents' Performance Evaluations: Robotic vs. Nonrobotic

Theresa N Wang, MD; Michael P Meara, MD; Michael R Go, MD; Kayla Diaz, MCR; Heider Pieper, MHA; E Christopher Ellison, MD; Xiaodong (Phoenix) Chen, PhD; The Ohio State University

Introduction: Evaluation of operative performance and entrustment is imperative for resident learning and development of surgical competency. Robotic-assisted surgery (RAS) is increasingly incorporated in General Surgery training curricula. We aimed to investigate potential differences in faculty and resident evaluations of intraoperative learning, surgical skill, autonomy, and entrustment in RAS when compared to open and laparoscopic surgeries (OLS).
Methods: We retrospectively extracted Surgical Entrustable Professional Activities (SEPA) evaluations of RAS and OLS cases from 3 procedures: cholecystectomy (Ch), inguinal hernia repair (IH), and ventral hernia repair (VH) performed by chief residents during 2020-2022. Both faculty and residents completed a SEPA evaluation for each case. Descriptive statistics and analysis of variance were performed with $p < 0.05$ considered statistically significant. Effect size Cohen's $d > 0.80$ is considered large effect.
Results: 84 cases were included, of which 56 (67%) were RAS (Ch 19, IH 27, VH 10) and 28 (33%) were OLS (Ch 12, IH 8, VH 8). On average, chiefs graded their learning, surgical skills, autonomy, and entrustment higher in OLS cases than in RAS cases (Fig. 1), particularly in self-assessed prospective entrustment ($4.15 > 3.46$, $p = 0.004$). When compared to faculty ratings, most (5/6) median scores of resident self-assessed RAS measures were lower (variance > 1) versus 2/6 in OLS. Two RAS measures showed large effect statistically significant differences: overall technical performance ($p < 0.0001$, $d = 1.01$) and prospective entrustment ($p = 0.001$, $d = 0.82$), followed by "achieved the learning goal" ($p = 0.003$, $d = 0.78$). In OLS, only "overall technical performance" demonstrated a large effect significant difference ($p = 0.0001$, $d = 1.14$). The heterogeneity of variance test suggested that rater variability did not contribute to average group variance between RAS and OLS.

Conclusion: Our study suggests that faculty and resident evaluations of operative performance and entrustment have more score discordance in RAS than in OLS cases. Clarification of performance benchmarks for both faculty and residents, particularly in RAS, may improve evaluation score concordance. Better understanding of performance benchmarks may allow both faculty and residents to consolidate the next steps towards proficiency. Future study is needed to further explore additional factors that lead to such differences in evaluations.

Fig. 1 Differences between Attending Surgeon Evaluation and Resident Self-Assessment in RAS and OLS

Measure*	RAS				OLS			
	Attending Mean	Resident Mean	P value	Cohen's d	Attending Mean	Resident Mean	P value	Cohen's d
Learning								
Learning Goal	4.41	4.45	0.7660	0.06	4.64	4.69	0.8357	0.06
Achieved Learning Goal	4.70	4.22	0.0003	0.78	4.68	4.35	0.1667	0.39
Surgical Skill								
Overall Technical Performance	4.41	3.67	<0.0001	1.01	4.65	3.88	0.0001	1.14
General Skill	4.30	3.88	0.0036	0.61	4.60	4.08	0.0148	0.70
Autonomy								
Overall Autonomy	4.18	3.58	0.0020	0.65	4.30	3.85	0.1502	0.41
Entrustment								
Prospective Entrustment^	4.14	3.46	0.0001	0.82	4.42	4.15	0.228	0.34

Note: * 5-point Likert Scale: 5 = Best performance or Most autonomy; 1=Worst performance or Least autonomy. ^ "Prospective Entrustment": 5 = Able to teach junior/medical student; 4 = Able to lead the case; 3 = Passive Guidance is needed to perform the case.

P561

Robotic-Assisted Sugarbaker Parastomal Hernia Repair in a Morbid Obesity Patient

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Robotic surgery has recently gained increased utilization in various surgical specialties. Specifically, the advantages of robotic surgery are particularly evident in cases that pose challenges for conventional laparoscopic procedures, such as those involving patients with high BMIs. In this report, we present a successful care of robotic-assisted parastomal hernia repair utilizing the Sugarbaker technique in a morbidly obese patient. The patient was a 47-year-old female with a BMI of 44.8 and a history of subtotal colectomy with end ileostomy for colonic inertia in 2021. She developed a large parastomal hernia thought secondary to her morbid obesity and smoking habits. While her hernia could be manually reduced, she complained of occasional obstructive-like symptoms, thus leading to the decision for surgical intervention. During the operation, the incarcerated small intestine was cautiously reduced, and after primary fascial repair, a mesh was placed utilizing the Sugarbaker method with excellent visualization. The patient was discharged home on the same day, and her post-operative recovery has been exceptional.

Keyhole and Sugarbaker mesh techniques are the two most commonly employed surgical approaches for parastomal hernias, with a growing preference for laparoscopic minimally invasive techniques over open approaches. Although the Sugarbaker approach is recommended due to its lower recurrent rate when compared to the Keyhole approach, the closure of fascial defects in morbidly obese patients poses technical challenges in conventional laparoscopic surgery. Robotic-assisted Sugarbaker parastomal hernia repair is recommended for patients with severe obesity as it enables a more precise and safer surgical procedure, offers enhanced visualization, and potentially reduces recurrence and complication rates.

In conclusion, this case highlights the successful application of robotic-assisted surgery in a morbidly obese patient undergoing Sugarbaker parastomal hernia repair. Robotic technology offers distinct advantages in managing complex cases, particularly in the presence of obesity-related challenges. Further studies and experiences will contribute to establishing robotic-assisted techniques as the preferred approach for parastomal hernias, especially in patients marked obesity.

P562

Changes in Objective Performance Indicators Are Associated with Experience in Robotic Inguinal Hernia Repair

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Introduction: Evaluating surgeon performance in robotic inguinal hernia repair (RIHR) is a challenge, especially for the surgeon who adopts robotic surgery after residency. The advent of objective performance indicators (OPI) has introduced a potentially transformative assessment of technical skill. OPI data for RIHR and its association with patient outcomes is emerging. Our study investigates changes in OPI during RIHR in an experienced laparoscopic surgeon's learning curve.

Methods: We collected video, system event, and kinematic data streams of a single surgeon's RIHR cases with the DaVinci XI platform utilizing Intuitive Data Recorder over a two-year period. Videos were segmented into surgical steps by professional annotators, and OPIs were calculated for each step. Initial review of 38 bilateral IHR procedures ($\sim$ 160-205th career RIHR) were analyzed for step-specific changes in OPIs over time. A Pearson test was performed to evaluate correlations between OPIs and a surgeon's RIHR cases.

Preliminary Results: Multiple OPIs were associated with surgeon experience. Specifically, in the task of creation of peritoneal incision (CPI), 17 OPIs exhibited significant correlations with surgeon case volume. The total angular motion distance in the left-sided CPI in the dominant instrument arm demonstrated a negative correlation of -0.602 (95% CI -0.825, -0.218) with the total case count. Similarly, the total angular motion distance in the right-sided CPI in the dominant arm also exhibited a negative correlation of -0.676 (95% CI -0.861, -0.333) with case numbers. Furthermore, the task duration was closely approximated by the active time of the robotic system during the operation, which exhibited a negative correlation of -0.542 (95% CI -0.785, 0.157) with the total case count. More specifically, the active time of the dominant and non-dominant instrument arms demonstrated significant negative correlations of -0.580 and -0.592, respectively. Interestingly, the active time of the camera increased over time, indicated by a positive correlation of 0.449 (95% CI 0.022, 0.738) with case numbers.

Conclusion: This study is the first to assess OPI changes over time in general surgery. Although the data captured was from an experienced laparoscopic surgeon with robotic experience (over 100 RIHRs), significant OPI differences were identified, potentially uncovering a refinement phase of mastery not otherwise observable with traditional assessments. Together, this study provides the proof of concept for OPIs to be utilized to optimize surgical training through learning curve tracking and objective evaluations of skills.

P563

Robotic Surgery's Economic Edge in a Safety Net Hospital: Direct Cost Analysis

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Introduction: The adoption of robotic-assisted surgery has seen a surge over the past decade, driven by its promise for greater surgical precision and potentially improved patient outcomes. However, since the inception of robotic-assisted surgery, its cost-effectiveness remains a subject of debate. This study aims to compare the direct costs of robotic-assisted and laparoscopic approaches in hernia and bariatric surgeries. By doing so, it seeks to clarify the economic viability of robotic surgery.
Methods: We conducted a comprehensive cost analysis by comparing the direct costs of laparoscopic and robotic-assisted surgical procedures, specifically focusing on hernia and bariatric surgeries. Procedures included laparoscopic Gastric Sleeve vs. Robotic Gastric Sleeve, Laparoscopic Roux-en-Y Gastric Bypass (RYGB) vs. Robotic Roux-en-Y Gastric Bypass (RYBG), Laparoscopic Totally Extraperitoneal (TEP) Inguinal Hernia Repair vs. Robotic Transabdominal Preperitoneal (TAPP) Inguinal Hernia Repair, Laparoscopic Intraperitoneal Onlay Mesh (IPOM) Hernia Repair vs. Robotic IPOM Hernia Repair, and Laparoscopic IPOM Hernia Repair vs. Robotic Preperitoneal Ventral Hernia Repair.
Results: Our findings reveal significant cost savings associated with robotic-assisted surgery in several key procedures. In the case of the Gastric Sleeve, a robotic approach resulted in $309.16 in savings per procedure. For Roux-en-Y Gastric Bypass, the robotic method saved an average of $2635.61. Robotic Inguinal Hernia Repair yielded a saving of $629.28 compared to the laparoscopic method. For ventral hernias, a laparoscopic IPOM Hernia Repair vs. Robotic IPOM Hernia Repair exhibited a cost differential of $65.91, favoring the laparoscopic technique. However, but this does not account for an overnight hospital stay required for pain control, unlike its robotic counterpart which is typically an outpatient procedure.
Conclusions: Our study unveils a paradigm shift in surgical economics. Robotic-assisted surgery demonstrates substantial direct cost savings compared to laparoscopic procedures Our findings challenge the notion that robotic surgery is inherently more expensive and runs counter to existing literature. This study highlights cost-effective aspects of robotic surgery which is particularly important in a safety net hospital where resource allocation is paramount. We hope this research contributes to informed decision-making and encourages further exploration of robotic surgery's role in achieving both financial efficiency and improved patient outcomes.

P565

Supply and Demand: A Study on Streaming Solutions for the OR

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Introduction: In this study we investigate the real-life usage of live streaming in surgical ORs (Operating Room). Live streaming of surgery may be controversial, particularly when utilized in conferences and meetings, but is also considered to have high educational value. This study provides the current landscape for streaming on surgical video footage.
Methods: 201 surgeons and 102 surgical administrators completed an online survey to determine their current attitudes towards and usage of live streaming in the OR.
Results: 43% (N = 131) of all respondents work in a facility equipped with live streaming technology. However, only 53% (N = 70) of these users currently use the streaming technology. All users that do use the technology stream to participants within their own hospital and less than half stream to participants outside their hospital (N = 28; 40%).
Respondents with current or past streaming experience (N = 112) reported the top-3 uses of streaming to be teaching purposes (N = 44; 39%), conferences (N = 37; 33%), and requesting second opinions from colleagues (N = 36; 32%). Among respondents who have been in their position for less than 10 years, streaming for a second opinion is most common.

59% (N = 180) of respondents would recommend their hospital to acquire a live streaming solution. Respondents are more likely to recommend if they hold an administrative role (71% would recommend) or if they work in a teaching hospital (66% would recommend). Respondents who record their surgical video are also more likely to recommend (65% would recommend).
Conclusions: Whilst live streaming is becoming more common place in hospitals, this survey indicates an increasing yet unfulfilled demand for streaming technology. Streaming technology is available to less than half of the surveyed users, and among those a little over half currently use the service. However, almost 60% of respondents would recommend their hospital to acquire streaming technology, pointing to a significant gap in the market for surgical video streaming solutions.

P566

Case Report: Combined Robotic Gastrectomy and Low Anterior Resection for Two Synchronous Primary Cancers

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Introduction: Robotic surgery, with its enhanced visualization and intracorporeal ergonomics, has advanced both minimally invasive techniques and oncologic resection approaches.
Methods and Procedures: A 76-year-old man presented with a 2.7 cm gastric antral adenocarcinoma cT2N0 and 3.5 cm upper rectal adenocarcinoma. Staging showed no evidence of distant metastasis for either primary cancer. Genetic evaluation revealed no clinically significant mutations. A multidisciplinary discussion recommended upfront robotic distal gastrectomy combined with low anterior resection. During surgery (Fig. 1), 4 robotic ports (R1—R4) and 2 assistant ports (A1, A2) were placed. The low anterior resection was performed first in a steep Trendelenburg position, with the robotic boom facing the pelvis. After utilization of a 25 mm EEA stapler for the colorectal anastomosis, the lower midline assistant port (A2) was widened to 3 cm to allow for extraction of the specimen. This lower midline incision was then capped with a Gelpoint Mini port to continue robotic surgery. For the gastrectomy, the patient was positioned in reverse Trendelenburg with robotic boom now facing the epigastrium. We switched left upper assistant port (Airseal [A1]) with an 8 mm robotic port (R4) without need for any new incision or port.

After an oncologic distal gastrectomy with modified D2 lymphadenectomy, the specimen was removed via the Gelpoint Mini port, without losing insufflation, prior to reconstruction with Billroth-II anastomosis.
Pathology revealed a 3 cm gastric adenocarcinoma (pT1aN0) and a 2.7 cm upper rectal adenocarcinoma (pT3N1b) with negative margins and adequate lymphadenectomy. HER2 was negative and microsatellite stable. Patient was discharged home on postoperative day 5 without complication and with good wound healing (Fig. 2).
Conclusions: Combined robotic oncologic resection is safe and feasible, even among our complex geriatric cancer patients with synchronous cancers. Having multidisciplinary discussion with thoughtful preoperative planning and port placement are keys to successful surgical treatment of both cancers, allowing for earlier adjuvant therapy.

Figure 1. Port Placement (Taken After Low Anterior Resection and Before Gastrectomy)

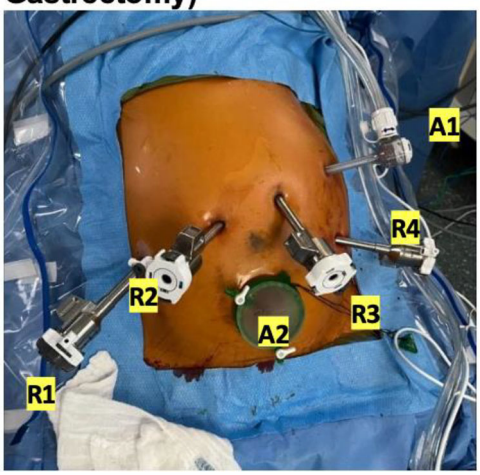


Figure 2. Surgical Wound (Taken On Postoperative Day 24)



P567

Acute Care Robotic Colorectal Surgery, A Safe Approach

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Introduction: Robotic colorectal surgery (CRS) may be feasible in the acute setting for certain patients. Robotic CRS has become widely adopted for patients in the elective setting. Technologic advances have allowed for improved dexterity and tissue handling subsequently associated with beneficial impacts on perioperative outcomes. However, there have been few studies evaluating robotic surgery's role in the acute care setting, particularly in CRS patients. We sought to evaluate the results of patients that were treated at our institution in an acute manner and compare them to patient's undergoing elective CRS.
Methods and Procedures: We performed a retrospective review on cases performed at our institution on the Da Vinci Xi System from February 2019 to July 2023. We categorized the cases into acute versus elective cases and then compared the patient demographics and perioperative outcomes. Acute cases were defined as being performed within the first 24 h of a patient's care.
Results: 804 total patients were identified within the study period, 728 elective and 76 acute cases. The mean hospital stay was longer in the acute surgery cohort, 2.6 days as compared to 1.35 days in the elective surgery cohort ($p = 0001$). On average bowel function returned sooner after elective cases 0.79 days vs 1.15 day in patient's undergoing acute CRS ($p = 0.0001$). Complication rate was higher in acute (9.2%) vs elective cases (3%, $p = 0.022$), and readmissions occurred more frequently in acute (13.2%) vs elective cases (7.3%) but non-significantly ($p = 0.07$). Not unexpectedly, the proportion of patients whose diagnosis was classified as malignant was statistically greater in the acute care cohort (72% vs 50%, $p < 0.0001$). Operative time was similar between the two groups at 165 min vs 169 min OR time ($p = 0.90$) and 110 min vs 100 min for the elective vs acute cases ($p = 0.24$). Finally, the ASA classification was higher in the acute CRS group (2.66 vs 2.47, $p < 0.0001$).
Conclusions: Patient's undergoing acute CRS are frequently more ill, have a higher likelihood of malignancy, and experience somewhat longer hospitalizations and slower return of bowel function. However, it's clear that overall perioperative outcomes suggest use of acute CRS is safe and feasible with acceptable complication and readmission rates.

P568

Learning Curve in Single-Port Robotic Rectal Cancer Surgery: A Single Surgeon's Experience with 117 Consecutive Cases

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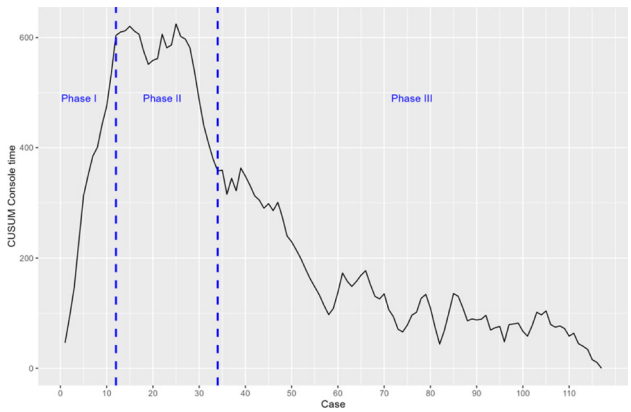
Introduction: The objective of this study is to delineate the learning curve associated with single-port robotic rectal cancer surgery.
Methods and Procedures: Data were collected from patients who underwent single-port robotic rectal cancer surgery performed by a single surgeon between July 2020 and July 2023. Out of 175 patients who underwent rectal cancer surgery using a single-port robot, we focused on 118 consecutive patients who received sphincter-preserving total mesorectal excision (TME) without multivisceral resection. The learning curve was assessed using the Cumulative Sum

(CUSUM) methodology, evaluating variations in total operative and console times across the sequence of cases.

Results: The analysis of single-port robotic TME revealed distinct operative and console times, which were categorized into three phases: Phase I (Learning Period, cases 1-12), Phase II (Proficiency Period, cases 13-33), and Phase III (Mastery Period, cases 34-117). As the surgeon progressed through these phases, there was a significant reduction in total operative time, console time, and estimated blood loss.

Conclusions: The CUSUM analysis identifies three distinct phases in the learning curve for single-port robotic TME. For surgeons with prior experience in robotic surgery, proficiency in single-port robotic rectal cancer surgery is estimated to be attained after 12 cases.





P569

The Learning Curve of a Novel Robotic System in Colectomy Procedures: Outcomes from a Single Surgeon

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Introduction: We previously reported the perioperative safety and efficacy of a novel miniaturized Robotic Assisted Surgery Device (mRASD) used to perform right and left colon resections in a multicenter, investigational device exemption (IDE) study. The aim of this analysis is to explore the learning curve of a single surgeon's initial experience with this transformationally different soft tissue surgical robot (MIRA by Virtual Incision) in which the motorized robotic arms and integrated camera triangulate internally, as opposed to externally in mainframe surgical robots.

Methods and Procedures: We retrospectively reviewed the consecutive cases by the senior author from August 2021 to November 2022. Unique performance characteristics and metrics for each case, which were recorded and captured automatically by the mRASD system, were evaluated. System data metrics included: Console Time, Robotic Workspace, Clutch Reminder (maintenance of controllers in optimal workspace), Instrument Cycle (frequency of open/closing of instruments), and Instruments in View (maintaining visualization of the instruments). Linear regression and analysis of variance were used to evaluate performance metrics.

Results: A total of 15 consecutive patients underwent a robotic colectomy (7 left and 8 right) with the miniaturized robotic system for the following conditions: 46.7% polyps, 40% cancer, and 13.3% diverticulitis. Mean operating time was 127.8 ± 42.3 min for right colectomies and 141 ± 28.35 min for left colectomies. Relationships observed between case number and operating time, Clutch Reminder, Average Instrument Cycle, and Instruments in View metrics differed slightly for left and right procedures. Graphs of trend/correlation of metrics over time for consecutive cases could not demonstrate a clear learning curve.

Conclusions: Surgical learning curves are measured as a change in operative variables (which can be considered a surrogate for surgeon performance) over a series of procedures. In this small series, we confirmed relevant parameters that may assess robotic skills and surgeon performance, however, a typical learning curve, exhibiting improvements in those metrics followed by a plateau over time, could not be observed. A greater number of uniform cases is likely required over a multitude of surgeons with variable degrees of experience to evolve our understanding of the learning curve and discriminate relative importance of specific parameters to operative efficiency. The lack of a learning curve in this series may also be indicative of the notion that the adoption of the novel miniaturized surgical robot is seamless for high volume, experienced robotic colorectal surgeons.

P570

Warm Climate Is Not Associated with Increased Wound Infection Rate in Patients Undergoing Minimally Invasive Surgery

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Introduction: For open operations, a seasonal variation in the incidence of surgical site infection occurrences has been shown, with increasing infection rates occurring during warmer months. For minimally invasive surgery (MIS), this association has not yet been studied.

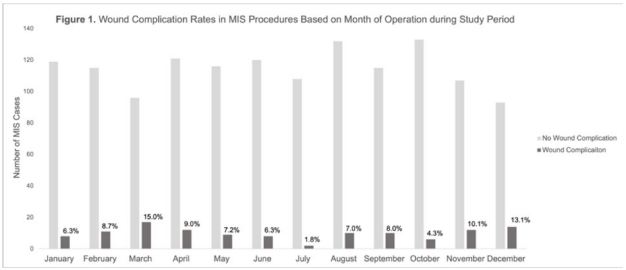
Methods: We conducted a retrospective cohort study of adult patients undergoing minimally invasive surgery from 2006-2021. Using CPT codes, we identified patients undergoing MIS approach to inguinal hernia repair (IHR), ventral hernia repair (VHR), small bowel resection (SBR) or appendectomy, colonic resection with primary anastomosis, colonic resection with ostomy formation (ostomy), or colonic resection combined with abdominoperineal resection (APR)

within our institutional ACS-NSQIP data. Patient home county was then used to link to social vulnerability index (SVI) and average ambient temperature during the month of their surgery. We then analyzed the following surgical outcomes: length-of-stay (LOS), complication rate (any, wound or pulmonary), and readmission. Statistical analysis included chi-square tests, Kruskal Wallis rank sum, as well as logistical regression modeling.

Results: We linked 1495 MIS operations to temperature data from 4 states during the study period. The majority were colonic resection with anastomosis (60.3%), 12.3% ostomy, 12.1% APR, 5.7% SBR or appendectomy, 5.4% IHR, and 4.3% VHR. The majority of patients were female (52.6%), though this was only true for three of the procedural categories: VHR (65.6% women), and colonic resection with ostomy and with primary anastomosis (55.4% and 56.7%, respectively). The majority of patients were white (62.5%—77.8%), with Black race being the second most common (17.8-33.8%). Patients had a high complexity of medical illnesses, with the majority being ASA III (72.6%), 15.5% were smokers, 15.2% used steroids or immunosuppressants, and 15.3% had diabetes. The SVI was > 0.75 in 63.3%.

Figure 1 summarizes the wound complication rates for the overall cohort by month for the study period. On unadjusted models, higher temperature was associated with lower odds of wound complications for the overall cohort as well as for those undergoing colonic resection with primary anastomosis (OR = 0.982 [95% CI 0.968–0.997] and 0.972 [0.954–0.991], respectively). However, upon multivariable analysis, ambient temperature was not significantly associated with wound complications for the overall cohort or procedural subgroups

Conclusions: Unlike in studies of open operations, MIS patients within our cohort did not seem to be impacted by ambient temperature after controlling for other factors. This merits further study across a larger cohort as health systems globally are working to become more climate resilient.



P571

Piloting Total Perioperative Telemedicine for Elective Cholecystectomies for Symptomatic Cholelithiasis

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Introduction: Telemedicine has the potential to increase healthcare access while decreasing the environmental impact associated with providing care. Currently, there is a lack of data and consensus for utilizing telemedicine for preoperative evaluations. For six months, we piloted the implementation of preoperative telemedicine consultations for patients undergoing elective cholecystectomy for symptomatic cholelithiasis. With this pilot study, we examined the frequency of adverse perioperative events, the number of perioperative visits conducted, and the estimated environmental savings associated with total perioperative telemedicine (TPT).

Methods: For six months in 2022, all patients referred to a single provider at our academic tertiary care center for uncomplicated symptomatic gallstones were offered a pre-operative telemedicine visit. Adverse events, perioperative clinic visits, and patient demographics were then collected retrospectively for all elective cholecystectomies performed for symptomatic cholelithiasis between 1/1/2022 to 12/31/2022. Adverse events were defined as intra- or post-operative complications within 30 days following surgery, including blood transfusion, surgical site infection, bile leak, common bile duct injury, conversion to subtotal cholecystectomy, readmission, or emergency room visit. These perioperative measures were compared between patients who were evaluated preoperatively through TPT versus in-person. Total travel distance required for all perioperative visits was calculated using the patient's listed address, and the Environmental Protection Agency's validated formula of 404 g CO_2 per car-mile was used to estimate carbon emissions.

Results: During the six-month pilot in 2022, 12 patients underwent elective cholecystectomy for symptomatic cholelithiasis after a pre-operative telemedicine evaluation. Thirty-one patients underwent elective cholecystectomy for symptomatic cholelithiasis with the same provider over a 12-month period in 2022. Patients participating in TPT had a similar adverse event rate (8.3% vs. 12.9%, $p = 0.67$, chi-squared test), and similar number of perioperative clinic visits (2.3 vs. 2.2, $p = 0.60$, independent t-test) as patients undergoing in-person preoperative evaluation. Including travel for the operation, the TPT group required fewer round trips to the medical center (1.3 vs. 2.9, $p < 0.0001$, independent t-test), resulting in a 56% decrease in travel-associated carbon emissions per patient (20.4 vs. 46.7, $p = 0.005$, Mann-Whitney U Test).

Conclusion: This pilot study suggests that pre-operative telemedicine evaluation is safe for patients undergoing elective cholecystectomy for symptomatic gallstones and significantly decreases the environmental impact of delivering surgical care to these patients.

P572

Fiscal Impact and Surgical Performance Costs for the Routine Use of Robotic Platforms for Abdominal Surgical Procedures: A Follow-up Study

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A follow-up analysis to our previous study [Surg Endosc. 2022 Feb;36(2):1433-1443] was initiated to continue assessing robotic platforms' fiscal impact over the past 24 months on our service lines.

Study: using the same clinical analytics, an identical analysis was conducted on patients who underwent a core intra-abdominal procedure in our health system i.e., cholecystectomy, inguinal hernia repair, colectomy, appendectomy, and hysterectomy between a 24-month period from 01/01/2021 to 12/31/2022. Data from the same medical centers was sampled to keep our data consistent. Cost differential, direct facility expenses [Average Cost per Case], contribution margin, and cost per case were assessed and reported for all three surgical techniques used, i.e., laparoscopic [L], robotic [R], and open [O].

Results: All datasets show a similar financial picture of increased operating costs when using our robotic platforms, while significant cost performance increases were noted for some procedures. Direct facility expenses per procedure [formerly Average Cost per Case] remained our best indicator to assess the actual cost of these procedures. They are as follows: 1. OP Cholecystectomy [L $4,764, R $15,578], 2. Appendectomy [L $4,571, R $13,573], 3. Inguinal hernias [L $10,402, O $7,637, R $ 21,294], 4.Colectomies [Lap $12,202, Rob $16,642, Op $15,330] and 5. OP Hysterectomies [Lap $5,765, Rob $8,805, Op $4,724].

Conclusion: Our previous in-depth study demonstrated no significant outcome difference between laparoscopic and robotically performed procedures. In this follow-up analysis, robotic procedures are again shown to have a much higher direct expenses facility cost. Additional supply robotic expenses and operating time remain the main cost drivers of robotic procedures.
Robotic surgical platforms continue to have a negative fiscal impact on our surgical service lines. Surgical procedures performed using robotic platforms are performed at a much higher performance cost than their laparoscopic techniques. The analysis reiterates that the routine use of robotic appendectomy, cholecystectomy, and inguinal hernia repair is not supported.

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