Stream Care™

Surgical Expert Systems:

Bleeding

Bleeding and hemorrhage are severe complications that may arise during or after surgery, presenting a direct and life-threatening risk to the patient[1]. Postoperative bleeding is defined as blood loss occurring after surgery, varying in severity and timing[2]. Thus, swift intervention, typically involving surgical examination and steps to stop bleeding, is crucial for effectively managing bleeding problems[1]. Factors such as age, sex, race, and BMI can all impact risk of postoperative bleeding[3].

Postoperative hemorrhage occurs in 1% to 10% of all surgical patients[4].

Bleeding risk scores provided by Stream Care™ are selected based on a thorough and extensive review of existing literature, incorporating:

- ✓*65 Peer Reviewed Papers*
- ✓*1 Systematic Review*
- ✓*3 Textbooks*

Impact

In colorectal surgical populations, about 0.81-12.5% of patients experience postoperative bleeding[5,6]. Likewise, the incidence of postoperative bleeding in esophageal populations is 0.5-8.2% and 0.94-3.2% in bariatric populations[7–10].

As one of the most common surgical complications, bleeding is associated with blood transfusion, reintervention, organ injury, death, and increased costs[11]. The complication results in incurred total additional hospital costs up to $75,309 USD per patient[12]. Furthermore, patients who developed bleeding complications experienced a 33.1% higher risk of 30-day hospital readmission[13]. Therefore, understanding the risk and timing of bleeding is critical for clinical decision making, enabling physicians to anticipate and prevent further complications[11].

*Facilitating **early intervention** for bleeding complications to improve patient outcomes.*

Dynamic Risk Scores

GBS

The Glasgow-Blatchford Bleeding Score (GBS) **predicts the need for treatment for upper gastrointestinal (GI) haemorrhage** preoperatively, starting at the **time of hospital admission**[14] and updates **every 24hrs with new vitals.**

Source

GBS was developed by Blatchford et al. and validated by Renukaprasad et al. and Laursen et al.

Patient Population

GBS was developed using patients admitted for upper-gastrointestinal haemorrhage[14].

Data Set

All 19 hospitals in west Scotland[14]

Sample Size

1,748[14]

Inputs

- Bun
- Hemoglobin
- Systolic BP
- Liver Disease
- Pulse
- Melena
- Syncope
- Cardiac Failure

Lower GI Bleeding and Risk of Severe Bleeding Score

The Lower GI Bleeding and Risk of Severe Bleeding Calculator **predicts the risk of severe bleeding** in patients with acute lower gastrointestinal (GI) bleeding starting at the **time of hospital admission**[15] and updates **every 24hrs with new vitals.**

Source

The Lower GI Bleeding and Risk of Severe Bleeding Score was developed by Strate et al. and validated by Strate et al. and Oakland et al.

Patient Population

The Lower GI Bleeding and Risk of Severe Bleeding Score was developed using patients presenting with acute lower GI bleeding[15].

Data Set

Brigham and Women's Hospital, Boston[15]

Sample Size

252[15]

Inputs

- Pulse
- Systolic BP
- Syncope
- Blood per Rectum
- Aspirin
- Comorbidities

Performance Metrics

Risk Score	Cited By	Reference	Validation Type	AUC	Specificity	Sensitivity	NPV	PPV
FluidAI Recommended GBS	1,539	Blatchford et al.	Internal	0.92	0.32	0.99	-	-
		Laursen et al.	External	0.713	0.48	0.97	0.92	0.74
		Renukaprasad et al.	External	0.79	0.875	0.692	-	-
Lower GI Bleeding and Risk of Severe Bleeding Score	301	Starte et al.	External	0.75	-	-	-	-
		Oakland et al.	External	0.67	-	-	-	-
		Oakland et al.	External	0.72	-	-	-	-

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