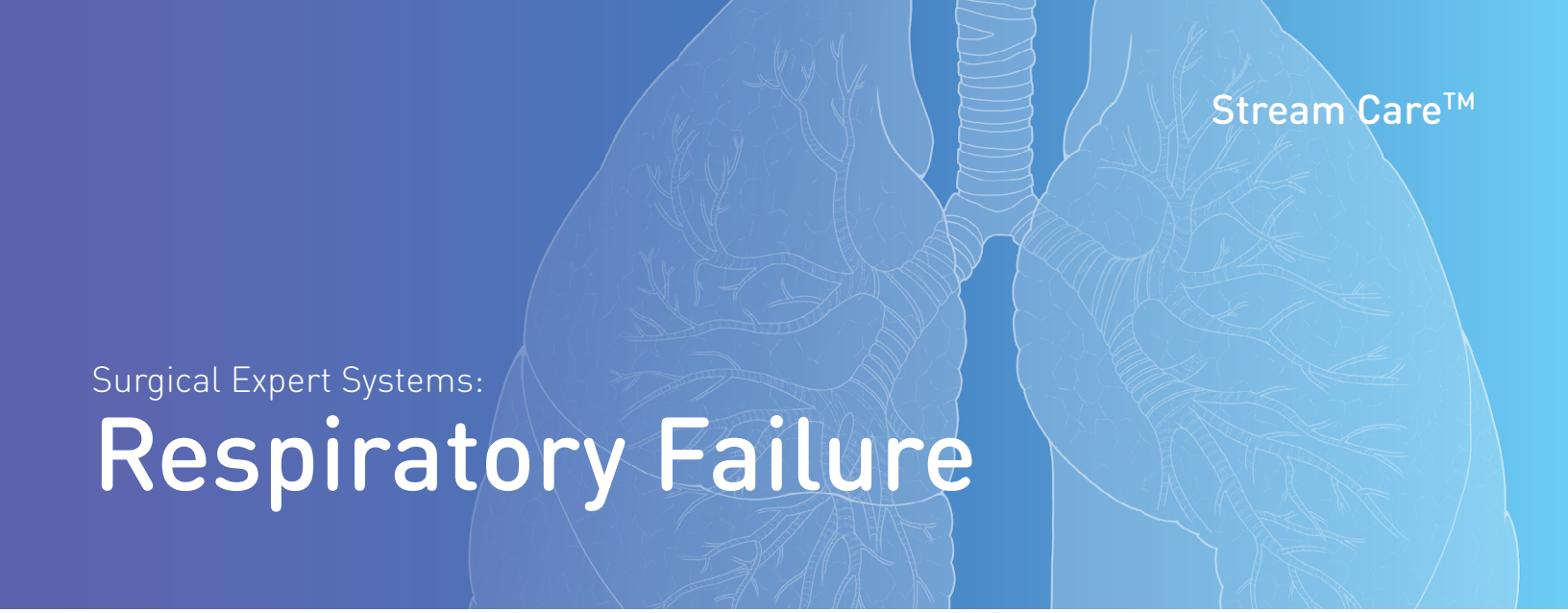

Stream Care™

Surgical Expert Systems:

Respiratory Failure

Postoperative respiratory failure (PRF) is defined as prolonged intubation after surgery or reintubation after unsuccessful extubation. As one of the most serious postoperative complications, it can lead to poor outcomes such as a longer duration of mechanical ventilation and tracheotomy. Risk factors include advanced age, in-patient status, hypertension, COPD, elective procedure, surgical duration >2 hours, and higher ASA status[1].

PRF is the most common postoperative pulmonary complication (PPC), with an incidence in general surgical populations that ranges from 0.2 to 3.4%[2].

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

- ✓*42 Peer Reviewed Papers*
- ✓*2 Systematic Reviews*
- ✓*2 Textbooks*

Impact

Postoperative respiratory failure occurs in 1-4% of colorectal patients, while incidence in bariatric populations sits at 0.25%[3,4]. Likewise, the complication occurs in about 3% of esophageal populations[5].

Postoperative respiratory failure can adversely affect the outcomes of surgical patients and may even threaten their lives, since mortality can exceed 25%[2,3]. As such, operations complicated by postoperative respiratory failure have 3.74 times higher adjusted odds of death than those not complicated by respiratory failure[4,6]. Furthermore, the complication increases healthcare utilization such as hospital length of stay, unplanned admission to intensive care or high-dependency units, and hospital readmission[7]. Cases of PRF have been associated with an excess of $53,000 in hospital charges, 9 extra days of hospitalization, and a 22% increase in mortality[8]. For example, respiratory failure after abdominal surgery can increase 30-day mortality 10-fold[9].

FluidAI

Identifying respiratory failure risk early to facilitate timely intervention and reduce clinical workloads.

Static Risk Scores

Gupta Postoperative Respiratory Failure Risk Score

Gupta Postoperative Respiratory Failure Risk Score **predicts the risk of mechanical ventilation for longer than 48hrs postop or reintubation within 30 days[10].**

Source

The Gupta Postoperative Respiratory Failure Risk Score was developed by Gupta et al. and validated by Wood et al. and Aneeshkumar & Sundararajan.

Patient Population

The Gupta Postoperative Respiratory Failure Risk Score was developed using patients who underwent anorectal, aortic, bariatric, and brain operations[10].

Data Set

The American College of Surgeons' National Surgical Quality Improvement Program (ACS NSQIP)[10]

Sample Size

211,410[10]

Inputs

- Emergency Case
- Type of Procedure
- ASA Class
- Functional Status
- Preoperative Sepsis

Performance Metrics

Risk Score	Cited By	Reference	Validation Type	AUC	Specificity	Sensitivity	NPV	PPV
Gupta Postoperative Respiratory Failure Risk	289	Gupta et al.	Internal	0.897	-	-	-	-
		Wood et al.	External	0.649	0.41	0.88	0.91	0.33
		Aneeshkumar & Sundararajan	External	0.92	0.82	0.92	-	-

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