Predicting Hip Fracture Admission to the ICU: What Matters?

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Purpose: Risk stratification models can help predict which patients may benefit from critical care monitoring following surgery due to higher risk of adverse outcomes. Prior risk stratification models have been utilized in elective joint arthroplasty at our institution; however, hip fracture patients are fundamentally different in their clinical course compared to elective arthroplasty patients. We believe that a simple calculator utilizing preoperative risk factors can improve decision-making and critical care resourcing for hip fracture patients in the immediate perioperative period.

Methods: A cohort of geriatric hip fractures at a single Level I trauma center was retrospectively reviewed from July 2018 to April 2021. Nonoperative patients, peri-implant fractures, and additional procedures performed under the same anesthesia period were excluded in the study. Hip fracture patients admitted to the ICU prior to surgery, along with patients with incomplete preoperative laboratory data, were also excluded. Hemoglobin and creatinine values from the day of surgery and albumin values within 90 days prior to surgical intervention were utilized. Revised Cardiac Risk Index (RCRI) was calculated via standard metrics. Preoperative ambulatory status was determined (independent, cane, walker, wheelchair, other). The primary outcome measure was ICU admission in the postoperative period. Outcomes were assessed with Fisher's exact test, Kruskal-Wallis test, logistic regression, and receiver operating characteristic (ROC) curve.

Results: A total of 360 patient charts were analyzed with 262 patients meeting inclusion criteria based on the variables assessed including: age, RCRI, preoperative hemoglobin, albumin, and ambulatory status. A 5-point scale with a single point administered for each value was utilized: age ≥80 years, RCRI ≥1, preoperative hemoglobin <10, albumin <3.5, and use of a 4-point walker for ambulation. If the patient scored 4 (out of 5), ICU postoperative admission to the ICU occurred with 93.3% specificity and 25% sensitivity (AUC [area under the ROC curve] 0.755). If 5 points (out of 5) were scored, a patient went to the ICU postoperatively with 98.9% specificity and 6.2% sensitivity.

Conclusion: A simple preoperative scoring system can improve risk stratification to the ICU following isolated hip fracture surgery. Use of a scoring system to stratify geriatric hip patients meeting specific criteria to the ICU postoperatively can improve the preoperative decision-making of surgical and critical care teams as they triage hip fracture patients.