

Predictors of Acute Kidney Injury in Older Adults with Extracapsular Hip Fractures

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INTRODUCTION: Postoperative acute kidney injury (AKI) is a common and serious complication that worsens outcomes in surgical patients, yet little is known about predictors and consequences in extracapsular hip fractures, a subgroup with higher bleeding risks and surgical complexity. The objective of this study was to identify predictors of postoperative AKI and evaluate its association with short-term complications in older adults undergoing surgery for extracapsular hip fractures.

METHODS: A retrospective cohort study was performed using the TriNetX Analytics platform, a federated EHR database aggregating de-identified patient records from 109 U.S. healthcare organizations. Data spanned January 1, 2015 to July 30, 2025. Adults aged ≥ 65 years undergoing extracapsular hip fracture surgery (CPT 27244/27245) were included. Patients with prior AKI diagnosis (ICD-10-CM N17) were excluded. Demographics, comorbidities, labs, vitals, medications, and procedures were extracted using standardized coding. Cohorts were matched 1:1 by propensity score. Independent predictors were identified using Cox proportional hazards modeling. Postoperative complications were assessed using risk ratios, odds ratios, and Kaplan-Meier survival analysis.

RESULTS: Of 46,287 patients who met inclusion criteria, 1,413 matched pairs (n = 2,826) were retained. After propensity score matching, baseline demographics, comorbidities, and lab values were well balanced between cohorts. Predictors of postoperative AKI included Black race (HR = 1.64), White race (HR = 1.21), elevated preoperative chloride (HR = 1.04), bicarbonate (HR = 1.03), serum creatinine (HR = 1.18), and decreased serum protein (HR = 1.11). Protective factors included Hispanic or Latino ethnicity (HR = 0.70), preoperative opioid use (HR = 0.58), elevated preoperative serum sodium (HR = 0.97), preoperative Tdap vaccination (HR = 0.82), and primary hypertension (HR = 0.88). Patients who developed AKI had significantly higher 30-day risks of myocardial infarction (MI) (RR = 8.01), sepsis (RR = 5.99), respiratory failure (RR = 5.30), stroke (RR = 2.58), arrhythmia (RR = 2.22), deep vein thrombosis (DVT) (RR = 1.98), blood transfusion (RR = 1.92), and death (RR = 2.22).

DISCUSSION: In older adults undergoing surgery for extracapsular hip fractures, postoperative AKI was a clinically significant complication. Postoperative AKI was associated with both non-modifiable and potentially modifiable predictors, as well as a substantially higher risk of major short-term complications. The protective associations with ethnicity, opioids, Tdap vaccination, and hypertension warrant further study. These findings underscore the necessity of perioperative risk stratification in this vulnerable population. This study is limited by its retrospective design, reliance on ICD-10-CM coding, and lack of intraoperative data, which may lead to residual confounding despite matching.

SIGNIFICANCE/CLINICAL RELEVANCE: Extracapsular hip fractures carry higher bleeding and surgical risk yet remained understudied. This study identifies novel, real-world predictors of postoperative AKI and emphasizes the need for targeted perioperative risk stratification to reduced morbidity and mortality in this vulnerable population.

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IMAGES AND TABLES:

