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Serum Albumin May Predict Acute Kidney Injury Among Patients Undergoing Total Shoulder Arthroplasty

Introduction:

Serum albumin measurement is a low-cost test assessing nutritional status and organ function. It has been cited as a predictor of adverse surgical outcomes, morbidity, and mortality. This study examined the relationship between preoperative serum albumin levels and postoperative acute kidney injury (AKI) in total shoulder arthroplasty (TSA) patients.

Methods:

A retrospective cohort study was conducted using NSQIP data (2012-2021). Inclusion: age ≥ 18 years. Patients were grouped by preoperative albumin: severe hypoalbuminemia (<3 mg/dL), mild hypoalbuminemia (3-3.49 mg/dL), normal (3.5-4.49 mg/dL), and hyperalbuminemia ($\geq 4.5 \text{ mg/dL}$). The primary outcome was AKI within 30 days postoperatively. Confounders included demographics (age, sex, race, ethnicity), baseline health (functional status, ASA class, BMI, smoking, diabetes, immunosuppressive therapy), and procedure characteristics (admission origin, surgical setting, anesthesia, transfusion, emergency designation). Univariate analyses assessed differences between cohorts, and multivariable regression examined the relationship between albumin and AKI. Results:

Among 18,044 TSA patients, 13,744 had normal albumin, 1,055 mild hypoalbuminemia, 248 severe hypoalbuminemia, and 2,997 hyperalbuminemia. Most hypoalbuminemia and normal albumin patients were 70-79 years old, female, White, non-Hispanic, functionally independent, ASA class 3, obese, and had no smoking, diabetes, or immunosuppressive therapy. The hyperalbuminemia cohort had more patients aged 60-69, male, and ASA class <3.

Adjusted multivariable regression showed severe hypoalbuminemia was associated with 3.90 times higher odds of AKI (95% CI 1.28-9.64; p=0.007) compared to normal albumin. Conclusion:

TSA patients with severe hypoalbuminemia have an increased AKI risk. Further research on preoperative albumin management and perioperative support strategies may improve outcomes.