

Stepwise Impact of Increasing BMI on Outcomes Following Rotator Cuff Repair: A Stratified Cohort Analysis

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INTRODUCTION: Elevated body mass index (BMI) is a known risk factor for surgical complications, yet the specific impact of incremental BMI categories on outcomes after rotator cuff repair is not fully understood. This study investigates the stepwise relationship between increasing BMI and postoperative outcomes, comparing overweight, obese, and morbidly obese patients to their respective lower BMI counterparts.

METHODS: A retrospective cohort study was conducted using a large, multi-institutional electronic health record (EHR) database. Adult patients undergoing rotator cuff repair were stratified by BMI: normal weight (18.5–24.9 kg/m²), overweight (25.0–29.9 kg/m²), obese (30.0–39.9 kg/m²), and morbidly obese (≥40.0 kg/m²). Propensity score matching was used to control for demographic and clinical confounders. Outcomes assessed at two years included wound disruption, postoperative infection, sepsis, deep vein thrombosis (DVT), pulmonary embolism (PE), acute kidney injury (AKI), hardware removal, revision surgery, and conversion to total shoulder arthroplasty (TSA). Risk ratios (RRs) with 95% confidence intervals (CIs) were calculated for each stratified comparison. Significance is set to $p < 0.05$.

RESULTS: Overweight patients (BMI 25.0–29.9) demonstrated no significant increase in any postoperative complications compared to normal-weight patients. Obese patients (BMI 30.0–39.9) were at significantly increased risk for DVT (RR: 1.255, 95% CI: 1.040–1.516; $p = 0.018$), PE (RR: 1.263, 95% CI: 1.012–1.575; $p = 0.039$), and AKI (RR: 1.130, 95% CI: 1.022–1.251; $p = 0.017$), but had no increased risk of infection, wound complications, or revision procedures. Morbidly obese patients (BMI ≥40.0) had the highest complication rates, with significantly elevated risks of wound disruption (RR: 1.600, 95% CI: 1.104–2.319; $p = 0.012$), sepsis (RR: 1.444, 95% CI: 1.106–1.886; $p = 0.007$), PE (RR: 1.513, 95% CI: 1.059–2.160; $p = 0.022$), and AKI (RR: 1.212, 95% CI: 1.036–1.417; $p = 0.016$). No significant differences were found in hardware removal, revision, or TSA across BMI groups.

DISCUSSION AND CONCLUSION: A stepwise relationship between increasing BMI and postoperative complications was observed in patients undergoing rotator cuff repair. While overweight patients had no increased risk, obese and morbidly obese patients experienced significantly higher rates of thromboembolic and renal complications, with morbid obesity further linked to wound disruption and sepsis. These findings support BMI-based risk stratification in surgical planning and postoperative management. Further investigation is warranted to assess the potential benefit of preoperative weight optimization in reducing these risks.