

## **Hypoalbuminemia in Morbidly Obese Patients Associated with Increased Risk of Postoperative Complications after Total Knee Arthroplasty: A Propensity-Matched Analysis**

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**INTRODUCTION:** A body mass index (BMI) > 40 kg/m<sup>2</sup> is defined as morbid obesity. Obesity is increasingly common among patients undergoing Total Knee Arthroplasty (TKA). The known increase in complications associated with an elevated BMI has created an incentive for surgeons to encourage weight loss that may precipitate poor nutrition. Hypoalbuminemia is frequently associated with worse outcomes following TKA and is a marker for malnutrition, but is not routinely checked in obese patients before surgery. This study aimed to evaluate whether preoperative hypoalbuminemia is associated with adverse outcomes in morbidly obese patients undergoing primary TKA.

**METHODS:** This retrospective cohort study screened patients between 2010 and 2025 using the TriNetX Research Network database. International Classification of Diseases, Ninth and Tenth Revisions (ICD-9 and ICD-10) procedure and Current Procedural Terminology (CPT) codes were used to identify 29,077 morbidly obese patients who underwent primary TKA and had a two-year minimum follow-up, of which 4,447 (15.4%) had preoperative hypoalbuminemia (serum albumin < 3.5 g/dL). Propensity-score matching (PSM) was used to match cohorts 1:1 based on age, sex, and Charlson Comorbidity Index components. Multivariable logistic regression was used to compare risks of postoperative complications at intervals of 90 days and 2 years.

**RESULTS:** Following PSM, 8,888 matched patients (4,444 per cohort) were analyzed. At 90-days postoperatively, morbidly obese patients with preoperative hypoalbuminemia were at increased risk infection (Relative Risk [RR]: 1.36; 95% Confidence Interval [CI]: 1.09, 1.69; p=0.006), wound disruption (RR: 1.32; 95% CI: 1.09, 1.59; p=0.004), and deep vein thrombosis (RR: 1.22; 95% CI: 1.03, 1.44; p=0.023). At two-years postoperatively, hypoalbuminemia was associated with increased periprosthetic joint infection (RR: 1.65; 95% CI: 1.38, 1.96; p<0.001) and revision arthroplasty (RR: 1.46; 95% CI: 1.20, 1.76; p<0.001).

### **DISCUSSION AND CONCLUSION:**

This is the largest propensity-score matched study investigating the impact of preoperative hypoalbuminemia on outcomes after TKA in morbidly obese patients. Hypoalbuminemia prior to TKA was linked to higher rates of early and intermediate postoperative complications in morbidly obese patients, suggesting that serum albumin may serve as a valuable preoperative risk stratification tool in this high-risk population. Importantly, unlike prior studies examining malnutrition in arthroplasty, this cohort included only patients who had been medically optimized prior to surgery, strengthening the association between hypoalbuminemia and postoperative risk by minimizing confounding from uncontrolled systemic illness. Additionally, this study focused on clinically meaningful primary outcomes, including mechanical and infectious complications, rather than surrogate markers of delayed recovery or length of stay.

As novel pharmacologic weight loss agents become more affordable and available they are being increasingly utilized in the perioperative setting. As these agents, particularly GLP-1 receptor agonists, gain popularity for BMI reduction prior to surgery, these findings carry growing relevance. While these therapies offer significant potential benefits for obese patients preparing for joint replacement, they may also exacerbate or mask nutritional deficiencies if not closely monitored. Ensuring that patients achieve both weight and nutritional optimization will be essential to improving outcomes and reducing disparities in care for this vulnerable population.

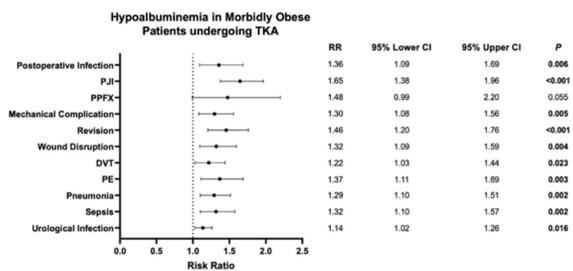


Figure 1. Relative risk of postoperative complications in morbidly obese patients undergoing TKA with preoperative hypoalbuminemia compared to matched cohort with serum albumin > 3.5 g/dL.