

Body Mass Index Classification Did Not Significantly Increase Risk for 30-Day and 90-Day Complications after Aseptic Revision Total Knee Arthroplasty

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INTRODUCTION: Elevated body mass index (BMI) contributes significantly to developing osteoarthritis and demand for total knee arthroplasty (TKA). Increased BMI has been shown to increase risk for complications following primary TKA in many studies. It has been demonstrated that early complications in revision TKA (rTKA) are elevated when compared to that of primary TKA. This study investigated the impact of BMI on re-operation rates following aseptic rTKA, which served as the primary outcome. Secondary outcomes included 30- and 90-day readmission rates, as well as postoperative complications.

METHODS:

A retrospective review of 470 patients who underwent aseptic rTKA within one regional health system from 2017-2022 was performed. Electronic medical records were used to collect demographics, including BMI at the time of rTKA, as well as data on operative characteristics, hospital stay, and postoperative course. Outcomes including re-operation, readmission, and postoperative complications were assessed at 30- and 90-days. Spline regression models using BMI as a continuous variable were utilized to assess its impact on outcomes. Significance level was set at $p < 0.05$.

RESULTS:

Among the 470 patients who underwent aseptic rTKA, analysis demonstrated significant association between higher BMI and increased odds overall re-operation (OR: 1.03, $p=0.036$); BMI did not significantly affect odds of 30-day or 90-day re-operation (Table 1). Increasing BMI was also associated with greater odds of 30-day readmission (OR: 1.05, $p=0.029$), though no other significant associations were found between BMI and most postoperative complications of interest within 30- or 90-days (Table 2). However, specific complications such as postoperative hypoxemia (22.86% in patients with BMI $> 40 \text{ kg/m}^2$) and hypotension (33.85% in patients with BMI $> 40 \text{ kg/m}^2$) showed increased incidence with higher BMI values.

DISCUSSION AND CONCLUSION:

When analyzed as a continuous variable, incremental increases in BMI are associated with higher risks of 30-day readmission and overall reoperation following aseptic rTKA. While most postoperative complications were not significantly linked to BMI, adverse events including hypoxemia and hypotension were more frequent with rising BMI. Overall rates of reoperation and early complication following rTKA remain higher than those typically reported for primary TKA. These findings highlight the importance of considering BMI as a continuous risk factor rather than relying solely on categorical thresholds.

Table 1 – Primary Endpoints: Reoperation Using BMI as a Continuous Variable

Outcome	Odds Ratio (95% CI)	p-value
30-Day Reoperation	1.01 (0.93-1.10)	0.82
90-Day Reoperation	1.01 (0.96-1.08)	0.63
Overall Reoperation	1.03 (1.00-1.07)	0.036

Significant p-values are bolded.

Table 2 – Secondary Endpoints: Operative and Postoperative Characteristics Using BMI as a Continuous Variable

Post-operative Complications	Odds Ratio (95% CI)	p-value
Length of Stay	0.018482 (-0.005-0.04)	0.138
PE	1.037317 (0.92-1.17)	0.563
SSI	0.998205 (0.97-1.03)	0.912
ICU admission	1.051299 (0.96-1.15)	0.278
Condition C	1.012712 (0.94-1.10)	0.742
AKI	1.02529 (0.90-1.17)	0.704
Transfusion required	0.9812528 (0.87-1.10)	0.756
Oxygen requirement >3days	1.049342 (0.99-1.11)	0.126
Oxygen requirement >2days	1.028659 (0.99-1.07)	0.188
Postoperative Hypotension ≤ 24hrs	0.9968621 (0.97-1.02)	0.811
Postoperative Hypotension > 24hrs	1.022728 (0.99-1.05)	0.125
Postoperative Hypoxemia ≤ 24hrs	1.021552 (0.98-1.06)	0.262
Postop Hypoxemia >24hrs	1.041568 (1.00-1.08)	0.038
30-Day Readmission	1.05 (1.00-1.10)	0.029
90-Day Readmission	1.01 (0.96-1.06)	0.65

Significant p-values are bolded.

PE = Pulmonary embolism; SSI = Surgical Site Infection; ICU = Intensive care unit; AKI = Acute Kidney Injury; Condition C = Code called when a patient is in crisis and in need of rapid intervention or escalation of care.