

## Severe Obesity Worsens 30-Day Surgical Outcomes and Projected Costs in Operative Femoral Shaft and Tibial Shaft Fractures: Considerations for Value-Based Care in Orthopedic Trauma

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**Purpose:** Severe obesity can present significant surgical challenges for orthopaedic surgeons, and the link between obesity and poorer health outcomes is well established. This study sought to assess the impact of severe obesity on 30-day adverse event rates, hospital length of stay (LOS), readmissions, and projected costs following operative fixation of tibia and femur fractures.

**Methods:** An analysis of femoral shaft and tibia fracture patients in the American College of Surgeons National Surgical Quality Improvement Project (NSQIP) database from 2012 to 2019 was conducted. Cases were identified by CPT codes. Adverse events, infectious complications, LOS, readmission rates, and operative time were queried for severe obesity, defined as body mass index (BMI) greater than 40, compared to other patients. Paired Student t tests were used to assess continuous variables. Pearson's  $\chi^2$  and odds ratios (ORs) were used for categorical variables. A cost analysis was also performed to quantify the effect of severe obesity on projected health-care expenditures using publicly available cost information from the Agency for Healthcare Research and Quality and Centers for Medicare & Medicaid Services.

**Results:** A total of 11,573 patients were included in the study with 6.7% of patients categorized as severely obese. Severely obese patients had significantly higher major adverse event rates (8.3% vs 5.5%,  $P < 0.01$ , OR 1.16, 95% confidence interval [CI] 1.19-2.04), infectious complication rates (7.6% vs 5.8%,  $P = 0.038$ , OR 1.34, 95% CI 1.02-1.77), readmission rates (7.4% vs 5.3%,  $P = 0.013$ , OR 1.43, 95% CI 1.08-1.89), longer LOS (5.6 days  $\pm$  5.8 vs 4.4 days  $\pm$  5.1 days,  $P < 0.01$ ), and longer operative times (mean 117.8 min  $\pm$  59.9 min vs 110.13 min  $\pm$  61.13 min,  $P < 0.01$ ). Cost analysis revealed severe obesity resulted in an estimated \$3722.92 additional health-care expenditures per patient on average compared to nonobese patients and a projected added total expenditure of \$2.88 million US in this cohort.

**Conclusion:** Severe obesity is associated with significantly worse 30-day outcomes and higher readmission rates for patients undergoing operative fixation of tibial shaft and femoral shaft fractures. These findings suggest that surgeons and hospitals caring for a disproportionate number of obese patients may face an undue cost and capacity burden, especially under bundled payment systems. As shifts toward value-based care occur, policy considerations should be made to incentivize care for this patient population, particularly in trauma where modification of risk factors prior to surgery is often not feasible.