The Impact of Severe Obesity on 30-Day Rates of Adverse Events in Patients Undergoing Internal Fixation for Acetabular Fractures

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Background/Purpose: Acetabular fractures are potentially devastating injuries that often require complex surgical treatment. Surgical outcomes in these fractures are affected by obesity, although the impact of severe obesity on inpatient outcomes for these patients has not been previously described in large data sets. This study sought to assess the impact of severe obesity and body mass index (BMI) on (1) occurrence of any adverse event; (2) rate of major complications; (3) infectious complications; (4) total operative time; and (5) total length of hospital stay following open reduction and internal fixation (ORIF) of acetabular fractures.

Methods: Patients undergoing ORIF for acetabular fractures from 2008-2013 were identified using the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) using CPT codes 27226, 27227, 27228, and 27254. Patients with missing peri-operative data or BMI were excluded from analysis. Severe obesity was defined as a BMI greater than 35. Major complications, infectious complications, and minor complications were defined as previously described in the literature for the NSQIP database. BMI as a predictor of total hospital length of stay and total operative time was tested using linear regression analysis. Severe obesity and numerous other patient characteristics were tested for association with occurrence of any adverse event, major complications, and infectious complications using Pearson X^2 test for categorical variables or independent *t* tests for continuous variables. Risk factors with a *P* value of <0.2 after initial testing were included in a multivariate logistic regression to determine independent risk factors for outcomes.

Results: Of 636 patients who underwent ORIF for acetabular fractures in the database, 560 met inclusion criteria for analysis. 20.7% sustained an adverse event (either major or minor) during the 30-day postoperative period. 13.6% had a major complication with the most common being death (n = 25, 4.5% of cohort). Severe obesity had no effect on risk of major complications ($P = 0.685$) or infectious complications ($P = 0.074$). However, multivariate analysis revealed severe obesity was significantly associated with occurrence of any adverse event (major or minor) in the 30-day postoperative period (odds ratio [OR] 2.05, CI 1.063-3.953, $P = 0.29$; Table 1). Linear regression revealed BMI did not predict total length of hospital stay $F(1, 558) = 0.171$, $P = 0.680$. BMI significantly, albeit minimally, predicted longer operative time for patients with acetabular fractures, accounting for 2.3% of variability in operative time as determined by linear regression analysis $F(1, 558) = 14.27$, $P < 0.001$. The regression equation was: predicted total operative time in minutes = 45.67 + (2.19 x BMI).

Conclusion: Patients undergoing ORIF for acetabular fractures who are severely obese are more likely to have an adverse event in the 30-day postoperative period. BMI is also associated with longer operative time in these patients. The increased length of operative time in this patient group may have implications for hospital costs and resource utilization, and may contribute to the increased incidence of adverse events seen in this study.

Table 1: Significant Risk Factors for Occurrence of Any Adverse Events as Determined by Multivariate Logistic Regression Analysis

Characteristic	Odds Ratio(95% CI)	P Value
Severe Obesity (BMI>35)	2.324 (1.105-4.887)	0.026
Age>70	2.083 (1.003-4.326)	0.049
ASA>3	2.008 (1.062-3.797)	0.032

See pages 49 - 106 for financial disclosure information.