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# THE OBESITY PARADOX: OVERWEIGHT PATIENTS HAVE A LOWER RATE OF 30-DAY POSTOPERATIVE MEDICAL COMPLICATIONS AFTER TOTAL SHOULDER ARTHROPLASTY

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**Background:** While increased mass index (BMI) has traditionally been associated with negative health effects and poor surgical candidacy, prior studies suggest increased BMI may be contradictorily protective. This obesity paradox has been identified in knee and hip arthroplasty, but not total shoulder arthroplasty (TSA). Our primary purpose was to determine the BMI associated with the lowest rate of medical complications post-TSA.

**Methods:** The American College of Surgeons National Surgical Quality Improvement Project (ACS NSQIP) database was queried to identify adults who underwent primary TSA between January 1, 2012, and December 31, 2020. We included 31,755 elective TSAs. Thirty-day postoperative medical complications were extracted which included death, readmission, pneumonia, pulmonary embolism, renal failure, and cardiac arrest among others. BMI was classified into 5 categories (underweight [BMI < 18.5 kg/m<sup>2</sup>], normal weight [BMI ≥ 18.5 and < 25 kg/m<sup>2</sup>], overweight [BMI ≥ 25 and < 30 kg/m<sup>2</sup>], obese [BMI ≥ 30 and < 40 kg/m<sup>2</sup>], and morbidly obese [BMI ≥ 40 kg/m<sup>2</sup>]). We examined the risk of any 30-day postoperative complications and BMI using aforementioned categories and on a continuous basis modeled as a third-degree polynomial using multivariable logistic regression controlling for age, sex, procedure year, and all comorbidity variables.

**Results:** Most TSAs were Caucasian (84%), 56% were female, and the average age was 69.2 ± 9.3 years. The rate of any 30-day postoperative medical complication was 4.53% (n = 1440). When adjusting for age, sex, procedure year, and comorbidities, patients with greater than normal BMI demonstrated lower odds of any medical complication compared to normal-weight patients (overweight 0.80-times, obese 0.81-times, and morbidly obese patients 0.77-times). When assessed on a continuous basis, a U-shaped relationship between BMI and 30-day medical complication risk was found, with the lowest risk in BMI between 30-35 kg/m<sup>2</sup>. Although the probability of medical complications increased with age and was greater for females, all strata demonstrated lower probability of complications in the obese BMI range.

**Conclusions:** The relationship between BMI and probability of medical complications in patients undergoing TSA does not appear to be linear. Obesity alone should not preclude patients from being eligible for TSA; rather, surgical candidacy should be evaluated in the context of patients' overall health and likelihood of benefit from shoulder surgery.