

G22: Is there increased risk of surgical site infection (SSI)/periprosthetic joint infection (PJI) in patients undergoing major orthopaedic surgery who have had a prior bariatric surgery?

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Response/Recommendation:

The current evidence is insufficient and conflicting. It shows a trend towards both decreased and increased risk of SSI/ PJI in patients with prior bariatric surgery who undergo joint arthroplasty when compared to the general arthroplasty population or obese controls.

Strength of recommendation: Moderate

Delegate Vote:

Rationale:

Obesity, defined as a body mass index (BMI) of ≥ 30 kg/m², has reached alarming proportions internationally ¹. Recent studies have suggested that the prevalence of morbid obesity (BMI ≥ 40) is projected to rise in the United States (US) and the United Kingdom (UK) ^{2,3}. Although lifestyle modification is advocated as the first-line treatment for obesity, this may be difficult to sustain in morbidly obese patients ⁴. In obese patients undergoing total joint arthroplasty (TJA), there is a significantly increased risk of surgical site infection (SSI) and/ or periprosthetic joint infection (PJI) ^{5,6}. Hence, bariatric surgery has been proposed as a weight-loss strategy to mitigate this risk ⁷. Nevertheless, others have suggested that bariatric surgery may induce a catabolic state and may increase the risk of SSI/ PJI ⁸.

Twenty-two studies report on the results of TJA after bariatric surgery ⁹⁻³⁰. Among these were one randomised controlled trial ¹⁰ and one retrospective case series ²³. The remaining nineteen studies were observational. Seven of these studies provided total hip arthroplasties (THA) ^{9,14,16,18,19,28,30} data, while fourteen provided total knee arthroplasties (TKA), allowing for subgroup analyses ^{10,11,13,16-18,20,22,24-27,29,30}. Four studies combined the data on both THA and TKA ^{12,15,21,23}. All but four studies were conducted in the US ^{10,11,15,24}. The overall prevalence of SSI/ PJI was 1.81% [95% Confidence Interval (CI): 1.08 – 2.68] in patients receiving TJA after bariatric surgery ^{9,10,12-15,17-30}. When stratified by type of TJA, this was 2.34% [95% CI: 1.03– 4.11] for those undergoing THA ^{9,14,18,19,28,30} and 1.88% [95% CI: 0.85 – 3.21] for those undergoing TKA ^{10,13,17,18,20,22,24-27,29,30}.

As the comparative incidence of SSI/ PJI is time-dependent, we quantified this using hazard ratios (HR). When these are not reported, the HR is estimated using the technique described by Shor et al. ³¹. We found no statistically significant difference in the risk of SSI/PJI [HR = 0.81, 95% CI: 0.62 – 1.05] between patients undergoing TJA following bariatric surgery and obese controls ^{9,10,12-14,17,18,20,22,25,26,28-30}. This did not vary based on the type of TJA, with an HR of 0.80 [95% CI: 0.58 – 1.11] for THR ^{9,14,18,28,30} and 0.78 [95% CI: 0.57 – 1.07] for TKR ^{10,13,17,18,20,22,25,26,29,30}. Similarly, when considering the general arthroplasty population as a control, we found no statistically significant difference in the risk of SSI/ PJI [HR = 1.44, 95% CI: 1.00 – 2.08] ^{11,13,14,16,19,20}. Subgroup analysis indicated no statistically significant difference in the risk of SSI/ PJI among THA patients [HR = 1.20, 95% CI: 0.77 – 1.87] ^{14,16,19} and TKA patients [HR = 1.61, 95% CI: 0.91 – 2.83] ^{11,13,16,20}.

The risk of SSI/ PJI was significantly higher in patients undergoing TJA following bariatric surgery when compared to non-obese controls [HR = 1.61, 95% CI: 1.13 – 2.29] ^{9,17,22,25,26,29}.

Further analysis revealed this risk was consistently elevated in post-bariatric surgery patients in the TKA subgroup [HR = 1.67, 95% CI: 1.04 – 2.70]^{17,22,25,26,29}. Only one THA study provided this comparator, reporting an HR of 1.54 [95% CI: 1.22 – 1.95]⁹. Several of these studies compared the complication profile based on the type of bariatric surgery^{9,20,25,26}. Bains et al. found that gastric bypass was linked to a lower SSI/PJI risk than sleeve gastrectomy⁹. Similarly, Meller et al. found that gastric bypass and sleeve gastrectomy were associated with a lower SSI/ PJI risk than laparoscopic banding²⁰. In contrast, Sax et al. reported no difference in SSI/PJI risk between gastric bypass and sleeve gastrectomy²⁶. Additionally, Ryan et al. reported no difference in overall reoperation rate, although gastric bypass patients experienced a higher number of SSI/PJI. The statistical significance of this was not discussed²⁵.

Finally, the impact of the timing of bariatric surgery on the risk of complications was examined in five studies^{9,12,19,25,29}. Bains et al. found no difference in SSI/PJI among those performed within 6 months, from 6 to 12 months, and after one year⁹. Similarly, Inacio et al. found no difference in SSI/ PJI risk between those who underwent TJA within 2 years and those who had it performed after 2 years of bariatric surgery¹². Three additional studies reported no effect of bariatric surgery timing on the risk of revisions or complications, although these did not specifically address SSI/PJI.^{19,25,29} Future research is needed to evaluate whether specific types of bariatric surgery and the timing of such surgery influence the outcomes of subsequent TJA.

Overall, there is only low to moderate evidence supporting the above findings. Almost all studies in this area are retrospective and, therefore, have inherent bias³². The only randomized controlled trial had a median follow-up of 2 years for the bariatric surgery group and 2.3 years for the obese control group. Furthermore, of the 41 patients randomized to the bariatric surgery group, more than a quarter subsequently declined further arthroplasty. This raises doubts about the external validity of their findings¹⁰. Lastly, the confidence interval for comparing SSI/ PJI risk between patients undergoing TJA following bariatric surgery and obese controls was wide and very close to attaining statistical significance, therefore indicating a small fragility index³³. A small fragility index warrants further robust studies comparing outcomes in patients with prior bariatric surgery to obese controls.

Conclusion:

The reviewed studies demonstrate conflicting evidence in terms of either increased or decreased rate of SSI/PJI after bariatric surgery in morbidly obese patients who undergo TJA. There is a need for further studies to determine the effect of bariatric surgery on the rate of SSI/PJI in these patients.

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