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Original article

Benefits of bariatric surgery before elective total joint arthroplasty: is there a role for weight loss optimization?

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Abstract

Background: The association between obesity and osteoarthritis is well established, as is the increased risk of postoperative complications after total knee arthroplasty (TKA) and total hip arthroplasty (THA) among patients with obesity.

Objective: To evaluate the outcomes after TKA/THA based on whether the surgery was performed before or after bariatric surgery.

Setting: Integrated, multispecialty, community teaching hospital.

Methods: The medical records of all patients who underwent bariatric surgery from 2001 to 2014 were reviewed. Statistical analysis included χ^2 test and *t* tests. A *P* value < .05 was considered significant.

Results: One-hundred and two patients were included; 36 had TKA/THA before their bariatric procedure, 66 underwent TKA/THA after their bariatric procedure. TKAs/THAs were performed at a mean of 4.9 ± 3.2 years before and 4.3 ± 3.3 years after bariatric surgery. Body mass index for those undergoing TKA/THA after bariatric surgery was lower than those with TKA/THA before bariatric surgery (37.6 ± 7.4 versus 43.7 ± 5.7 kg/m²; *P* < .001). Operative time and length of stay (LOS) were significantly decreased for TKA/THA performed after versus before bariatric surgery: 81.7 ± 33.9 min versus 117 ± 38.1 min; *P* < .001 and 2.9 ± 0.7 versus 3.8 ± 1.4 d; *P* < .001, respectively. Early complications and late reinterventions were similar.

Conclusions: Decreased operative time and LOS were observed among patients who underwent TKA/THA after versus before their bariatric surgery. Patients who underwent TKA/THA after bariatric surgery had lower body mass index before and 1 year after TKA/THA. Postoperative complication rates were similar. Benefits of bariatric surgery and subsequent weight loss should be considered among patients with obesity requiring TKA/THA. Optimal timing of TKA/THA and bariatric surgery has yet to be established. (Surg Obes Relat Dis 2016;■:00–00.) © 2016 American Society for Metabolic and Bariatric Surgery. All rights reserved.

Keywords:

Bariatric surgery; Obesity; osteoarthritis; Joint arthroplasty; Postoperative outcomes

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Obesity is an epidemic in the United States. Currently, more than 34% of U.S. adults are classified as obese. This proportion has seen an upward trend since the 1960s [1]. Many co-morbidities are associated with obesity, including cardiovascular disease, hypertension, type 2 diabetes, and obstructive sleep apnea [2]. Another well-established consequence of obesity is the development of osteoarthritis [3].

The increased stress seen on weight-bearing joints, especially the knee, and resultant articular cartilage tissue damage secondary to obesity frequently contributes to the eventual need for total joint arthroplasty (TJA) [4].

The rise in incidence of osteoarthritis has resulted in an increase in the total annual volume of total knee arthroplasties (TKA) [5]. The total number of total hip arthroplasties (THA) has seen a similar trend in number of annual cases [6]. It is estimated that by 2030 the number of total joint replacements will increase by 174% and 673% for THA and TKA, respectively [7].

The link between obesity, TJA, and perioperative complications has been studied extensively [4,8–13]. Arthroplasty in patients with obesity has been found to have increased risk compared with nonobese cohorts [6,10,14]. Obesity appears to be an independent risk factor for complication rates, and weight loss before TJA may lead to improved postoperative outcomes. The impact of length of stay (LOS) and operative time in patients with obesity who need TJA, on the other hand, has not been well studied. We hypothesized that a reduction in body mass index (BMI) achieved from bariatric surgery before TJA would lead to improved surgical outcomes and reduced perioperative complication rates. Our objective was to evaluate the outcomes in patients who underwent TJA after bariatric surgery compared with obese patients who had not undergone bariatric surgery before TJA.

Methods

Our health system is an integrated multispecialty group medical center serving 19 counties over a 3-state region. The main campus includes a teaching hospital with an accredited general surgery residency program as well as an accredited fellowship in minimally invasive bariatric surgery and advanced laparoscopy. The bariatric surgery program is accredited by the American College of Surgeons and American Society for Metabolic and Bariatric Surgery. All potential bariatric surgical patients were evaluated using a multidisciplinary team approach including bariatric surgeon(s), a physician assistant, registered dietitians, and clinical psychologist. All patients undergoing bariatric surgery met the National Institute of Health criteria for weight loss surgery [15].

After institutional review board approval was obtained, a retrospective review of the medical records of patients who underwent laparoscopic Roux-en-Y gastric bypass or laparoscopic sleeve gastrectomy from September 2001 through November 2014 with TKA or THA performed before or after bariatric surgery was completed. Patients who underwent TKA or THA before bariatric surgery were compared with those who underwent TKA or THA after bariatric surgery. Statistical analysis included χ^2 tests and *t* tests. A *P* value < .05 was considered statistically significant.

Statistical analysis was performed using SAS 9.3 (Cary, NC).

Results

A total of 1546 patients underwent bariatric surgery during the study period. Of those, 102 patients also underwent TKA or THA and comprised the study population: 90% underwent laparoscopic Roux-en-Y gastric bypass, whereas 10% received a laparoscopic sleeve gastrectomy. Sixty-six (65%) patients had TJA after the bariatric procedure whereas 36 (35%) patients had TJA before bariatric surgery.

Preoperative characteristics

TKAs/THAs were performed at a mean of 4.9 ± 3.2 years before and 4.3 ± 3.3 years after bariatric surgery. The majority of the patients in the study population were female (80%; Table 1). Obesity-related co-morbidities were similar between the groups; however, remission of type 2 diabetes and obstructive sleep apnea was observed in 4 and 8 patients, respectively, after bariatric surgery but before TKA/THA.

Perioperative characteristics

The majority of joint arthroplasties in our cohort were TKA (71%), with a similar proportion of TKA and THA in the 2 groups (Table 2). Median operative times were significantly longer for patients who underwent joint arthroplasty before bariatric surgery, regardless of whether they received TKA or THA (Table 2). Similarly, LOS was significantly reduced when TKA or THA was performed after bariatric surgery (Table 2). At the time of TKA or THA, a mean BMI reduction of 11.7 kg/m^2 was observed for patients who had previously undergone bariatric surgery (Table 3). The mean BMI was similar at the time of TKA/THA and bariatric surgery for patients who underwent bariatric surgery after joint arthroplasty.

Postoperative outcomes

There was no difference in early (<30 d) postoperative complications or need for reinterventions during the follow-up period (Table 4). The rates of surgical site infections (SSI) and venous thromboembolism (VTE) were similar between the 2 groups. There were a total of 3 SSIs, all of which occurred in the post-bariatric surgery group; however, this was not significant (*P* = .550). There were no periprosthetic infections, regardless of timing of TJA and bariatric surgery. Mean post-TKA/THA follow-up duration was 3.2 ± 2.8 years for those who had joint arthroplasty after bariatric surgery and 9.2 ± 3.9 years in patients who had joint arthroplasty before bariatric surgery. Joint manipulation, revision, and reoperation rates were low overall,

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