

White Paper

3 Considerations for Better Elective Total Joint Arthroplasty Outcomes for Obese Patients

IMPROVE PATIENT OUTCOMES TO REDUCE COMPLICATIONS AND READMISSIONS

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EXECUTIVE SUMMARY

As the population ages, the number of people undergoing a total joint arthroplasty (TJA) to remedy problems associated with chronic arthritis and other musculoskeletal diseases is on the rise. Primarily affecting hips and knees, symptoms indicating the need for joint surgery include lack of mobility, pain, loss of sleep, and joint stiffness which can affect every day activities. Also continuing to rise is an increase in the rate of obesity which currently affects nearly forty-percent of the United States population. The obesity epidemic, combined with longer lifespans, suggests a continued and growing need for TJA. To meet this demand primary care physicians and surgeons must remain informed on complications more common to obese patients as these affect the patient's, doctor's, and hospital's goals for best outcomes.

INTRODUCTION

Over seven-million Americans are living with joint implants. The number of people opting for TJA continues to increase and conservative projections of new surgeries forecast roughly 635,000 total hip replacements and over a million total knee replacements by 2030. It should be noted that these projections are based on age and gender and do not consider other variables, including obesity. This is a critical omission as there is a direct correlation between obesity and the development of osteoarthritis (OA), and OA often develops earlier in obese patients. For example, each pound of body weight puts four to six pounds of pressure on each knee joint, so it is not surprising that obese patients are three times as likely as non-obese patients to develop OA and at a younger age. Obesity in the United States is at the highest it has ever been and with a significant increase between 2007-2016, it is likely this trend will also continue to swing upward.

CONSIDERATIONS

Pre-surgical Assessment

While TJA offers positive results for most orthopedic patients, there are risks inherent in all surgeries, especially patients with a BMI over 40. Obese patients are more likely to have diabetes mellitus, hypertension, dyslipidemia, coronary artery disease, heart disease, and liver disease. Among post-surgical problems specific to TJA are infection, osteolysis, subsidence, and loosening of the component. As such, a comprehensive pre-surgical assessment is critical for both patient and doctor to minimize these and any other complications.

Surgical Impact of Comorbidities

Managing comorbid conditions

Preoperative comorbidities are directly related to postoperative complications and costs. Further, the more comorbidities a patient has, the greater the risk of a surgical or post-surgical complication. Patients with three

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or more preoperative comorbid conditions are readmitted more than twice as frequently as patients with one or no preoperative comorbidities. Specifically, congestive heart failure, valvular heart disease, chronic obstructive pulmonary disease, and electrolyte disorders pose the greatest risk for a major complication following TJA. Among patients undergoing TKA, 30% of obese patients were found to have three comorbidities compared to 7% of non-obese patients; obese patients also experienced significantly more postoperative complications and technical errors.

Impact on readmission

Several risk factors contribute to an extended hospital stay. These include operating time, an American Society of Anesthesiologists (ASA) score of two or greater, and comorbid conditions, both of which are typical in obese patients.

Medical comorbidities have been found to increase the risk for readmission after hip replacement surgery. In a study reviewing factors contributing to readmission after total hip arthroplasty, age and body mass index (BMI) were significantly associated with readmission, with the highest readmission rates among those with a BMI of ≥ 40 kg/m². Additionally, post-operative complications for super-obese patients – persons with a BMI between 45-60 – found that for every five-unit increase over ≥ 45 kg/m², the likelihood of readmission increased 100%, as does a longer hospital stay and the risk of in-hospital or outpatient complications.

Readmitted obese patients also have significantly higher rates of comorbid conditions including diabetes, chronic obstructive pulmonary disease, hypertension, and hyperlipidemia. They are more likely to have had previous cardiac surgery, use a corticosteroid, and be identified as ASA class 3 (having substantive functional limitations). Surgical and postoperative medical complications also were significantly higher among readmitted patients.

Post-surgery

Complications

For most patients, TJA provides relief for symptoms that nonsurgical approaches fail to relieve, with minimal risk. However, as with other types of surgeries, obese patients face greater risk due to longer surgical times, increased blood loss, difficulty in exposing surgical area, decreased vascularization of adipose tissue, and reduced immune response. This results in worse outcomes and higher costs. The higher a patient's BMI is over 30 kg/m², the higher the risk. The risk is notably higher when BMI exceeds 40 kg/m².

Compared with patients with normal BMI, obese patients have significantly higher rates of significant and deep infections and increased rate of pulmonary emboli. Patients with a BMI >40 kg/m² also experience increased rates of renal insufficiency, venous thromboemboli, reoperation, and operative time.

SOLUTIONS

Weight reduction

Morbid obesity is identified as a modifiable risk factor for TJA. Because obesity and osteoarthritis are linked, preoperative weight management is critical to optimizing surgical outcomes. Weight loss programs that combine dietary modifications with exercise yield higher weight loss than either method singularly, and programs that include limit caloric intake and contact with a dietician result in significantly greater weight loss. This suggests that a program including all four components – diet, exercise, calorie-counting, and meeting with a dietician – could result in reliable weight loss for obese TJA patients, particularly those with a very high BMI.

Low-calorie diet programs

Medically monitored weight loss programs featuring very low-calorie diets (VLCD) can benefit patients prior to surgery. Low-calorie diets have been found to be effective in reducing body fat in patients with metabolic syndrome and pre-surgery weight loss has had a positive impact on post-surgery results. Obese patients who lose weight non-surgically through a weight loss program have better surgical and functional outcomes. Further, a meta-analysis found that participants on a partial meal replacement plan experienced significant weight loss and significant improvement in systolic blood pressure, triglycerides, and glucose levels. Improving comorbid conditions also improves surgical outcomes.

Bariatric surgery

Surgical weight loss has lasting benefits for many obese patients in terms of sustained weight loss and reduction in comorbidities. For example, several studies found that patients who had gastric bypass surgery were in diabetes remission or had normal fasting plasma glucose levels, and that patients maintained a 15-point reduction in BMI at 3 years.

Similarly, an observational study comparing patients who had bariatric surgery before TKA and those who had TKA before bariatric surgery found that having bariatric surgery first resulted in shorter surgical time and length of stay. Conversely, the benefits of having bariatric surgery after TJA surgery are less clear.

Physical conditioning

Patients' preoperative physical condition including mobility, ambulatory ability, and other musculoskeletal issues further predict surgical outcomes. These problems increase the likelihood of a longer hospital stay and rehabilitative period. In many cases, "prehabilitation" is recommended to increase post-operative functions and reduce the need for inpatient rehabilitation. Prehabilitation is a form of physical therapy and strength training to help prevent injury and enhance patients' functional capacity to better enable them to tolerate post-surgery inactivity.

The better condition patients are in prior to surgery strongly impacts their post-surgery outcomes. Indeed, some physicians assert that preoperative and postoperative rehabilitation are of equal importance in terms of positive outcomes. Recovering from THA and TKA can take six to twelve months, respectively, so it is important that postoperative care is coordinated between the patient's PCP, surgeon, and, if needed, acute care facility. Prehabilitation helps reduce the likelihood of patients needing inpatient rehabilitation or discharge to a rehabilitation facility, which helps avoid complications that may lead to readmission. To maximize post-surgical functionality, it is important for physicians to determine the appropriate balance of pre- and post-operative therapy as healthcare payers will limit the number of sessions.

Delay or deny surgery

The decision by a surgeon to delay or even deny surgery remains controversial, particularly when obesity is a deciding factor. Beyond ethical concerns, surgery on an obese patient takes longer and comes with increased risks and costs to the patient and the doctor. Further, doctors and hospitals increasingly are being penalized if complications result, which is a more likely occurrence with obese patients.

CONCLUSION

TJA is a safe and commonly practiced surgical procedure that offers relief to over one million patients a year. Although obese patients are as likely as non-obese patients to enjoy the benefits of TJA, the increased

risk associated with their surgery can be a divisive issue for the medical community. With a continued rise in the number of obesity patients who need TJA, more clearly defined guidelines are needed regarding recommendations for obese patients considering this elective surgery.

Obese patients come into the surgery with higher risk which leads to greater complications during and following surgery. Physicians who recognize and address perioperative contributing factors improve their patient's care from diagnosis to discharge and beyond. To that end, patient engagement and education is critical throughout the process to optimize patient readiness for surgery. Likewise, surgeons must be aware of and prepared to address the risks associated with their obese patients to decrease the number of patient readmissions, which, in turn, reduces the likelihood of institutional penalty.

Various recommendations have been put forward to address many issues associated the compromised outcomes of TJA in obese patients. Risk mitigation has been recommended and may be aided with the use of assessment tools such as the Arthroplasty Risk Score (ARS) model, which helps predict postoperative disposition. Pre-surgical weight loss and physical conditioning also help improve patients' readiness for surgery and reduce some complications.

The recommendation gaining the most attention, however, is stratifying patients by risk, with obesity as the primary consideration. There is an abundance of evidence that an increased BMI contributes to a range of perioperative complications. A workgroup of the American Association of Hip and Knee Surgeons found that all obese patients (those with a BMI ≥ 30 kg/m²) are at increased risk and that those risks increase considerably for patients with a BMI ≥ 40 kg/m². This raises the question of whether there should be a threshold based on BMI for elective TJA and if so, where that line is drawn. While many believe BMI ≥ 40 kg/m² is that line, others suggest a BMI of 45-50 kg/m² may be acceptable. Regardless of where a cut off might be established, enacting this type of restriction again brings up the question the ethics and responsibility in denying surgery to patients who can benefit from it.

While the debate on the viability of patient stratification continues, it is incumbent on both PCP's and surgeons to inform and guide their patients regarding perioperative care. For obese patients, this includes a comprehensive assessment of their health that can contribute to complications, recommendations of preoperative care to help reduce risk, and clear expectations on the challenges and setbacks associated with rehabilitation.

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