

CORR Insights®: Preoperative Risk Management Programs at the Top 50 Orthopaedic Institutions Frequently Enforce Strict Cutoffs for BMI and Hemoglobin A1c Which May Limit Access to Total Joint Arthroplasty and Provide Limited Resources for Smoking Cessation and Dental Care

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Where Are We Now?

Modifiable risk factors associated with complications after total joint arthroplasty include obesity, uncontrolled diabetes, poor dental hygiene, smoking,

antecedent high-dose narcotic use, and, to some degree, emotional distress (symptoms of anxiety or depression). Nonmodifiable risk factors include age, coronary artery disease, chronic obstructive pulmonary disease, and immunosuppressive disorders. To mitigate the risk of complications and adverse events after joint arthroplasty, many surgeons and institutions have used cutoff values or upper limits for modifiable risk factors such as BMI, hemoglobin A1c level, and time since smoking cessation. However, the use of cutoff values can restrict access to hip or knee arthroplasty for patients who are unable to improve their health and achieve satisfactory cutoff values [3, 4]. Bundled care payments that incentivize healthcare providers can reduce healthcare costs. However, they might penalize physicians for adverse outcomes, allow physicians to “cherry pick” patients who do not have complications or comorbidities, and may provide further disincentive to deliver care to high-risk patients with medical comorbidities [6].

The study by Dlott et al. [1], “Preoperative Risk Management Programs at the Top 50 Orthopaedic Institutions Frequently Enforce Strict Cutoffs for BMI and Hemoglobin A1c Which May Limit Access to Total Joint Arthroplasty and Provide Limited Resources for Smoking Cessation and Dental Care,” used a survey of the top 50 orthopaedic institutions ranked by *US News and World Report* to assess the use of cutoff values for BMI and hemoglobin A1c, as well as access to services for weight loss, smoking cessation, and dental care. Cutoff values were used by most institutions, while programs to help patients improve their health were more limited. The study by Dlott et al. [1] identifies an important concept; the use of strict cutoff values deviates from the traditional physician-patient shared decision-making model, which includes a risk-benefit analysis with individualized goals for weight loss, glycemic control, smoking cessation, and dental care preoperatively. Findings from this study emphasize the need for surgeons to be familiar with resources for patients to lose weight, obtain dental care, control diabetes, stop smoking, treat anxiety and depression, and reduce narcotic dependency, and surgeons must actively counsel patients to achieve realistic

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goals for improving modifiable risk factors before surgery.

Where Do We Need To Go?

Bundled care payments have been found to decrease hospital length of stay, hospital readmissions, and healthcare costs [2]. However, it is unclear whether the improvement in quality metrics and reduction in healthcare costs is because of better treatment programs or restricted access for high-risk patients. We need to find answers to the following questions:

1. How many patients in whom the typical cutoff values (such as BMI over 40 kg/m², hemoglobin A1c over 8.0 g/dL, or poor dental hygiene) are exceeded are treated effectively for a modifiable risk factor and eventually achieve an acceptable cutoff value for hip or knee arthroplasty, and how many never achieve an acceptable cutoff value for surgery?
2. Of the patients in whom a cutoff value is exceeded and were effectively treated for a modifiable risk factor, is their outcome after joint arthroplasty equivalent to or different from that of patients in whom the cutoff value was never exceeded?
3. For patients who are unable to achieve the strict cutoff value and are treated nonoperatively for arthritis, how does their quality of life, fitness, and life expectancy compare with that of patients who meet the cutoff values and undergo joint arthroplasty?
4. Depending on the resources available to researchers and institutions, how can we find out what happens to patients with arthritis who come into our clinic seeking a hip or knee

arthroplasty, but exceed a cutoff value and never return to have the operation?

5. For patients who exceed a cutoff value, what is an appropriate goal for them to achieve?

How Do We Get There?

The answer to questions 1 and 3 would likely require an institutional database of patients with arthritis who meet the indications for joint arthroplasty but exceed a cutoff value and are denied surgery. To my knowledge, this database does not exist, but could be developed prospectively in a single-institution or multicenter study. Once this type of database is established, further prospective or retrospective analyses could be performed, comparing patients in the database with patients in an institutional joint arthroplasty registry to determine how many patients in this cohort eventually undergo joint arthroplasty (question 1). The outcome of patients who exceed cutoff values and do not have surgery likely would require specific prospective analyses to determine their quality of life, fitness, and life expectancy compared with historical control studies of these outcomes in patients with arthritis who have had hip or knee arthroplasty (question 3).

The answer to question 2 has been studied extensively regarding bariatric surgery before joint arthroplasty to treat patients with obesity. Meta-analyses of these studies suggest that bariatric surgery before joint arthroplasty may not reduce complication rates or improve clinical outcomes [5, 8]. A matched-cohort comparison of patients with morbid obesity and patients who have undergone bariatric surgery used a large statewide total joint database in New York and has

been an effective study model to analyze the results of bariatric surgery for patients with obesity who undergo total joint arthroplasty [7]. Similar institutional database-matched cohort studies may be useful to assess the efficacy of treatment of other modifiable risk factors before total joint arthroplasty.

To find the answer to question 4, we need to collaborate with our medical colleagues to access a database of patients with lower extremity arthritis who also have medical conditions and have an exceeded cutoff value. These patients can be identified by ICD-10 codes for lower extremity arthritis and a specific medical condition such as obesity, diabetes, anxiety, depression, or smoking. The outcome of nonoperative treatment for lower extremity arthritis may be assessed using patient-reported outcome measures or similar methods.

We know that patients who exceed a cutoff value have an increased risk of complications after surgery; therefore, we have assumed that the cutoff value is the goal. However, patients who exceed the cutoff value for BMI and then successfully reduce their BMI may not necessarily have a reduced risk of complications. This finding indicates that although obesity is modifiable, the risk of complications for patients with obesity who undergo joint arthroplasty may not be modifiable. To answer question 5 and understand what goal is appropriate for a patient who exceeds a cutoff value, we need studies defining a goal value that, when achieved, results in a reduction in complications and adverse events. This would require a study of patients who exceed a cutoff value and then are treated for their medical condition and proceed to undergo joint arthroplasty. The outcome and risk of complications in this patient population may need to

be stratified by age or other demographics, and by the relative improvement in risk factor reduction such as percent reduction of BMI or hemoglobin A1c, to determine how much and in which patients the modifiable risk factor must be modified to become a factor that, when modified, reduces the risk of complications.

References

1. Dlott CC, Metcalfe T, Jain S, Bahel A, Donnelley CA, Wiznia DH. Preoperative risk management programs at the top 50 orthopaedic institutions frequently enforce strict cutoffs for BMI and hemoglobin A1c which may limit access to total joint arthroplasty and provide limited resources for smoking cessation and dental care. *Clin Orthop Relat Res*. 2023;481:39-47.
2. Dundon JM, Bosco J, Slover J, Yu S, Sayeed Y, Iorio R. Improvement in total joint replacement quality metrics: year one versus year three of the bundled payments for care improvement initiative. *J Bone Joint Surg Am*. 2016;98:1949-1953.
3. Leopold SS. Editorial: the shortcomings and harms of using hard cutoffs for BMI, hemoglobin A1C, and smoking cessation as conditions for elective orthopaedic surgery. *Clin Orthop Relat Res*. 2019;477:2391-2394.
4. Leopold SS. Editor's spotlight/take 5: eligibility criteria for lower-extremity joint replacement may worsen racial and socioeconomic disparities. *Clin Orthop Relat Res*. 2018;476:2297-2300.
5. Li S, Luo X, Sun H, Wang K, Zhang K, Sun X. Does prior bariatric surgery improve outcomes following total joint arthroplasty in the morbidly obese? A meta-analysis. *J Arthroplasty*. 2019;34:577-585.
6. McLawhorn AS, Buller LT. Bundled payments in total joint replacement: keeping our care affordable and high in quality. *Curr Rev Musculoskelet Med*. 2017;10:370-377.
7. McLawhorn AS, Levack AE, Lee YY, Ge Y, Do H, Dodwell ER. Bariatric surgery improves outcomes after lower extremity arthroplasty in the morbidly obese: a propensity score-matched analysis of a New York statewide database. *J Arthroplasty*. 2018;33:2062-2069.
8. Smith TO, Aboelmagd T, Hing CB, MacGregor A. Does bariatric surgery prior to total hip or knee arthroplasty reduce post-operative complications and improve clinical outcomes for obese patients? Systematic review and meta-analysis. *Bone Joint J*. 2016;98:1160-1166.