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CORR Insights®: Obesity Epidemic: Is Its Impact on Total Joint Arthroplasty Underestimated? An Analysis of National Trends

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Where Are We Now?

Few issues within adult reconstruction have received as much attention in the past few years as obesity. There is little disagreement about the basic premise that as a patient's weight goes up, so too

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does the risk of complications after arthroplasty surgery. However, far less clear is what to do about this problem. The debate regarding how to manage obesity in the joint replacement population encompasses important ethical, political, and social issues. The move toward value-based care and bundled-payment models has only increased the intensity of this debate.

The study of obesity and its impact on total joint arthroplasty outcomes is complex. Obesity is associated with numerous medical comorbidities and socioeconomic factors that can adversely impact outcomes following total joint replacement. Stripping out the confounding variables in an attempt to tease out the inherent risk of obesity is challenging. Research using matching has suggested that although obesity is associated with complications following TKA, the independent impact of obesity as an isolated variable appears to be

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fairly modest [1]. It is also important to recognize that research has suggested an association between obesity and outcomes; a direct causal relationship between obesity and complications, if it exists, has yet to be established.

In the present study, George and colleagues studied the association between the increasing prevalence of obesity on primary, revision, and infected total joint arthroplasty in the United States. Their mathematic models suggest that the increasing prevalence of obesity is associated with an increased infection and revision burden.

Where Do We Need To Go?

Should we take these numbers to the bank? No, or at least not yet. Future studies will have to confirm or refute these findings, since there is some uncertainty in the dataset, and the authors' sensitivity analyses (provided in the appendix of the article) point out that small changes in the assumptions they made could result in different estimates of effect size. However, their broad conclusion that the growing

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prevalence of obesity will have implications for the infection and revision burden is provocative and worthy of further investigation.

The present study used BMI, but there is mounting evidence that BMI does not perfectly represent the health risks associated with obesity. For example, a recent meta-analysis suggested that a pattern of central obesity is more accurate than BMI in predicting obesity-related cardiovascular complications [2]. While BMI is a practical and simple way to measure obesity, body fat distribution may have a better association with outcomes following hip and knee replacement. Future work to clarify this will be important to surgeons as they try to assess the risks of surgery in their individual patients and decide who is an appropriate surgical candidate.

We also need to remember that patient weight and adiposity is a continuous variable. Simply classifying patients as either obese or not will fail to further our understanding on this topic. Morbid or severe obesity (BMI > 40 kg/m² or 50 kg/m²) entail far more serious health consequences than moderate obesity, and create additional technical challenges for surgeons. The importance of recognizing the severity of obesity will only become more important in the future given that the prevalence of morbid obesity appears to be increasing faster than more moderate

levels of obesity. We must move away from treating obesity as a dichotomous variable.

Further research is needed to help define actions we can take to mitigate the risks of obesity in joint replacement patients. Obesity is clearly a modifiable risk factor, and while it seems intuitive that weight loss will reduce the risks of infection and revision, high-quality data to support that conclusion is currently lacking. There may be other interventions, such as preoperative nutritional screening and improving the local soft-tissue delivery of perioperative antibiotics, which could positively impact outcomes.

How Do We Get There?

Epidemiological studies that use modeling are helpful but have their limitations. Evidence of a trend is suggestive, but far from definitive. The results from the present study should be interpreted as a plausible estimate of the impact of obesity on the practice of arthroplasty in the United States. Confirmation with prospective, longitudinal data is required. A robust joint replacement registry, as is being constructed with the American Joint Replacement Registry seems perfectly suited to answering questions regarding national trends in the practice of hip and knee arthroplasty.

As far as the broader topic of obesity and joint replacement, experimental studies evaluating the effect of weight loss interventions or other techniques to mitigate complications are feasible and of great practical importance. Such prospective studies should be relatively simple to design and execute. Randomization would control some of the confounding variables that are present in observational studies, as those obese patients receiving the intervention should be similar to those in the control group. The results of interventions that modify different factors associated with obesity, such as nutrition or lifestyle, could answer questions about what exactly it is about obesity that leads to complications. In addition to improving our scientific understanding of this topic, the clinical benefit of developing practical and effective interventions to improve outcomes in this population cannot be overstated.

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