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CORR Insights®: Can Patient Selection Explain the Obesity Paradox in Orthopaedic Hip Surgery? An Analysis of the ACS-NSQIP Registry

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Where Are We Now?

In their study of more than 91,000 patients, Zhang and colleagues [5] found that patients with morbid obesity (> 40 kg/m2) who underwent nonurgent hip surgery between 2011 and 2014 were less likely to die and less likely to have cardiac and respiratory complications within 30 days compared to patients with a normal weight (18.5–24.9 kg/m2). They also found that patients with morbid obesity and patients with normal weight who underwent urgent hip surgery had no differences in their odds of death within 30 days. Finally, they learned that patients with morbid obesity were more likely to have wound complications (regardless of whether the index procedure was urgent or nonurgent). The idea that patients with a condition that might appear to be associated with poorer health (obesity) are less likely to experience major complications or death after surgery has been termed "the obesity paradox," and it has been reported by others both after hip fracture [2] and elective arthroplasty [4].

Zhang and colleagues [5] contend that the obesity paradox may be the result of preoperative patient selection. Indeed, it does seem to me that more attention is being paid of late to ensuring that patients are both well selected and as medically prepared as possible for elective hip surgery. This seems especially important in today's environment where cost-effective care is critical, and where alternative-payment models such as bundled-payment programs make providers fiscally responsible for the care of complications after surgery.

Bronson and colleagues [1] explored the ethics and clinical benefits of delaying elective surgery to address potentially modifiable risk factors, and determined it is ethically sound when considering elective total joint replacement. I suspect that these delays may have occurred with increasing frequency in the current study, as these alternative-payment programs have proliferated during the study period. Delaying nonurgent hip surgery to address modifiable risk factors may have reduced the risks in the nonurgent group of the study by Zhang and colleagues [5]. For example, if surgeons are more-carefully selecting patients in order to minimize complication risks, and if there are increased efforts and resources aimed at improving health conditions before elective hip surgery in order to minimize complications as we have seen in previous studies [3], then there will likely be fewer risks in the nonurgent hip surgery group. If these efforts are more frequent and have greater impact in the obese group, this may partially explain the "obesity paradox" noted by the authors. Although evidence of this is lacking, it is also possible that obesity or some manifestation of it has a protective effect that is not yet understood.

This CORR Insights® *is a commentary on the article* "Can Patient Selection Explain the Obesity Paradox in Orthopaedic Hip Surgery? An Analysis of the ACS-NSQIP Registry" *by Zhang and colleagues available at:* DOI: 10.1007/s11999.0000000000000218.

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Because of the short preoperative period, it is more difficult to modify risk factors in the urgent hip surgery population compared to the nonurgent group. Perhaps this explains the results of the current study, which found that clinicians offer more avenues to improve medical conditions for patients with obesity (30–39.9 kg/m2) in the nonurgent hip surgery group. In addition, the data indicates that obesity alone should not be used as a criterion for who is at risk for complications after surgery, and patients with obesity under the right circumstances can do as well or better than normal weight patients after hip procedures.

Where Do We Need To Go?

Although complications may be reduced among patients with obesity who undergo elective surgery, patients with morbid obesity were more likely to experience wound complications after surgery [5]. This knowledge could potentially bias clinicians evaluating patients with obesity and may make surgeons less likely to offer those patients an operation. Alternatively, it is possible that patients with normal weight are not viewed through the same critical preoperative lens, and do not receive the same support from physicians and other caregivers compared to patients with obesity, thus changing their preoperative work-up, the number of preoperative tests they receive, and potentially negatively impacting the quality of care they receive. In this way it is possible that surgeons are more restrictive with patients with obesity regarding surgical indications, but the opposite effect, where nonobese patients receive less preoperative testing and treatment can also take place. This could lead to differences other than obesity in these populations, which could at least partially explain the findings of this analysis. Increased measurement and reporting of quality outcomes may impact this practice as well. Indeed, the increased pressure to minimize all complications and readmissions may remove the incentive to treat higher risk patients for elective procedures. Furthermore, patients with obesity may be treated differently after surgery. For example, it is possible providers chose different deep vein thrombosis chemoprophylaxis agents for this patient population, perhaps putting patients without obesity—paradoxically—at greater risk for thromboembolic complications than those with obesity. Certain clinical practices, such as using specialized dressings, may decrease wound complications, and if preferentially used in either the obese or nonobese population, this could impact the results. Further studies examining if this is the case, and the outcomes of these clinical strategies, are needed. The opposite effect, whereby obesity biases providers in some way to do less preoperatively, is possible, and this could also impact the results in some undefined way. Finally, it is possible that obesity reflects or provides an uncharacterized protective effect that is not currently recognized.

Additionally, the current study found that patients who were underweight experienced increased complications and mortality both for urgent and nonurgent hip surgery [5]. We still need to determine the ideal evaluation and care for these patients prior to hip surgery. This highlights the principle that a high weight or BMI alone cannot be used as the sole arbiter of a patient's health status prior to both urgent and nonurgent hip surgery.

Factors other than obesity impacting mortality and morbidity should be considered by providers treating patients undergoing hip surgery regardless of whether a patient has obesity or is of a normal weight, and special care should be taken with patients who are underweight, since they appear to be at increased risk both with urgent and nonurgent hip procedures.

How Do We Get There?

The precise indications for nonurgent hip surgery, including total hip replacement, are only partially defined. Studies quantifying the precise risks that an individual patient has with surgery, and comparative-effectiveness trials examining the evaluation and preoperative treatment programs for each patient undergoing both urgent and nonurgent hip surgery are needed as numerous questions remain. For example, does preoperative weight loss have an impact on the complication rates, readmission rates, and functional outcomes of elective total hip replacement? Does tobacco cessation reduce the risk associated with total hip replacement? Can we impact patients in the urgent population after surgery? What type of program achieves the best results? Although studies that address these issues are challenging, they could be used to construct a more-precise risk profile and preoperative intervention strategy for each individual patient, which could lead to more-complete shared decision-making in hip surgery.

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References

1. Bronson WH, Fewer M, Godlewski K, Slover JD, Caplan A, Iorio R, Bosco J. The

ethics of patient risk modification prior to elective joint replacement surgery. *J Bone Joint Surg Am.* 2014;96:e113.
2. Flodin L, Laurin A, Lökk J, Cederholm T, Hedström M. Increased 1-year survival and discharge to independent living in overweight hip fracture patients: A prospective study of 843 patients. *Acta Orthop*. 2016;87:146–151.
3. Maoz G, Phillips M, Bosco J, Slover J, Stachel A, Inneh I, Iorio R. The Otto Aufranc Award: Modifiable versus nonmodifiable risk factors for infection after hip arthroplasty. *Clin Orthop Relat Res.* 2015;473:453–459.
4. Shaparin N, Widyn J, Nair S, Kho I, Geller D, Delphin E. Does the obesity paradox apply to early postoperative complications after hip surgery? A retrospective chart review. *J Clin Anesth*. 2016;32:84–91.
5. Zhang JC, Matelski J, Gandhi R, Jackson T, Urbach D, Cram P. Can patient selection explain the obesity paradox in orthopaedic hip surgery? An Analysis of the ACS-NSQIP registry. *Clin Orthop Relat Res*. [Published online ahead of print]. DOI: 10.1007/s11999.0000000000000218.