Investigators Compare Outcomes of ORIF Versus THA for Femoral Neck Fractures

TERRY STANTON

A study comparing outcomes with open reduction and internal fixation (ORIF) versus total hip arthroplasty (THA) for femoral neck fractures in patients younger than age 65 years found that THA was a cost-effective option for healthy patients older than 54 years. THA was also a cost-effective option for patients with mild comorbidity older than 47 years and for patients with multiple comorbidities older than 44 years.

The study, presented at the AAOS Annual Meeting by Eric Swart, MD, of the University of Massachusetts, used a Markov model to estimate outcomes of a theoretical cohort of patients sustaining an acute displaced femoral neck fracture treated with ORIF, THA, or hemiarthroplasty. After ORIF, patients either healed successfully or had nonunion or osteonecrosis requiring revision surgery, which was conversion to THA. In that cohort, conversion of failed ORIF to THA was modeled to behave as a revision THA. Literature has shown that such scenarios have worse outcomes than primary THA. They are often associated with issues of deformity, loss of bone stock, and scarring from prior approaches that are closer to those encountered in a revision THA.

Patients who underwent primary arthroplasty (either THA or hemiarthroplasty) were modeled to have a specified annual failure rate of their arthroplasty requiring revision, and once revised, were assigned annual re-revision rates. Each procedure was assigned a cost, and for each year of life, patients were given quality of life (QALYs) based on assigned utility values for that health state (Fig. 1).

The investigators calculated the total lifetime costs, health utility (QALY), and reoperation rate for ORIF, THA, and hemiarthroplasty as a function of age at time of injury. The model predicted that hemiarthroplasty would generally have the highest lifetime costs. THA had higher lifetime costs than ORIF when performed on relatively young patients, but the cost of THA decreased as patient age at time of injury increased. For patients older than 56 years at the time of injury, the cost of THA was lower than ORIF.

In a subanalysis, the patients undergoing ORIF were subdivided into those in whom the index surgery successfully healed versus those in whom it failed to unite and revision surgery was required. This analysis showed that patients between 40 and 65 years of age who failed to heal with ORIF would require an average of 1.9 additional operations throughout their lifetime, while those undergoing primary THA would require a mean 0.4 operations on average. The results, the authors write, show that for patients aged 40 to 65 years with a displaced femoral neck fracture, “both ORIF and THA can be cost-effective options, while hemiarthroplasty has inferior results.” They observed, “Although ORIF and THA have similar health outcomes on average, the patients who undergo ORIF and heal their fracture have slightly better outcomes than THA with considerably lower costs, while those who fail to heal have notably worse outcomes with a higher reoperation rate. The success rate of ORIF is a function of (a) patient factors like injury mechanism, medical comorbidity, and fracture pattern, (b) surgeon factors, including comfort with complex ORIF and with primary THA, and (c) system factors, including operating room resources/accessibility and availability of specialist surgeons trained in either arthroplasty or advanced fracture fixation.”

Thus, they conclude, “Our study suggests that the transitional age where THA should be considered is 54 years in healthy patients, 47 years for those with mild comorbidity, and 44 years for patients with multiple comorbidities. However, rather than specifying treatment decisions, it is our hope that this study can add clarity to the conversation between patient and surgeon. The surgeon can evaluate the patient’s injury characteristics and comorbidities to estimate the likelihood of ORIF successfully healing and use that to counsel the patient about treatment options through a process of shared decision-making.”

Dr. Swart said he and his colleagues undertook the study because, “over the past few years, we have seen what feels like an increasing number of ‘middle-aged’ patients with displaced femoral neck fractures. This has led to challenging treatment decisions, usually involving discussions between trauma surgeons, arthroplasty surgeons, and the patient about their health, activity level, and goals. When speaking with patients, it is often difficult to give concrete, evidence-based answers about what to expect with different treatment options (arthroplasty vs. ORIF). In general, we felt that the current decision process was largely guided by our general impressions and best judgement, but that it lacked a firm quantitative backing based on available evidence.”

Of the study’s findings he said, “The ‘cut-off’ age above which arthroplasty performed better than ORIF in healthy patients (55 years) was a little lower than we expected, and significantly lower for patients with multiple medical comorbidities (45 years). This may be a little younger than for what most surgeons would consider primary arthroplasty for a displaced femoral neck fracture, but this analysis supports the decision to perform arthroplasty in some cases.”

The results, he said, show that “in patients 45 to 65 years old with a displaced femoral neck fracture, consideration of primary THA is reasonable, and, in some circumstances, preferable to ORIF. This is strongly dependent on the presurgical probability of ORIF successfully healing.”

In regard to future research, Dr. Swart said, “Ideally, we would have better, more accurate data to predict the union rate of ORIF as a function of injury characteristics in patients in this age group to help inform surgeons and counsel patients, as the current data is very limited. Additionally, as we get more data about the long-term survival of THA with high molecular weight polyethylene, the results of this model may change.”

Dr. Swart’s coauthors of “ORIF or Arthroplasty for Displaced Femoral Neck Fractures in Patients Under 65: An Economic Decision Analysis,” are Paulvalery Roulette, MD; Daniel Leas, MD; Kevin J. Bozic, MD, MBA; and Madhav A. Karunakar, MD.

The authors’ disclosure information can be accessed at www.aaos.org/disclosure.

Terry Stanton is the senior science writer for AAOS Now. He can be reached at tstanton@aaos.org