No difference in medium-term reoperation rates following acute total hip arthroplasty versus open reduction internal fixation for elderly acetabular fractures

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INTRODUCTION:

The management of elderly acetabular is complex, with high rates of conversion total hip arthroplasty (THA) after open reduction internal fixation (ORIF), but potentially higher rates of complications after acute THA. Few studies exist comparing the medium and long-term risk of reoperation following the surgical management or elderly acetabular fractures. This study uses a longitudinal state-wide database to compare the risk of revision surgery (conversion THA versus revision THA) following ORIF or acute THA for elderly acetabular fractures.

METHODS:

The California Office of Statewide Health Planning and Development (OSHPD) database was queried between 2010 and 2017 for all patients aged 60 or older who sustained a closed, isolated acetabular fracture and underwent either ORIF, THA or a combination. Patients undergoing THA in isolation or THA with ORIF were analyzed together. Patients within this database have a unique identification number which allows for longitudinal tracking of all patient visits in California hospitals. Using this, all patients who underwent second surgery for either conversion THA, revision THA, or revision ORIF were identified. Chi-squared tests and student-t tests were used to identify demographic differences between groups. Multivariate regression was used to evaluate predictors of 30-day readmission and 90-day complications. Kaplan-Meier (KM) survival analysis and Cox proportional hazards modeling was used to estimate the reoperation free survival (RFS), with reoperation defined as conversion THA, revision ORIF or revision THA.

RESULTS:

A total of 2,184 surgically managed acetabular fractures in elderly patients occurred in California between 2000 and 2017, with 1,637 (75.0%) undergoing ORIF, 547 (25.0%) undergoing THA. The proportion undergoing acute THA did not change over time (p=0.25). Of ORIF patients, 238 (14.5%) underwent conversion arthroplasty and 1 underwent revision ORIF. Of THA patients, 32 (5.6%) underwent revision THA. Median follow-up was 295 days (IQR 13 to 1720 days).

THA patients tended to be older (76.4 vs 71.3 years, p<0.001), more likely to identify as non-Hispanic white race and ethnicity (81.3% vs 76.4%, p=0.021), more likely to have Medicare insurance (79.7% vs 58.6%, p<0.001), less likely to be male (38.0% vs 65.7%, p<0.001) and less likely to receive care at a teaching hospital (21.9% vs 30.8%, p<0.001). THA patients also had higher levels of baseline chronic kidney disease (8.2 vs 4.8%, p=0.003), COPD (8.8% vs 6.0%, p=0.03), depression (5.7% vs 2.0%, p<0.001), dementia (10.6% vs 3.7%, p<0.001), and morbid obesity (4.2% vs 2.1%, p=0.014), but similar rates of diabetes (11.9% vs 8.9%, p=0.051).

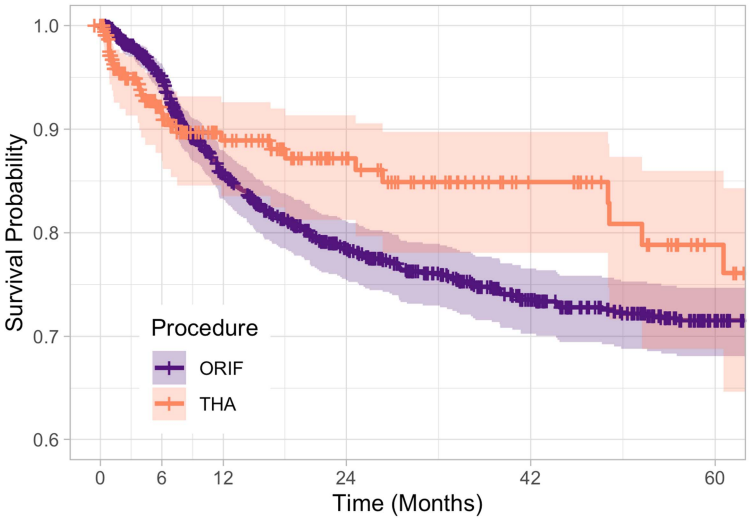
Unadjusted KM analysis showed no difference RFS between ORIF and THA (log-rank test p=0.28, Figure 1). RFS for ORIF patients was 95.1%, 85.8%, 78.4% and 71.5% at 6, 12, 24 and 60 months, respectively. RFS for THA patients was 91.6%, 88.9%, 87.2% and 78.8% at 6, 12, 24 and 60 months, respectively. RFS was similar between THA and ORIF patients on univariate (p=0.28) and multivariate analysis (p=0.40). Older age was associated with increased RFS (Age 80+ vs 60-69 years, HR 0.61, p=0.007), non-Hispanic white race was associated with decreased RFS (HR 1.38, p=0.037).

Univariate analysis of complications showed that THA patients had a higher risk of 30-day readmission (OR 1.33, p=0.029), 90-day mechanical complications (OR 1.92, p=0.006), and a lower rate of pneumonia (OR 0.51, p<0.001), with no difference in surgical site bleeding, wound infection, sepsis, or myocardial infarction compared to ORIF. Readmission rates were similar after multivariate adjustment (p=0.22), as were mechanical complication rates (p=0.17), however rates of pneumonia remained significantly lower in THA patients (OR 0.43, p<0.001).

Figure 1 – Kaplan-Meier RFS curves. For THA patients, reoperation defined as revision THA, for ORIF patients, reoperation defined as conversion THA. Shaded area represents 95% confidence interval.

DISCUSSION AND CONCLUSION:

In the surgical management of elderly acetabular fractures, there is no difference in risk of reoperation following acute THA or ORIF. However, the risk of reoperation – either conversion THA or revision THA – was substantial in the medium-term, with a nearly 30% rate of conversion arthroplasty at 5 years. We found minimal difference in short term complications between different groups. Further long-term study is necessary to determine if a long-term survival benefit exists for acute THA versus ORIF in the treatment of elderly acetabular fractures.


1.0
0.9
0.8
0.7
0.6
Survival Probability
Procedure
ORIF
THA
0
6
12
24
42
60
Time (Months)