Cost-Effectiveness of Fixation Versus Acute Total Hip Arthroplasty for Operative Acetabulum Fractures

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Purpose: Recent studies have demonstrated high rates of posttraumatic arthritis and conversion arthroplasty for elderly patients with displaced acetabulum fractures treated with open reduction and internal fixation (ORIF). The purpose of this study was to evaluate the cost-effectiveness of ORIF versus acute total hip arthroplasty (aTHA) for operatively treated acetabulum fractures.

Methods: A Markov decision analysis model was created to simulate outcomes after ORIF or aTHA in patients who sustained an acetabulum fracture requiring operative intervention. Costs, health state utilities, reoperation rates, and mortality rates were populated from a systematic review of clinical studies published in the last 20 years as well as publicly available data. The model was used to estimate the threshold age above which aTHA would be the superior strategy, utilizing a willingness-to-pay threshold set at $100,000 per quality-adjusted life year (QALY) and a lifetime time horizon.

Results: The results of the systematic review and pooled failure rates of ORIF are summarized in Tables 1 and 2. The Markov decision analysis model and lifetime total cost of treatment are summarized in Figures 1 and 2, respectively. Acute THA was found to be a more cost-effective treatment option for patients older than 59 years with an operative acetabulum fracture whereas ORIF was a more cost-effective option for patients younger than 59 years (Figure 2). Compared with ORIF, aTHA for a 70 year-old patient was associated with a greater quality of life benefit (5.16 QALYs vs 4.96 QALYs) and lower cost ($48,703 vs $ 72,171).

Conclusion: Compared to ORIF, aTHA is a more cost-effective treatment for operative acetabulum fractures in patients over the age of 59 years.

Table 1: Results of Systematic Review of Acetabulum ORIF or aTHA

	ORIF		aTHA	
Number of Studies	64		26	
Patients (N)	10,642		454	
	N	%	N	%
Mortality	253	2.4%	33	7.3%
Conversion or Revision	2,029	19.1%	23	5.1%
	Mean	Range	Mean	Range
Follow-Up (years)	4.3	1-13.5	3	1 - 6.8

Table 2: Pooled Conversion to THA Rates of ORIF for Acetabulum Fracture as a Function of Age in Studies Included in Analysis

Age Group	# Studies	ORIF N	Failure N	% Failure
<50	41	9165	1404	15.3%
50-69	12	977	166	17.0%
70+	11	500	125	25.0%
Total	64	10642	1695	15.9%

Figure 1: Markov decision analysis model, ORIF or aTHA for Acetabulum Fracture

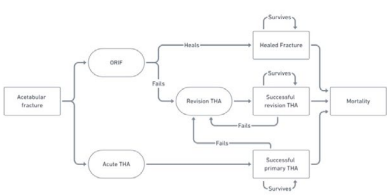
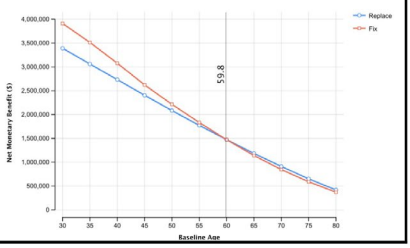


Figure 2: Lifetime Total Cost as a Function of Age and Treatment Decision



The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device they wish to use in clinical practice.