Lower Length of Stay and Higher Rate of Discharge Home for Patients Undergoing Fix and Replace versus Fixation Alone in the Treatment of Geriatric Acetabular Fractures

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INTRODUCTION:
Although advances in techniques and implants for acetabular fracture management have demonstrated improved anatomical reduction, the risk of posttraumatic arthritis predisposing a patient to a future total hip arthroplasty (THA) still remains. THA for posttraumatic arthritis has also been shown to have higher revision rates than THA for osteoarthritis. Furthermore, early mobilization postoperatively to avoid complications associated with immobility and prolonged bedrest are one of the primary goals, especially in geriatric acetabular fracture patients. The purpose of this study was to compare early outcomes and discharge parameters between patients undergoing Fix and Replace (FaR) versus Fixation Alone (FA) in the treatment of geriatric acetabular fractures.
METHODS:
A retrospective review was performed from January 2017 to April 2022 identifying consecutive acetabular fracture patients aged ≥ 55 years old treated by two orthopaedic trauma surgeons at one tertiary care center with FaR vs. FA with complete datasets within the 90 day global period. The primary outcomes were length of hospital stay (LOS), postoperative weightbearing status, postoperative disposition, and 90-day readmission rates. Secondary outcomes included demographic information, injury mechanism, surgical time, complications, revisions, and pre- and postoperative Hip Disability and Osteoarthritis Outcome Score Joint Replacement (HOOSJR) scores.
RESULTS:
Twenty-four FaR patients (average age 72.1 ± 1.0years) and 11 FA patients (average age 71.0 ± 10.8years) met inclusion criteria. Mean follow up was 24months (range:6 - 61.2months). A greater proportion of FaR patients had preoperative hip osteoarthritis (13% vs. 0%, **p=0.029**) (**Table 1**). The LOS was shorter in the FaR group compared to the FA group (5.5 ± 2.6days vs. 7.6 ± 3.4 days, **p=0.033**). More FaR patients were discharged to lower acuity postoperative care (**p=0.035**) and were ordered immediate weightbearing as tolerated, although this did not reach statistical significance (33% vs. 18.2%, p=0.171) (**Table 2**). Time to complication occurred earlier in the FaR group (2.2 ± 3.3months vs. 8.8 ± 7.3months, **p=0.034**), however total complication rates did not differ significantly between groups (p=0.948). FaR patients who had elevated BMI were more likely to have a postoperative complication (OR: 1.229, 95% CI: 1.016 – 1.486, **p=0.034**). There were no other differences in demographics, operative time, 90-day readmission rates, radiographic union, time to union, pre- or postoperative HOOSJR scores, delta HOOSJR scores, or reoperation rates between groups.
DISCUSSION AND CONCLUSION: Patients in the FaR group exhibited significantly lower LOS and higher rates of discharge home. Fracture patterns with poor prognostic indicators led to treatment with combined FaR modalities leading to earlier weightbearing, however, being fairly aggressive with the FA cohort, early weightbearing was also promoted. Future studies comparing the potential benefits of FaR (less need for perfect reduction, place THA, and weightbear earlier) vs. the risks (THA infection/dislocation/loosening) in the geriatric acetabular population is needed, but we hope that this comparative study will allow for the template for future refinement studies.

Table 1. Baseline Demographic Data

	Overall (n=35)	FaR (n=24)	ORIF only (n=11)	P-Value
Age (in Years) at DOS, mean ± SD	71.7 ± 10.1	72.1 ± 1.0	71.0 ± 10.8	0.774
BMI, mean ± SD	27.0 ± 6.4	27.7 ± 7.4	25.4 ± 2.9	0.197
Percent Male, n(%)	11 (40%)	9 (38%)	6 (55%)	0.344
Smoking, n(%)				
Never	28 (80%)	19 (79%)	9 (82%)	
Former	2 (6%)	2 (8%)	0 (0%)	0.579
Current	5 (14%)	3 (13%)	2 (18%)	
History of Hip Osteoarthritis. n(%)	8 (23%)	8 (33%)	0 (0%)	**0.029**
Tönnis Grading Scale of Hip Osteoarthritis, n(%)				
0	18 (51%)	8 (33%)	10 (91%)	
1	11 (31%)	11 (46%)	0 (0%)	**0.005**
2	6 (17%)	5 (21%)	1 (9%)	
History of Osteoporosis, n(%)	9 (26%)	6 (25%)	3 (27%)	0.886
Mechanism of Injury, n(%)				
Fall from 0-4m	25 (71%)	15 (63%)	10 (91%)	
Bike fall/crash	1 (3%)	1 (4%)	0 (0%)	
Motor vehicle accident	1 (3%)	0 (0%)	1 (9%)	0.209
Fracture due to osteoporosis	1 (3%)	1 (4%)	0 (0%)	
Occult acetabular fracture	4 (11%)	4 (17%)	0 (0%)	
Pathologic fracture	3 (9%)	3 (13%)	0 (0%)	
Polytrauma	3 (9%)	2 (8%)	1 (9%)	0.941
Acetabular Fracture Laterality, n(%)				
Left	16 (46%)	11 (46%)	5 (46%)	
Right	18 (51%)	13 (54%)	5 (46%)	0.318
Bilateral	1 (3%)	0 (0%)	1 (9%)	
AO/OTA Fracture Classification, n(%)				
62A1.2	3 (9%)	3 (13%)	0 (0%)	
62A2.1	2 (6%)	2 (8%)	0 (0%)	
62A3.1	1 (3%)	1 (4%)	0 (0%)	
62A3.2	4 (11%)	1 (4%)	3 (27%)	
62B1.2	3 (9%)	3 (13%)	0 (0%)	
62B2.3	1 (3%)	1 (4%)	0 (0%)	0.21
62B3.1	1 (3%)	1 (4%)	0 (0%)	
62B3.2	1 (3%)	0 (0%)	1 (9%)	
62C1	1 (3%)	1 (4%)	0 (0%)	
62C2	16 (46%)	11 (46%)	5 (46%)	
62C3	2 (6%)	1 (4%)	1 (9%)	
Femoral Head Impaction	4 (11.4%)	4 (17%)	0 (0%)	0.203
Acetabular Marginal Impaction	12 (34.3%)	10 (42%)	2 (18%)	0.165
Superior Medial Acetabular Impaction "gullsign"	12 (34.3%)	9 (38%)	3 (27%)	0.424
Posterior Wall Comminution	4 (11%)	4 (17%)	0 (0%)	0.203
Displacement >20mm	7 (20%)	5 (21%)	2 (18%)	0.619
Letournel Classification of Acetabular Fx, n(%)				
Elementary patterns	13 (37%)	10 (42%)	3 (27%)	
Posterior wall	3 (9%)	3 (13%)	0 (0%)	
Posterior column	2 (6%)	2 (8%)	0 (0%)	
Anterior wall	1 (3%)	1 (4%)	0 (0%)	
Anterior column	4 (11%)	1 (4%)	3 (27%)	
Transverse	3 (9%)	3 (13%)	0 (0%)	
Associated patterns	22 (63%)	14 (58%)	8 (73%)	0.086
Posterior column + posterior wall	0 (0%)	0 (0%)	0 (0%)	
Transverse posterior wall	0 (0%)	0 (0%)	0 (0%)	
T-style	1 (3%)	1 (4%)	0 (0%)	
Anterior column posterior hemitransverse	3 (9%)	0 (0%)	2 (18%)	
Both columns	18 (54%)	13 (54%)	6 (55%)	
PMH of Diabetes Mellitus, n(%)	7 (20%)	5 (21%)	2 (18%)	0.854
Charlson Comorbidity Index, n(%)				
Mild (0–2)	10 (29%)	6 (25%)	4 (36%)	
Moderate (3–4)	10 (29%)	8 (33%)	2 (18%)	0.615
Severe (≥5)	15 (43%)	10 (42%)	5 (46%)	
Charlson Comorbidity Index, mean ± SD	4.3 ± 2.4	4.4 ± 2.5	3.6 ± 2.2	0.292

FaR, Fix and Replace; DOS, date of service; BMI, body mass index; ORIF, open reduction and internal fixation

Table 2. Postoperative Outcomes

	Overall (n=35)	FaR (n=24)	ORIF only (n=11)	P-Value
Immediate postoperative weightbearing status, n(%)				
Non weight bearing	3 (9%)	3 (13%)	0 (0%)	
Immediate weight bearing as tolerated	10 (29%)	8 (33%)	2[†] (18.2%)	
Toe touch weight bearing	17 (49%)	8 (33%)	9[‡] (82%)	0.171
Partial weight bearing 30lbs	1 (3%)	1 (4%)	0 (0%)	
Partial weight bearing 50%	1 (3%)	1 (4%)	0 (0%)	
Partial weight bearing - flat foot	4 (11%)	3[†] (13%)	1 (9%)	
Length of Stay (days), mean ± SD	6.2 ± 3.0	5.5 ± 2.6	7.6 ± 3.4	**0.033**
Disposition, n(%)				
Home	16 (47%)	12 (50%)	4 (36%)	
Subacute Rehabilitation Facility	12 (34%)	10 (42%)	2 (18%)	**0.035**
Acute Rehabilitation Facility	7 (21%)	2 (8%)	5 (46%)	
Radiographic Union Achieved*, n(%)	31 (89%)	22 (92%)	9 (82%)	0.395
Time to Union (months)*, mean ± SD	3.5 ± 2.4	3.7 ± 2.6	3.0 ± 1.6	0.439
Clinical follow-up time (years), mean ± SD	2.0 ± 1.3	1.8 ± 1.1	2.5 ± 1.7	0.245
HOOS Jr preoperatively, mean ± SD	69.8 ± 27.5	65.2 ± 26.8	79.5 ± 27.7	0.162
HOOS Jr most recent f/u, mean ± SD	76.4 ± 23.5	77.0 ± 25.0	75.0 ± 21.1	0.815
Change in HOOS Jr, mean ± SD	6.3 ± 33.7	11.3 ± 34.7	−4.5 ± 30.0	0.203
Readmission within 90 days, n(%)	4 (11%)	4 (17%)	0 (0%)	0.15
Postoperative complication, n(%)	13 (37%)	9 (38%)	4 (36%)	0.948
Recurrent hip dislocation	1 (3%)	1 (4%)	0 (0%)	
Cellulitis	2 (6%)	2 (8%)	0 (0%)	
Serosanguineous drainage	1 (3%)	1 (4%)	0 (0%)	
Painful implant	2 (6%)	0 (0%)	2 (18%)	0.282
Anemia requiring transfusion	1 (3%)	1 (4%)	0 (0%)	
Aseptic loosening of THA implant	1 (3%)	1 (4%)	0 (0%)	
Periprosthetic joint infection	2 (6%)	2 (8%)	--	
Death	3 (9%)	1 (4%)	2 (18%)	
Time to Complication (months), mean ± SD	4.1 ± 5.4	2.2 ± 3.3	8.8 ± 7.3	**0.034**
Reoperation rate, n(%)	6 (17%)	4 (17%)	2 (18%)	0.912
revision THA for aseptic loosening	1 (3%)	1 (4%)	0 (0%)	
revision THA and ORIF acetabulum (cage)	1 (3%)	1 (4%)	0 (0%)	0.185
Removal of implant	2 (6%)	0 (0%)	2 (18%)	
revision THA for PJI	2 (6%)	2 (8%)	0 (0%)	
Time to reoperation (months), mean ± SD	4.0 ± 5.1	3.3 ± 4.5	5.5 ± 7.8	0.662

FaR, Fix and Replace ; †One patient had bilateral acetabular fracture fixation (right lower extremity was immediate weight bearing as tolerated, left lower extremity was toe touch weight bearing as tolerated); ‡One patient was flat foot weight bearing with heel slides with AFO in place; *4 Patients did not have adequate follow-up; HOOS Jr, hip disability and osteoarthritis outcome score for joint replacement; THA, total hip arthroplasty; ORIF, open reduction and internal fixation; PJI, periprosthetic joint infection