

Effect of Severity of Femoral Head Medialization on Complications Associated with Acetabular Fractures

*Madeline Shaoyun Tsee, MD; Jason Edward Meldau, MD; Amir M. Boubekri, MD; Ashley Levack, MD; Hobie D. Summers, MD; Joseph Bowman Cohen, MD
Loyola University Medical Center, Maywood, Illinois, UNITED STATES*

Purpose: Our objective was to determine how severity of femoral head medialization and other predictive factors affect complication prevalence for patients with acetabular fractures.

Methods: This is a retrospective cohort study of 86 adult patients sustaining acute acetabular fractures involving one or both columns with at least 1 year of clinical follow-up and no posterior dislocation. Data were collected on patient demographics, comorbidities, injury characteristics, management, and complications. Medialization of the femoral head was measured on pelvic radiographs as a ratio of the injured side to the intact side using SeleK and Sarlak method (ratio <1 indicates medialization), as well as categorized by presence of protrusion and subluxation versus dislocation. Patients were stratified into 4 levels of medialization severity using hierarchical agglomerative clustering. Variables were compared between medialization severity groups using analysis of variance, Kruskal-Wallis, 2, Fisher exact tests, and Cochran-Armitage trend tests. Cut-offs for the medialization ratio were found for each complication using logistic regression and maximization of the Youden index of sensitivity and specificity.

Results: Of 86 total patients, 37 (43.0%) were stratified into our no/minimal medialization category, and 13 (15.1%), 17 (19.8%), and 19 (22.1%) classified into the mild, moderate, and severe medialization groups, respectively. Additionally, 8 patients (9.3%) developed osteonecrosis (ON), 54 (62.8%) posttraumatic osteoarthritis (PTOA), 47 (54.7%) heterotopic ossification (HO), 6 (7.0%) postoperative infection, and 23 (26.7%) required reoperation. Medialization severity of the femoral head was associated with older age (60.9 years for severe medialization vs 47.3 for no/minimal medialization, $= 0.01$), osteoporosis ($= 0.03$), low-energy injury mechanisms ($= 0.001$), and presence of marginal impaction ($= 0.01$). More importantly, medialization severity was significantly correlated with increased complications including PTOA (78.9%, 82.4%, 53.8%, and 48.6% for the severe, moderate, mild, and no/minimal medialization groups, respectively, $= 0.003$), reoperation (42.1% of the severe vs 13.5% of the no/minimal medialization groups, $= 0.01$), and infection (21.1% of the severe vs 0.0% of the no/minimal medialization group, $= 0.01$). Individuals with more severe medialization with a ratio <0.81 had a 6.45-times higher likelihood of developing ON ($= 0.02$) in comparison to those above that ratio. Likewise, a medialization ratio 0.86 indicated a 25.29-times higher odds of developing post-surgical infection.

Conclusion: For patients with acetabulum fractures, more severe medialization of the femoral head occurred in elderly patients with osteoporosis and low-energy mechanisms and was associated with increased complications of PTOA, ON, infection, and reoperation.