

Posterior Wall Acetabular Fractures and Stability

Reza Firoozabadi, MD, MA¹; Clay A. Spitler, MD¹; Calvin L. Schlepp, MD¹;

Benjamin Hamilton, MS²; Julie Agel, MA¹; Paul Tornetta III, MD³;

¹Harborview Medical Center/University of Washington, Seattle, Washington, USA;

²Case Western Reserve University, Cleveland, Ohio, USA;

³Boston University School of Medicine, Boston, Massachusetts, USA

Purpose: The stability of the hip after posterior wall acetabular fractures is difficult to determine radiographically. Historically the percent of the posterior wall involvement was utilized to estimate stability based on cadaveric data. A history of dislocation may also aid in predicting instability. The purpose of this project was to determine if the radiographic parameters of femoral head coverage by the intact posterior wall, acetabular version, and location of fracture or a history of dislocation were determinates of hip stability based on intraoperative fluoroscopic examination after a posterior wall acetabular fracture.

Methods: A retrospective review of prospectively gathered data at a regional Level I trauma center was performed to identify patients who sustained a posterior wall acetabular fracture and underwent a fluoroscopic examination under anesthesia to determine instability. Patients were categorized as either stable or unstable and all comparisons compared these two groups. Measurements obtained using preoperative and postoperative CT scans included: ratio of remaining femoral head coverage at the fovea, cranial exit point of the fracture (mm from dome), roof edge angle, equatorial angle at fracture line, center edge angle, and percent wall involvement based on 3 published methods (Moed, Keith, Caulkin). A history of dislocation in the two groups was also recorded. A positive stress examination was any subluxation on any view of the hip in any position, including flexion, internal rotation, and posterior stress.

Results: 138 total patients underwent fluoroscopic stress examination of the hip under general anaesthesia of which 116 were stable and 22 unstable. Average age in stable group was 39 years old and 41 years in the unstable group. Mechanism of injury included 91 motor vehicle collisions, 6 pedestrian struck, 11 motorcycle collisions, 11 falls, and 19 other mechanisms. Table 1 displays the radiographic parameters studied.

Table 1. Radiographic Parameters

	Dislocations (<i>P</i> = 0.49)	Head Coverage at Rovea (<i>P</i> = 0.7)	Cranial Exit Point of Fracture (<i>P</i> = 0.004)	Roof Edge Angle (<i>P</i> = 0.85)	Equatorial Angle at Fracture Line (<i>P</i> = 0.69)	Center Edge Angle (<i>P</i> = 0.97)	Displaced wall size based on:		
							Moed (<i>P</i> = 0.02)	Keith (<i>P</i> = 0.001)	Caulkin (<i>P</i> = 0.96)
Unstable	15/22 (68%)	33%	5.0 mm	5.2°	13.1°	40.3°	26%	27%	25%
Stable	69/116(59%)	32.7%	9.5 mm	4.8°	12.4°	40.4°	21%	17%	25.3%

Conclusion: Determination of hip stability can be challenging in patients with posterior wall acetabular fractures. While displaced wall fragments over 50% are a reliable indicator of hip instability, radiographic assessment of stability in patients with smaller wall fragments is

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less predictable. Our data suggest that the location of the exit point of the fracture in relation to the dome of the acetabulum may be a radiographic marker that can be utilized to aid physicians in determining stability. Additionally, the presence of a hip dislocation was not associated with instability.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an “off label” use). For full information, refer to page 600.