A New Computed Tomography-Based Measure of Posterior Wall Acetabulum Fractures Decreases the Need for Examination Under Anesthesia

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Purpose: Examination under anesthesia (EUA) is the gold standard for definitive diagnosis of instability following posterior wall acetabulum fractures (PWFs). The percentage of mediolateral fragment involvement on axial CT is the primary diagnostic adjunct for determining stability, and deciding whether to perform EUA. An articular fracture emerging £5.0 mm from the dome has recently been reported as a risk for instability. Our objectives are to describe the technique and results for a new CT-based measure highly predictive of stability following PWF, and to compare the accuracy of this method to previously described measures within subgroups of patients.

Methods: This is a retrospective review of prospectively collected data from 50 consecutive patients between June 2017 and January 2022, all with high-energy PWFs, all undergoing EUA or demonstrating instability on static images. Utilizing 2-mm sagittal CT cuts of the affected side, an angular measure is generated based upon proximal and distal fracture lines as they transition to the articular surface. The angular measures were then used to identify a specific angle or range of angles that would most accurately predict instability. Four subgroups of patients were then identified based upon previously described CT-based measures: ³50% wall involvement (Moed method), fracture within 5.0 mm of dome, fracture within 5.0 mm and £20% involvement, and fracture within 5.0 mm and £50% involvement. The diagnostic accuracy of each measure was compared to the new method within their respective groups.

Results: 80% were male. Average age was 35 years (standard deviation [SD] 37). There were 29 operative and 21 nonoperative fractures, 26 unstable and 24 stable fractures. A sagittal measure of >70° predicted instability in 26/26 patients, and £70° predicted stability in 24/24 patients (100% sensitive, 100% specific; 95% confidence interval [CI] 87-100/86-100). Predicted instability for subgroups was as follows: ³50% wall involvement 11/16 (42% sensitive, 79% specific; 95% CI 23-61%/63-95%), fracture within 5.0 mm of dome 15/18 (58% sensitive, 88% specific; 95% CI 39-77%/75-100%), fracture within 5.0 mm and £20% involvement 1/1, and fracture within 5.0 mm and £50% involvement 8/10 (53% sensitive, 89% specific, 95% CI 28-78%/75-100%).

Conclusion: Our CT measure was 100% sensitive and specific for detecting instability following PWF. Implications include a reduced need for the invasive and costly EUA as well as the obligatory consumption of operating room resources.

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.