A Novel CT Assessment to Determine Hip Stability After Posterior Wall Fractures

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Background/Purpose: Posterior wall fractures of the acetabulum are among the most common types of acetabulum fractures. The stability of these fractures determines whether the patient would benefit from surgical intervention, but methods of predicting the stability using plain radiographs and 2-dimensional CT vary widely in the literature. This study investigates the use of different CT measurements to predict the stability of posterior wall fractures. We hypothesized that a modified posterior acetabular sector angle (PASA) and an angle developed by the authors not previously reported in the literature would accurately predict the stability of the fracture and correlate with a history of dislocation at the time of injury.

Methods: A retrospective evaluation was conducted of 73 patients with unilateral posterior wall fractures of the acetabulum from 2010 to 2014. The modified PASA, measured between a line joining the centers of the femoral heads and a line through the edge of the fracture, and ischial wall fracture angle (IWFA), measured between a line parallel to the ischium and a line through the edge of the fracture, were measured on the axial CT at the level of the most medial excursion of the fracture. This was done to measure the angle at the level where the posterior wall defect was largest. Statistical analysis was performed using a logistic regression to assess independent predictors of dislocation with significance set at a P value of <0.05.

Results: The modified PASA was unable to be measured in nine patients. 42 patients presented to the emergency room with dislocated hips or a known history of dislocation. The modified PASA was the only significant predictor for dislocation ($P = 0.009$). Statistical analysis showed that for each degree decrease in the modified PASA, the odds of dislocation increase by 0.916. 13 patients with no dislocation had a modified PASA equivalent to that of patients with known dislocations. There was no statistically significant correlation between the IWFA and dislocation.

Table 1. Logistic regression data. The odds ratio for the PASA shows that the odds of having a hip dislocation increase by 0.916 for every point decrease in the PASA.

	B	S.E.	P-value	Odds Ratio
PASA	-.087	.033	.009	.916
IWFA	-.006	.022	.795	.994
Constant	-6.368	11.825	.590	.002

PASA – Posterior acetabular sector angle, IWFA – Ischial wall fracture angle

POSTER ABSTRACTS

Conclusion: The modified PASA may adequately predict a history of hip dislocation, and thus stability, for posterior wall fractures that does not rely on determining the size of the wall defect. It might eliminate the indeterminate stability assessment present using methods that rely on measuring the fraction of the posterior wall involved. Further clinical studies to determine an acceptable cutoff for treatment direction are warranted.