Intra-articular air predicts hip joint instability following posterior wall fracture, irrespective of fracture size or history of dislocation

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INTRODUCTION:
Intra-articular air is oftentimes noted on computed tomography (CT) following hip dislocation, but has not been specifically studied as a predictor of hip stability following posterior wall acetabulum fracture (AO/OTA 62-A1). The purpose of this study is to determine if the presence of intra-articular air on CT scan correlates with hip instability as determined by examination under anesthesia (EUA) of posterior wall acetabulum fractures.
METHODS:
A multi-center retrospective analysis was performed on posterior wall acetabulum patients who underwent EUA from 2014 to 2024. Chart review was performed to record demographic, injury, and management information. Radiographs and CT scans were reviewed to evaluate presence of intra-articular air, fracture size (Calkins, Keith, and Moed methods), fracture distance from dome, and fracture displacement. Fisher's exact and Mann *U* Whitney tests were used to compare respective categorical and nominal variables between the EUA positive and negative groups. A subgroup analysis was also performed in patients who presented without a history of hip dislocation and underwent an EUA.
RESULTS: There were 38 positive (unstable) and 33 negative (stable) EUAs for posterior wall acetabulum fractures. Patients with a positive EUA had a significantly higher incidence of intra-articular air (82% vs 9%, $P < 0.001$), fracture displacement greater than 5 millimeters (76% vs 33%, $P < 0.001$), sagittal angle measurement greater than 70° (74 vs 21%, $P < 0.001$), and hip dislocation on injury radiograph (58 vs 18%, $P < 0.001$). In 43 patients who presented without a history of hip dislocation, intra-articular air was present significantly more often in the positive EUA group ($n = 16$) compared to the negative EUA group ($n = 27$) (75 vs 7%, $P < 0.001$).
DISCUSSION AND CONCLUSION:
Hip joint instability following posterior wall acetabulum fracture is significantly higher in patients with intra-articular air on CT scan – regardless of a history for hip dislocation. Fracture displacement greater than 5 millimeters and sagittal angle measurement greater than 70° were also found to be predictors of positive EUA. When these characteristics are found on injury imaging, an EUA should be considered to rule out hip joint instability.