Paper #44

Computed Tomography Evaluation of Elder Femoral Neck Fractures: Guiding Classification and Treatment

Elizabeth P. Davis, MD, David Rodriguez-Quintana, MD, Timothy Achor, MD

Introduction: The Garden classification guides treatment for elder femoral neck fractures. Stable patterns receive percutaneous screw fixation and unstable patterns receive arthroplasty. The purpose of this study is to determine if computed tomography (CT) better identifies posterior cortical roll-off and head angulation and predicts failure of percutaneous fixation of "stable" femoral neck fractures.

Methods: A retrospective study of elder femoral neck fractures seen at our institution between January 2017 and August 2019 was performed. Garden classification was done using an AP radiograph of the hip. If the patient had a CT, it was reviewed to determine if it altered initial Garden classification with regards to posterior cortical roll-off, displacement, fracture completeness, and head angulation. Student's t-test was used to compare means and chi-square to compare incidence rates.

Results: 249 patients, 168 females and 81 males with mean age of 79, were analyzed. There were 57 and 24 Garden I and II fractures. There were 33 and 134 Garden III and IV fractures. CT was available for analysis in 126 patients. CT changed classification from stable to unstable in 50% of patients. Garden I had a significantly higher incidence of classification change after CT than Garden II, III and IV ($p<0.05$). Posterior cortical roll-off and head angulation was seen in 57% of Garden I fractures. 21 patients required revision arthroplasty after percutaneous fixation failure. All were stable on radiographs and unstable on CT with posterior cortical roll-off and head angulation. Patients with stable patterns on radiographs and CT did well with percutaneous fixation at 6-months to 1-year follow-up.

Conclusions: Radiographs grossly underestimate posterior cortical roll-off, head angulation, and fracture completeness in elder femoral neck fractures. Patients with posterior cortical roll off and increased head angulation that were treated with percutaneous fixation had significantly worse outcomes requiring revision surgery to arthroplasty.

Notes