

More Anteromedial Coronoid Involvement in Combined Fractures of the Coronoid and Radial Head Than Traditional Teaching

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Purpose: This study aimed to evaluate: (1) what is the distribution of coronoid fracture morphology (ie, involvement of lateral sigmoid notch versus anteromedial process) according to the O’Driscoll classification in combined coronoid and radial head fractures? and (2) does a radiologically confirmed dislocation, “terrible triad” injury, influence the distribution of coronoid fracture types?

Methods: This retrospective multicenter cohort study evaluated preoperative CT scans from 167 adult patients who had combined coronoid and radial head fractures between February 2014 and March 2023. Mean age was 50 years (standard deviation [SD]: 15), and more than half of the patients were female (90/167 [54%]). Coronoid fractures were classified using the O’Driscoll classification.

Results: 66% of the combined coronoid and radial head fractures involved type 1 coronoid fractures (109/167), 29% had a type 2 coronoid fracture (50/167), and in 5% of the patients, a type 3 coronoid fracture was seen (8/167). 43% of the patients (71/167) had a confirmed ulnohumeral dislocation, “terrible triad” injury, on plain radiographs. For these dislocated elbows, we found a similar distribution when compared to the total group; 64% (45/71) were type 1 anterolateral facet (ALF) fractures, 32% (23/71) had a type 2 anteromedial facet (AMF) coronoid fracture, and in 4% (3/71) of the patients, a type 3 basal coronoid fracture was seen. Therefore, the classic “terrible triad” injury with a type 1 coronoid ALF fracture was identified in 64% of patients with radiologically confirmed dislocation.

Conclusion: According to landmark studies and classic teaching, coronoid fracture morphology associated with terrible triads include the tip and extend into the sigmoid notch (ALF fracture). However, recent biomechanical- and clinical series suggest AMF involvement in terrible triad injuries. In the present study, we identified a spectrum of coronoid fracture types in radiographically confirmed terrible triad injuries and combined radial head and coronoid fractures, regardless of dislocation: two-thirds have a tip type 1 ALF coronoid fracture that extends into the sigmoid notch, while one-third of the patients have a type 2 AMF coronoid fracture.