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A Rare Case of Isolated Coronoid Fractures of the Elbow and Brief Review of Literature

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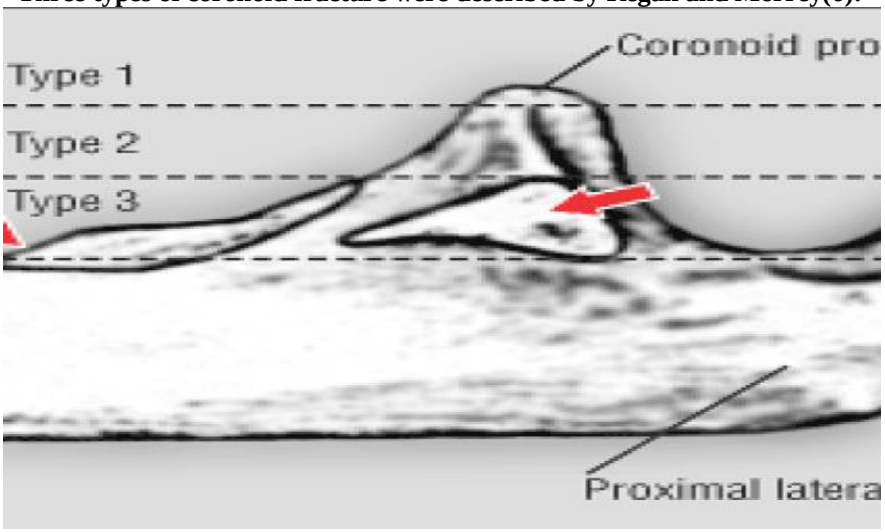
Abstract:
Introduction*: Coronoid fractures of the ulna are relatively uncommon, yet critical injuries to recognize. They often occur in association with elbow dislocations and play an important role in elbow instability.*
Case Report*: we report a case of 16 years old male with history of pain and swelling and restricted movements of left elbow following a road traffic accident. Left elbow X ray and CT scan confirmed an Isolated Type 3 Coronoid Fracture (O'Driscoll et al. and Morrey) .Limb was initially immobilized in an above elbow slab followed by open reduction and internal fixation with cortical screws. Slow mobilization of elbow was started after two weeks and 3 month follow up showed complete recovery of range of movement with fracture union.*
Conclusion*: Coronoid fractures without elbow dislocations are very rare specially type 3 A fracture but good clinical outcome can be achieved by accurate open reduction and stable internal fixation of fracture with early mobilization.*
Keywords*: Coronoid fracture, Elbow dislocation, terrible triad of the elbow.*

I. Introduction

Coronoid fractures of the ulna are rare injuries; coronoid has a pivotal role as an anterior buttress and resists varus stress and posterior elbow subluxation. At least 50% of coronoid must be present to have a stable elbow.Coronoid fractures are relatively uncommon injuries occurring in approximately 2% to 15% of patients with dislocation.(1,2).They often occur in an injury, termed the "terrible triad of the elbow,"(3,4,5) ," which involves a posterior or posterolateral elbow dislocation, a radial head fracture, as well as a coronoid process fracture .Isolated coronoid fractures are extremely rare. The incidence of these fractures is difficult to determine, given the limited data in the literature. (6).The first case report that specifically described an isolated fracture of the coronoid process and its management was published in 1984.(1) A few years later, Regan and Morrey(6) published a review of 35 patients with coronoid fractures, developed a classification system, and reported about treatment and outcomes.

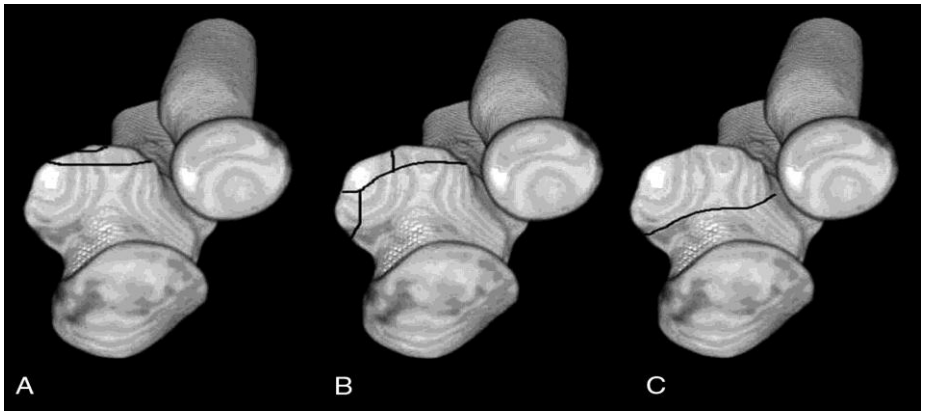
Three types of coronoid fracture were described by Regan and Morrey(6):



- Type I- fractures involve the tip of the coronoid
- Type II- fractures involve more than the tip and less than 50% of the coronoid, and
- Type III- fractures involve greater than 50%.

There are A and B designations for each type, in which the B indicates associated dislocation.
O'Driscoll et al.(7) described a new classification system involving 3 fracture types.

- Type 1- tip fracture,
- Type 2 -anteromedial facet fracture, and
- Type 3 - fracture through the base of the process.



II. Case Report

16 years old male came with pain and swelling of left elbow and a cut lacerated wound over the dorsum of the right foot following a road traffic accident. On examination - Elbow tenderness was present over the olecranon process and medial epicondyle of left elbow with flexion possible up to 90 degrees supination and pronation was painful and restricted. Three-point bony relationship was maintained and there was no neurovascular deficit.

Patient was placed in an above elbow slab and analgesic was started.X rays of the elbow anterior posterior were taken along with CT scans of the left elbow which showed completely displaced isolated type 3 coronoid fracture. (O'Driscoll et al. and Morrey)[6,7)

After one week, once elbow swelling subsided open reduction and internal fixation of fracture with cortical screws was done using a medial approach to elbow after securing the ulnar nerve and confirming the integrity of lateral ulnar collateral ligament. The patient was put on slab in post-operative period for 2 weeks and mobilization was started gradually.

3 weeks follow up revealed--extension lags of 30 degrees and restricted flexion of 20 degrees with full supination and full pronation. Patient was encouraged to continue with physiotherapy and range of movement exercises. 3 MONTHS follow up showed full extension, pronation and supination with complete union of fracture on x ray.

III. Discussion

ISOLATED type 3 Coronoid Fractures of the Elbow is very rare. Of 35 fractures of coronoid process of ulna reported by Regan and Morrey only one was type 3 A (WITHOUT ELBOW DISLOCATION)[6] . Type 3 fractures are often associated with recurrent dislocation and poor outcome. The average arc of flexion of the elbow in the five patients of Regan and Morrey who had a Type-3 fracture was 39 to 100 degrees .The average rotation of the forearm was only 42 degrees. One patient had recurrent dislocation of the elbow, and the other four complained of stiffness. All four were referred for surgical release of the elbow contracture. Three of these four patients had sustained dislocations [6].
In their biomechanical analysis of axial loading in cadaver elbows, Closkey(8) et al found;

- Isolated injury to more than 50 percent of the coronoid process can produce axial elbow instability.
- The coronoid process seems to function as an anterior buttress to prevent posterior elbow subluxation, and this role may be particularly important between 60 and 105 degrees of flexion; and
- Coronoid process behave differently biomechanically than those involving 50 percent or less of the coronoid

Jeon .(9) et al reviewed eight patients with coronoid type III fracture retrospectively and concluded: Early open reduction and stable internal fixation provided a reliable method for the treatment of type III coronoid process fractures. The average active elbow joint motion in their series was up to 105 degrees. Early mobilization is desirable since prolonged immobilization (beyond 3–4 weeks) leads to almost universally poor results including persistent stiffness, pain and loss of function (8 , 10 , 11, 12)

IV. Conclusion

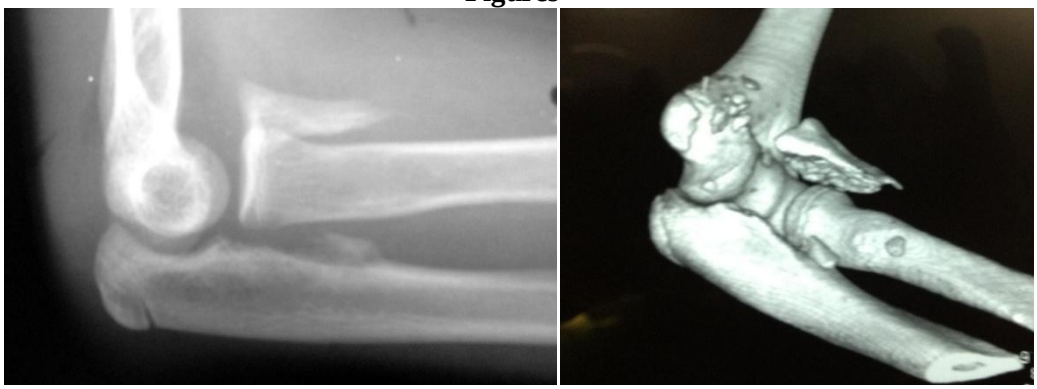
Coronoid fractures without elbow dislocations are very rare specially type 3 A fracture but good clinical outcome can be achieved by accurate open reduction and stable internal fixation of fracture with early mobilization.

V. Clinical Message

Coronoid fracture of ulna is a critical injury to be recognized. Failure to recognize it can have a devastating effect on the clinical outcome. Although coronoid fracture with elbow dislocation or with radial head fracture is well reported more cases of isolated coronoid fracture needs to be reported for better understanding regarding their treatment and prognosis.

Conflict of intrest – Nil
Source of support –None
Full and valid consent was taken from patient and his parents for publication of case report and clinical and surgical photographs.

Figures-



(a) (b)

Figure 1 a,b- X ray and CT SCAN showing ISOLATED TYPE 3 CORONOID FRACTURE (O'Driscoll et al. and Morrey)[6,7].

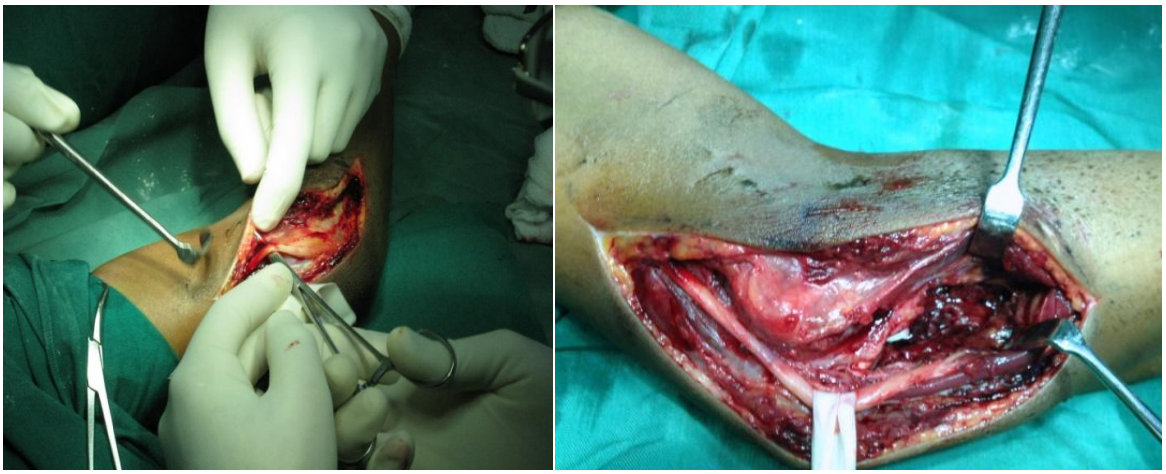


Figure 2- Exposure and ulner nerve identified

(a) **(b)**

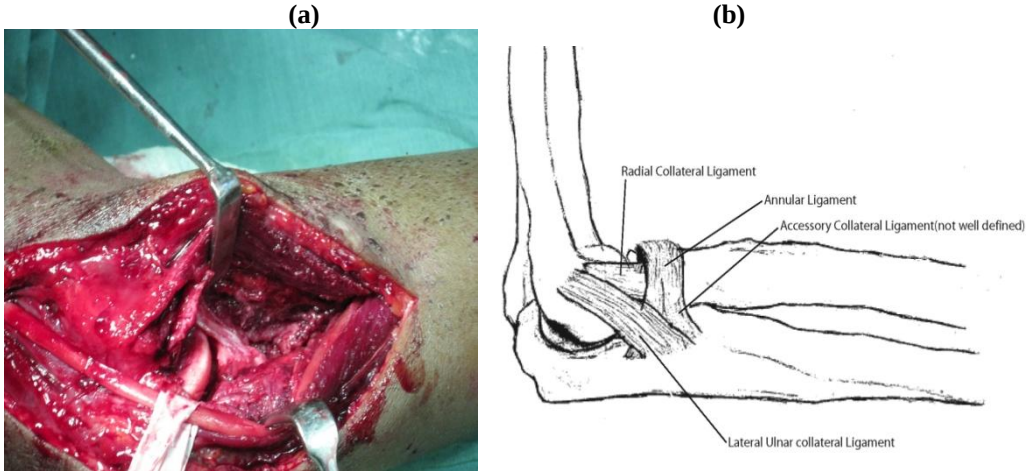


Figure 3-a,b Intraoperative confirmation of ulnar collateral ligament integrity.

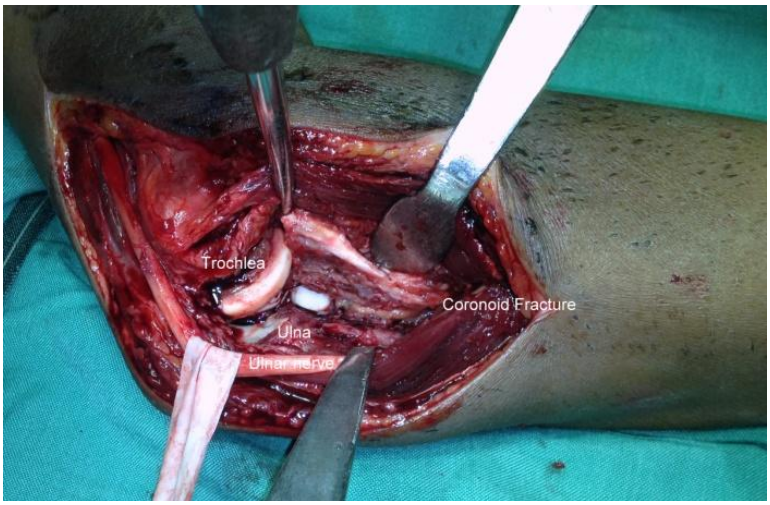


Figure 4 – Intraoperative anatomy coronoid fracture reduction.

Figure5 – ImmediatePost operative x ray AP and oblique view showing good reduction of fracture on x ray.

Figure6 – 3 months Post operative x ray Anterior Posterior and Lateral view showing complete union of fracture on x ray.

(a) **(b)** **(c)** **(d)**

Figure 7 a,b,c,d showing full range of movement of elbow in flexion, extension ,supination and pronation 3 months post operative.

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