

Isolated volar dislocation of distal radioulnar joint: rarely occurring, commonly missed

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Introduction

Distal radioulnar joint dislocations with associated fractures, such as Galeazzi fracture or distal radius fracture, are common injuries. However, isolated dislocation of distal radioulnar joint without fracture is rare and is described in terms of the position of the ulna in relation to the radiocarpal joint [1]. Dorsal dislocation is more common than volar dislocation [2, 3]. Because of the paucity of this injury, emergency physician may easily miss this injury and the deformed wrist may present to the orthopedic surgeon later. Early diagnosis, reduction, and immobilization restore forearm rotation in the majority of cases. Failed closed reduction and unstable DRUJ, however, requires surgical stabilization.

Case report

A 16-year-old male sustained an injury to his left wrist after a fall on outstretched hand. He came to our A&E where an emergency physician attended him. His wrist was X-rayed, and considering no bony injuries, a differential of soft tissue injury was made. A wrist splint was applied and he was asked to consult an orthopedic surgeon. Two days later, he presented to our out-patient department.

On examination, there was moderate swelling of the wrist and marked restriction of movement. Tenderness could be elicited over ulnar styloid and DRUJ region. Careful examination of the previous X-ray was suggestive of minimally displaced ulnar styloid fracture in the anteroposterior view and volar dislocation of DRUJ in the lateral view [Fig. 1].

The dislocation was reduced under supraclavicular block under an image intensifier. Radioulnar transfixation with a 1.8-mm K-wire was done, as the joint was unstable [Fig. 2]. Limb was immobilized in an above elbow cast. The fracture of ulnar styloid was minimally displaced and just above the base. It assumed its position after relocation of ulna so it was not fixed. The cast as well as the K-wire was removed after 6 weeks [Fig. 3]. Gradual physiotherapy regained full function and movements of wrist after 4 weeks. A 1-year follow-up reduced DRUJ, leading to pain-free wrist with full range of movements.

Discussion

Cotton and Brickley [4] were the first to describe this injury pattern in cadaver. Forced hypersupination of the forearm generally results in volar dislocation of the ulna. Other

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Fig. 1 X-ray AP and lateral view of left forearm showing volar dislocation of distal radioulnar joint



mechanisms include pronation injury to the hand, with fixed forearm and a dorsally applied force to the distal ulna [5].

Volar dislocation of DRUJ is frequently missed in as many as 50 % of the cases [6]. Localized swelling, loss of palpable landmarks, and preserved flexion/extension at the wrist misguide the proper diagnosis. Furthermore, positioning the limb to obtain true lateral X-ray film may be difficult because of pain. All these factors and absence of fracture of

forearm bones may be interpreted by the unwary as insignificant wrist injury [7], as happened in our case.

The clinical findings and properly exposed anteroposterior and lateral film helped in making the diagnosis. The desired anteroposterior view is obtained with the palmar aspect of the patient's hand, wrist, and forearm resting on the cassette with the elbow flexed to 90 ° and the shoulder abducted to 90 °. The X-ray beam is focused on the wrist.

Fig. 2 X-ray anteroposterior and lateral view of wrist showing reduction after transfixation with K-wire

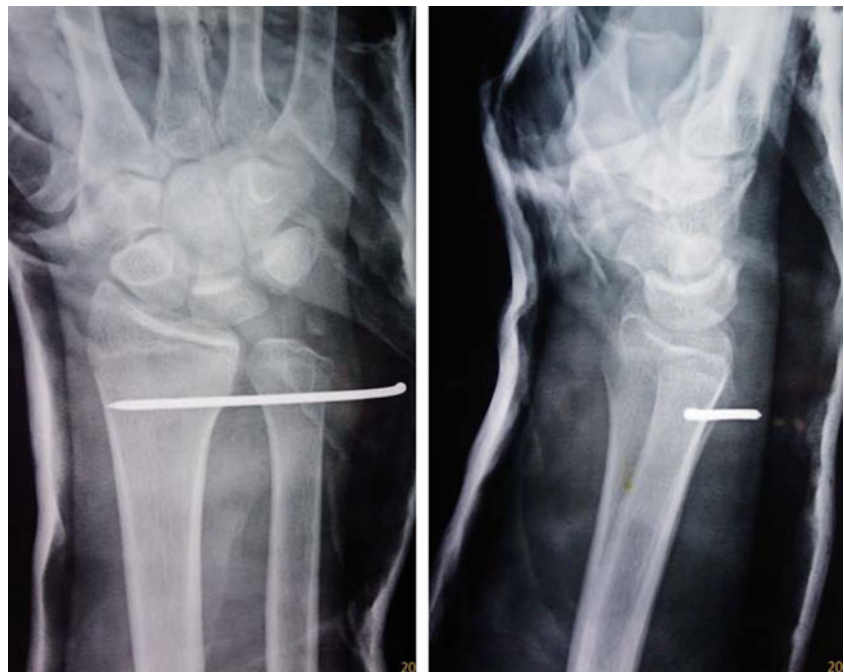


Fig. 3 X-ray AP and lateral view of wrist showing maintained reduction after removal of K-wire



Similarly, the lateral view is taken with the ulnar aspect of the forearm, wrist, and hand resting on the cassette in neutral rotation, with the elbow bent at 90 ° and the X-ray beam focused directly over the wrist. Where X-ray is inconclusive, CT scan provides a correct picture to aid in the diagnosis [8–10]. The role of MRI is better appreciated to assess soft tissue injury, mainly the stabilizers of the joint. However, routine MRI is not required as the soft tissue heals significantly with closed reduction and immobilization [11].

Open reduction and capsuloligamentous repair is advocated in which closed reduction fails or these present late [11–13]. However, routine repair of capsuloligamentous structures are not required as they heal tremendously with immobilization after closed reduction [11]. The relocation of joint, in our case, was easily achieved with minimal effort. Minimally displaced ulnar styloid assumed its position after relocation so it was left as such. However, it went into nonunion in the successive radiograph. However, the forearm rotation remained unaffected with its nonunion.

The concept of simple versus complex DRUJ dislocation formulates the treatment strategy [1]. A simple dislocation is defined as one that reduces spontaneously or with minimal manipulation. If simple dislocation is absolutely stable, 3–4-week immobilization in pronation in long arm cast is sufficient. If DRUJ is stable but dislocatable, 6-week immobilization is necessary. Grossly unstable DRUJ requires transfixation with one or two K-wires depending upon the stability of the joint.

The structures at risk are stabilizers of the joint. That includes ulnar collateral ligament, triangular fibrocartilage, and anterior and posterior radioulnar ligaments.

Irreducible dislocation necessitating open reduction can be considered as complex dislocation. Interposition of the

TFCC, pronator quadratus, and extensor tendon and extensor retinaculum has been mentioned to contribute to irreducible dislocation [14–18]. A case of locked volar dislocation has also been mentioned by Mulford et al. as irreducible dislocation [19].

Even with the chronic cases, anatomic reduction of the ulna head with reduction of the DRUJ can result in restoration of forearm rotation. This option should be considered before performing salvage procedures like Darrach procedures [12, 14, 20], Suave Kapanji procedures [21], and hemiresection of the ulna head [16].

Conclusion

Wrist injuries should have a careful clinical judgment and proper view radiographs to exclude DRUJ injury. Untreated or missed volar dislocation of DRUJ results in significant morbidity of daily activities. CT scan is more informative to assess the dislocation, to know associated chondral lesion and impacted fracture, and to evaluate the adequacy of relocation of the joint in difficult relocations.

Conflict of interest No conflict of interest exists.

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