

Isolated Volar Distal Radioulnar Joint Dislocation: A Very Rare and Easily Missed Injury – Case Report

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Abstract

Background: Isolated distal radioulnar joint (DRUJ) dislocations without associated fracture are very rare entity. A few mechanisms of injury were reported in the literature with dorsal (posterior) dislocation being more common than the volar (palmar, anterior) dislocation.

Case report: A 26-year-old male, manual laborer presented to our emergency department (ED) 24 hours post self-inflicted injury with right wrist pain, deformity and decreased range of motion (ROM). The physical examination showed bruising over dorsal ulnar side of the wrist, loss of the ulnar styloid bony prominence, abnormal volar fullness of the wrist and gutter deformity on the dorsal aspect of the distal forearm and wrist. Diagnosis was confirmed by comparative radiographs which was followed by closed reduction and immobilization in below elbow cast in pronation for 4 weeks.

Conclusion: Timely accurate diagnosis and conservative treatment with favorable outcome necessitates a proper history on the mechanism of injury with thorough physical examination, accurate radiographic positioning and true lateral view.

Key words: distal radioulnar, joint dislocation, volar, conservative treatment.

Introduction

Distal radioulnar joint (DRUJ) dislocations are more commonly seen as a part of distal radius fractures and complex forearm fracture-dislocations such as Galeazzi, Essex-Lopresti etc. Isolated DRUJ dislocations without fracture on the other hand are very rare injuries, with dorsal (posterior) dislocation occurring more common than the volar (palmar, anterior) with only 36 cases reported in

the literature to our knowledge. There are few mechanisms of injury reported in the literature. The main treatment is closed reduction with cast immobilization and surgical treatment is reserved for failed reduction and unstable DRUJ. This injury can be easily missed in the ED so high index of suspicion is needed for timely diagnosis and treatment otherwise a significant wrist functional disability can occur.

Case report

Clinical presentation and findings

A 26 years old male, right-handed manual laborer presented to the emergency department with right wrist pain, deformity and decreased range of motion (ROM) of the affected wrist and forearm 24 hours post injury. Shortly after the injury occurred he was seen by attending physician in another institution, X-ray was taken and considering no bony injuries he was discharged with soft tissue injury. With persisting symptoms he presented to our ED seeking for second opinion. On history, the injury was self-inflicted by hitting a flat surface with wrist and forearm in 30-40°

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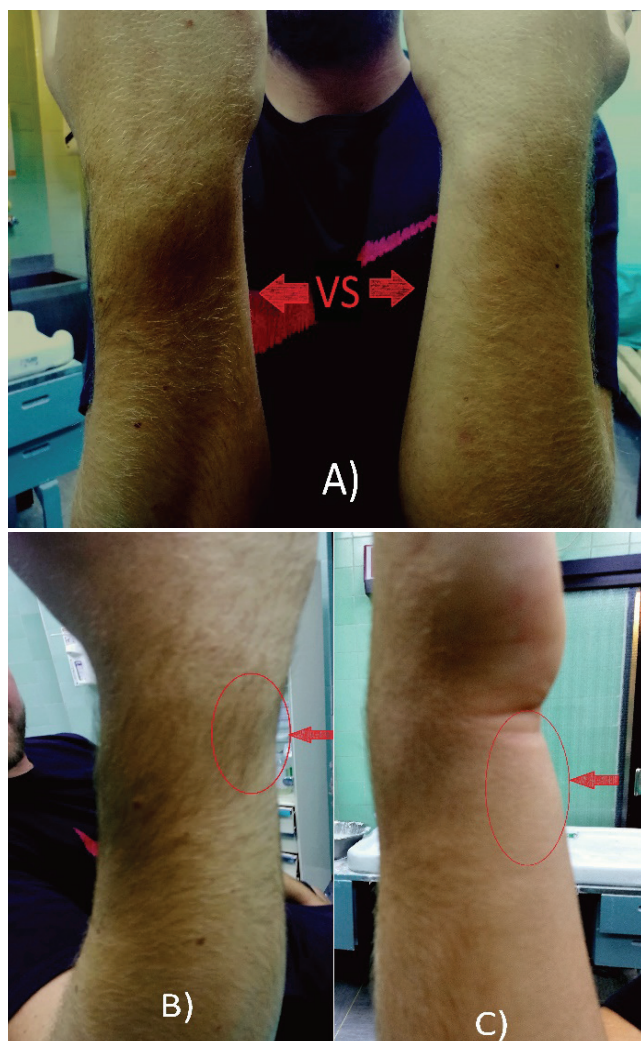


Figure 1. (A) “gutter” deformity of the distal forearm and wrist (B) absent ulnar styloid prominence (C) “fullness” of the volar ulnar aspect of the wrist.

pronation, he heard a click and felt sudden intense pain followed by inability for wrist rotation and evident deformity. The patient had no comorbidities and he never sustained any injury to his right forearm and wrist previously. On inspection there was local bruising over dorsal ulnar side of the wrist, the bony prominence of the ulnar styloid was lost, gutter deformity on the dorsal aspect of the distal forearm and wrist was obvious and abnormal volar fullness of the wrist was noted. (Fig.1)

The ROM of the wrist was limited and painful especially pro/supination, flexion and extension were not influenced. The skin was intact, finger movement and neurovascular status were normal. Bilateral comparative X-ray films in AP and LL projections although with suboptimal quality documented our suspicion of volar(palmar) dislocation of the DRUJ. (Fig.2)

Treatment

After the diagnosis was made, we proceeded to closed reduction and cast immobilization. The reduction was made

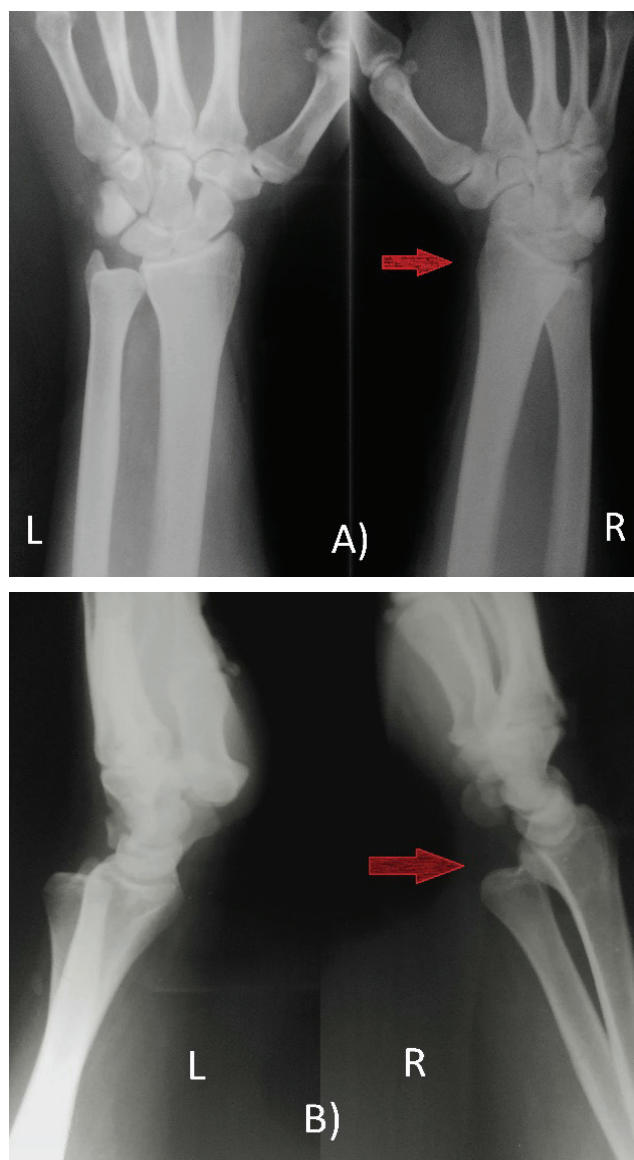


Figure 2. (A) comparative AP radiograph showing overlap of the distal radius and ulna due to pull of the *m. pronator quadratus* (B) comparative LL radiograph showing volar displacement of the ulna relative to the radius.

by pronating the forearm and applying slight traction with dorsally directed force to the ulnar head. The reduction technique was rewarded by audible click with restoration of normal wrist morphology and movement. Post reduction stability test was satisfactory. The wrist was immobilized in below elbow cast in pronation for 4 weeks. Post reduction films showed successful reduction. (Fig.3)

Follow up and outcome

On the 4 weeks follow up the cast immobilization was removed and clinical examination performed which showed mildly painful full range of motion compared with the contralateral wrist with tenderness over dorsal aspect of

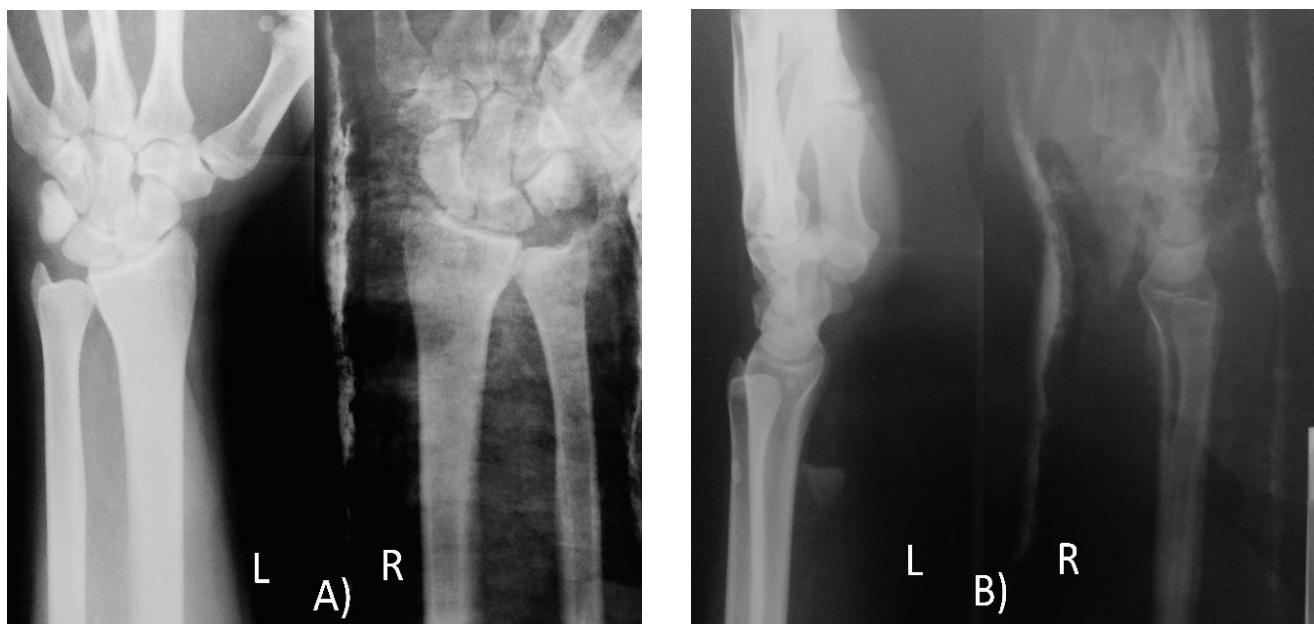


Figure 3. post reduction radiographs confirming the reduction A) AP, B) LL

DRUJ. MRI was ordered and showed no abnormalities. The patient was suggested to physical therapy and limitations for heavy activities for additional 2 weeks. On the last follow up, 2 months post injury the clinical examination showed painless full range of motion and patient noted normal daily laborer work without symptoms.

Discussion

This type of injury was first described by *Pierre-Joseph-Dessault* in 1777 in a cadaver dissection.[1] Since then by review of the literature we identified only 36 cases of isolated volar DRUJ dislocation.

The pat mechanisms of injury described in the literature are: hyper supination of the forearm on a fixed hand [2-10], fell on an outstretched hand (FOOSH) [11-14], directly applied force over the distal dorsal aspect of ulna [15-17], pronation injury to the hand in which the forearm is fixed associated with high-intense sport such as football, rugby, weight-lifting, gymnastics [18-19] and lastly described impact on opposition [20].

In our case most likely the mechanism of injury is combination of pronation of the hand with self-inflicted directly applied force over distal dorsal aspect of ulna. *Wanabe et al.* in their biomechanical analysis of DRUJ showed that this type of injury is only possible when there is a tear in TFCC as primary stabilizer and proximal interosseus membrane (IOM) rupture accompanied with lesion/s in the secondary DRUJ stabilizers (the joint capsule, bony sigmoid notch, extensor carpi ulnaris and pronator quadratus). [21-22] Although, in the literature has been described a case of irreducible DRUJ dislocation with absence of TFCC damage on MRI.[19]

The initial diagnosis is easily missed due to its benign appearance, subtle clinical sings, lack of adequately obtained history and suboptimal lateral radiographs. Only

10-20° of rotation in the forearm due to pain can be falsely documented as normal radiographs. Because of this a true lateral radiograph with elbow flexed 90° and forearm in neutral position is imperative.

Alternatively, a comparative radiograph of both wrist and forearms in AP and lateral are viable option with computed tomography being the examination of choice to identify DRUJ incongruity. [23-24] For the majority of cases (simple dislocations) closed reduction under appropriate analgesia/sedation as described in our case is successful followed by immobilization with plaster of paris (POP) cast for 3-6 weeks.[2, 6, 10, 13, 14]

Failed or unstable reduction (complex dislocation) is a result of TFCC interposition, impaction of the ulnar head or pronator quadratus spasm [3, 10, 11, 15, 16]. This necessitates further evaluation of the soft tissues with MRI in order to help in creating appropriate surgical treatment plan. Surgical treatment in the published literature consists of Kirschner wire or Steinman pin fixation, open reduction and TFCC and IOM repair.[2, 17, 21]

Conclusion

Isolated volar distal radioulnar joint dislocation is a very rare and often initially missed injury. A proper history on the mechanism of injury with thorough physical examination, accurate radiographic positioning and true lateral view is imperative for timely diagnosis, treatment and favorable outcome. Comparative radiographs and computed tomography can aid the diagnosis. Failed and unstable reduction should be further evaluated by MRI. Closed reduction and cast immobilization is the mainstream treatment for the majority of the cases and surgical treatment is reserved for the complex dislocations.

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