

Closed Reduction of Volar Distal Radio-ulnar Joint Dislocation

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Abstract

Volar dislocation of the distal radio-ulnar joint (DRUJ) is a rare occurrence in the literature, with only a few cases reported. Dorsal dislocation is more common than a volar dislocation. It can be easily missed due to the lack of a specific clinical presentation. They can be treated by closed reduction or more commonly by open reduction internal fixation. We present a case of volar dislocation of the DRUJ with an ulnar head fracture reduced by closed reduction. We report the case of a right-handed 35-year-old patient with no medical history who presented to our emergency department after sustaining a fall on his left hand. The trauma dated of 1 day and X-ray was initially judged normal in the emergency department. Due to the persistence of the pain and the functional impotence, the patient presented again to our department. The investigation showed that the patient's hand was in a supine position when the fall occurred. On physical examination, the forearm was locked in supination, with no passive or active pronation elicited. There was a loss of the dorsal ulnar prominence with a palpable deformity on the volar aspect of the wrist. There was no skin lesion and the neurovascular status of the hand was normal. Initial radiographs were made. Anteroposterior and lateral radiographs of the forearm and wrist showed a volar dislocation of the DRUJ with an associated ulnar head fracture. A closed reduction attempt in the emergency department was unsuccessful. The patient was admitted and under general anesthesia, the dislocation was reduced by pronating the forearm and applying direct pressure over the distal ulna. The wrist was tested after the reduction and the DRUJ was stable. Above-elbow cast was applied in a pronation position for a period of 5 weeks. Upon cast removal, the result was excellent. The patient regained full range of motion of the wrist and elbow, there was no instability nor pain or tenderness. Grip force was conserved. A radiographic assessment confirmed the reduction. Volar locked dislocation of DRUJ is a rare injury. A high index of clinical suspicion and proper X-ray is required for prompt detection. Computed tomography scanning can be useful if the diagnosis is not certain. If the reduction of the joint is stable, there is no need for fixation. Early diagnosis and appropriate treatment are the keys for a good outcome.

Keywords: Dislocation, distal radio-ulnar joint, volar

INTRODUCTION

Volar dislocation of the distal radio-ulnar joint (DRUJ) is a rare occurrence in the literature, with only a few cases reported. It is usually associated with fractures of the radius and ulna. Dorsal dislocation is more common than a volar dislocation. It can be easily missed due to the lack of a specific clinical presentation.^[1] These injuries can lead to significant functional disability if they are not treated properly.^[2] They can be treated by closed reduction or more commonly by open reduction

internal fixation.^[3] We present a case of volar dislocation of the DRUJ with an ulnar head fracture reduced by closed reduction.

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CASE REPORT

We report the case of a right-handed 35-year-old patient with no medical history who presented to our emergency department after sustaining a fall on his left hand. The patient presented with left wrist pain and an inability to rotate his forearm. The investigation showed that the trauma occurred a day before and that the patient consulted the emergency department. A radiological assessment was performed and judged normal and thus the patient was initially treated medically. Due to the persistence of the pain and the functional impotence, the patient presented again to our emergency department. He had no previous injuries of the wrist, forearm, or hand. The patient's hand was in a supine position when the fall occurred.

On physical examination, the forearm was locked in supination, with no passive or active pronation elicited. There was a loss of the dorsal ulnar prominence with a palpable deformity on the volar aspect of the wrist. There was no skin lesion and the neurovascular status of the hand was normal.

Initial radiographs were made. Anteroposterior and lateral radiographs of the forearm and wrist showed a volar dislocation of the DRUJ with an associated ulnar head fracture [Figure 1].

A closed reduction attempt in the emergency department was unsuccessful. The patient was admitted and under general anesthesia, the dislocation was reduced by pronating the forearm and applying direct pressure over the distal ulna. The wrist was tested after the reduction and the DRUJ was absolutely stable [Figure 2]. Above-elbow cast was applied in a pronation position for a period of 5 weeks. Upon cast removal,



Figure 1: Initial X-rays of the arm and wrist

the result was excellent. The patient regained full range of motion of the wrist and elbow in flexion extension, pronation, and supination [Figure 3]. There was no instability nor pain or tenderness. Grip force was conserved. A radiographic assessment confirmed the reduction [Figure 4].

DISCUSSION

Volar dislocation of the DRUJ is very rare and thus difficult to diagnose. This can cause this pathology to be missed in the emergency department leading to a chronic disability.^[2] This was the case of our patient with a missed diagnosis on the day of the trauma.

The first anterior dislocation of the distal end of the ulna was described by Desault in a cadaver in 1777.

Even though the distal radioulnar articulation is unstable by nature,^[4] it has an important role in the rotational movement of the forearm. It allows pronation and supination which are essential for the function of the upper limb.^[3]

The triangular fibrocartilage complex (TFCC) is the primary stabilizer of the DRUJ. Secondary stabilizers include the ulnar carpal ligaments, the extensor retinaculum, the pronator quadratus muscle, and the interosseous membrane.^[4] The interosseous membrane has an important role in preventing volar DRUJ dislocation. Its distal portion is taut through pronation and supination, while its middle and proximal portions are taut in neutral position and maximally relaxed in supination.^[5]

Volar dislocation could be caused by extreme supination of the forearm upon a fixed hand after a fall or a direct blow on the wrist.^[6] In this presented case, the mechanism is a fall with an extreme supination of the forearm. This injury can be associated with other lesions such as radius fracture in the Galeazzi injury or a complete disruption of the interosseous membrane and radial head fracture as seen in the Essex-Lopresti lesion.^[7]

On physical examination, the forearm can be locked in full supination, the wrist may appear narrowed, with an

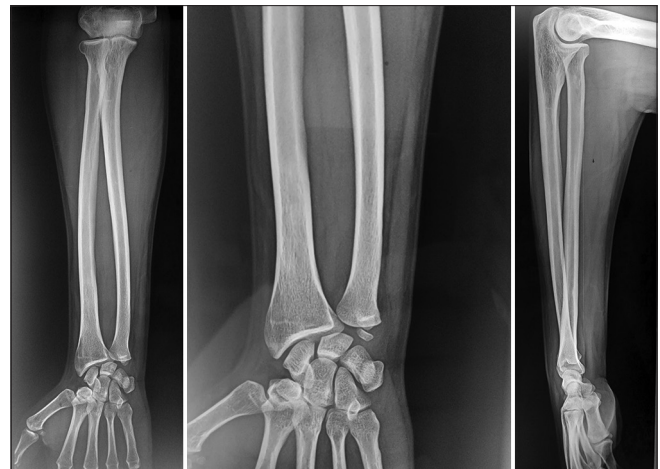


Figure 2: Postreduction X-rays of the arm and wrist

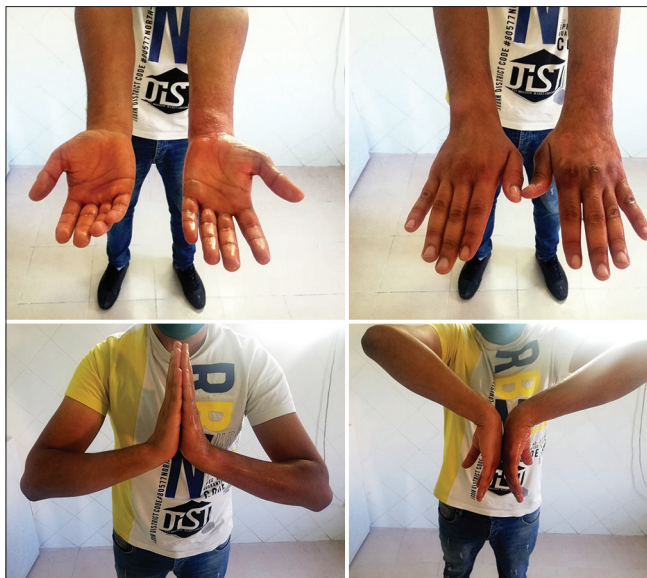


Figure 3: Physical examination upon cast removal

unusual fullness felt on the anterior aspect of the wrist.^[8] The narrowness of the wrist can be explained by the compressive pull of the pronator quadratus muscle, resulting in a diminished transverse dimension.

Radiological assessment is based on true anteroposterior and lateral radiographic views of the forearm. This is done with the shoulder abducted 90° and the elbow at 90° flexion and neutral forearm rotation. Even a 10° oblique malalignment can lead to false-negative results. These examinations show a slight overlap between the radius and ulna on the anteroposterior view and anterior position of the ulna in regard to the carpal bones on the lateral view. Some authors suggest obtaining radiographs of both wrists in analogous rotation. As these signs might be easily missed, a computed tomography (CT) scan of the forearm and wrist should be ordered if there is any suspicion.^[3] Associated lesions can also be detected by these imaging procedures.

Once the diagnosis is made, closed manipulation can be attempted in the emergency department with adequate analgesia. For most simple cases, anterior DRUJ dislocation can be treated successfully with closed reduction, followed by an above-elbow cast for a duration of 3–6 weeks.^[9] Reduction can be difficult for several reasons such as impaction of the ulnar head,^[10] spasm of the pronator quadratus, and interposition of the torn TFCC.^[10] Additional imaging (CT or magnetic resonance imaging) could help determine the cause and the appropriate treatment plan. In case of a failed reduction, manipulation should be made under general anesthesia. Reduction is achieved by manually applying pressure over the prominent ulnar head whilst pronating the forearm. Usually, the reduction is stable and is stabilized by the cast. In the case of an unstable reduction, Kirschner wire or Steinmann pin can be used to temporarily transfix the DRUJ.^[1] In our case, the reduction was possible only after full muscle relaxation



Figure 4: X-rays upon cast removal

under general anesthesia. Upon reduction, the joint was stable, and we used an above-elbow cast for 5 weeks followed by physiotherapy. When the DRUJ is deemed unstable and is transfixed with a Kirschner wire, below-elbow immobilization is satisfactory.^[1]

Early diagnosis and appropriate treatment give a favorable outcome.^[5] In case of a missed dislocation of the DRUJ, good function can still be achieved even after a delay of 7 weeks.^[1] Chronic volar dislocation of the DRUJ can be treated by excision of the distal ulna with a satisfactory outcome.^[1]

CONCLUSION

Volar locked dislocation of DRUJ is a rare injury. A high index of clinical suspicion and proper X-ray is required for prompt detection. CT scanning can be useful if the diagnosis is not certain. Spasm of pronator quadratus muscle is an important blockade to reduction in volar DRUJ dislocations. If the reduction of the joint is stable, there is no need for fixation. Early diagnosis and appropriate treatment are the keys for a good outcome.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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