

Isolated Volar Dislocation of the Distal Radioulnar Joint: A Case Report

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Learning Point of the Article:

Limitations in pronosupination of the DRUJ should alert the clinician to search for DRUJ dislocation. Mechanism of trauma orients the diagnosis. Clinic can be misleading and palpation of dislocation difficult due to edema. In case of doubt, the surgeon must use advanced radiological tools (i.e., CT scan).

Abstract

Introduction: Isolated dislocation of the distal radioulnar joint (DRUJ) is a rare phenomenon. Approximately 50% of isolated DRUJ dislocations are undiagnosed or diagnosed late with significant functional consequences. This clinical injury is rarely described in the literature and management is not well established. We reported a case of volar DRUJ dislocation early diagnosed.

Case Report: A 36-year-old man was diagnosed with an isolated volar dislocation of the DRUJ. The clinical examination, X-rays, and computed tomography scan allowed an early diagnosis. A reduction by external maneuvers was performed and the patient was immobilized in an above elbow plaster cast for 6 weeks. Magnetic resonance imaging did not reveal any capsuloligamentous lesions requiring surgery. Evolution was favorable.

Conclusion: Isolated volar dislocation of the DRUJ is an uncommon injury which can be easily missed. Missed or late diagnosis may lead to significant morbidity. Early diagnosis and treatment of such injuries usually results in excellent functional recovery.

Keywords: Volar dislocation, distal radioulnar joint, closed reduction.

Introduction

Isolated volar dislocation of the distal radioulnar joint (DRUJ) is an uncommon injury which can be easily missed. This injury is caused by extremely forceful pronation of the forearm on a fixed hand. Clinical deformation can be minimal on a mainly swollen wrist. Anteroposterior (AP) and lateral views of the wrist can help in the diagnosis without necessarily being obvious. These dislocations are mainly dorsal and are often associated with fractures of radius and/or ulna. In case of misdiagnosis, functional consequences are critical. Literature is lacking on this subject compared to traditional injuries (Galeazzi and Monteggia lesions) and treatment remains based on experience. Some authors recommend a maximal systematic surgical treatment combining open reduction, ligament suture, and stabilization using K-wires [1, 2]. For others, treatment can

be non-operative [3, 4]. Type, position, and duration of immobilization remain to be defined. This case report describes a successful non-operative management of an acute isolated, non-complicated, and volar DRUJ dislocation. Dislocation was diagnosed in the emergency room and was reduced and treated immediately. The patient was informed that data concerning the case would be submitted for publication and agreed.

Case Report

A 36-year-old man, right-handed, manual worker, without medical background or hyperlaxity presented himself to the emergency room after an injury of the upper right limb. The patient was a sportsman, martial arts competitor. Trauma was related to an accident on the public road (electric scooter). Fall

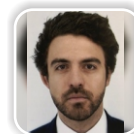
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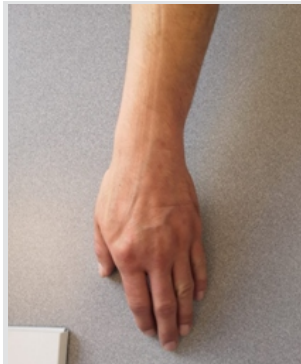


Figure 1: Swollen wrist in pronation.



Figure 2: Emergency X-ray: Superposition of the ulna and radius.

was described as wrist in pronation and hyperextension. On arrival, the patient reported a severe localized pain in the DRUJ. Wrist was in pronation (Fig. 1). Mobility in flexion-extension was preserved. Pronation and supination were blocked and painful. The patient did not have a neurovascular deficit. Edema helped diagnosis. The ulnar head, palpable, was prominent in volar side. Diagnosis was supposed on the AP wrist and lateral views (Fig. 2) and confirmed with a computed tomography (CT) scan (Fig. 3). A radiological series including forearm and elbow X-rays confirmed the isolated character of the lesion.

The patient was managed in the operating room under general anesthesia. Reduction by a closed manipulation was performed. In forced pronation, the operator maintained volar pressure on the ulnar head. The reduction was confirmed by the perception of a jerk. Post-reduction X-rays (AP, lateral, and dynamic pronosupination) made at the operating room confirmed the reduction. The test was performed in full flexion-extension and full pronation-supination. The perfectly stable aspect of the DRUJ made it possible to allow a non-operative management and avoid temporary stabilization with K-wire (Fig. 4).

The patient was immobilized in an above-elbow plaster cast for 6 weeks with the wrist in supination.

At 8 days, a magnetic resonance imaging (MRI) was performed to complete the assessment of ligament injuries. No lesions of the interosseous membrane were found. A disruption of the triangular fibrocartilage complex (TFCC) at the ulna styloid and injury to the ligamentum subcruentum was found without the need for surgical intervention (Fig. 5).

The patient was clinically and radiographically reassessed at the 2nd, 4th, and 6th weeks. At the control X-rays, ulna was in a

satisfactory position allowing the plaster to be removed at the 6th week. An active physiotherapy was started at a rate of 3 sessions per week.

The patient was seen again at the 12th week. Wrist was painless and stable both in flexion-extension (80°–50°) and pronation-supination (70°–70°). Control X-rays showed a non-arthritic wrist. The patient began to work at the 9th week. Martial arts began at the 14th week without limitation.

The patient was assessed at the 6th month and 1 year. Ranges of motion at each assessment are resumed in Table 1. There were no sequelae and no evidence of arthrosis on the X-ray. QuickDash at the last follow-up was equal to 0.

Discussion

Isolated dislocation of the DRUJ is a rare phenomenon. This dislocation, which the direction is determined by the position of the ulna relative to the radius, is mainly dorsal and rarely volar. Thus, approximately 50% of isolated DRUJ dislocations are undiagnosed or diagnosed late with significant functional consequences.

This clinical injury is rarely described in the literature with only 15 cases and various treatments [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]. Management is not well established (closed reduction/closed reduction + stabilization/open reduction + stabilization), and clinical and radiological arguments will guide the surgeon. Surgeon may be misled by the clinical presentation of this injury. Clinical examination is poor, the patient keeps a flexion-extension of the wrist. A slight pronation can be observed (in this case 5° of pronation). The volar tilt of the ulna can be felt. Lateral view is the most significant X-ray in evaluation for DRUJ dislocation but may also be difficult to perform due to the patient pain and limited range of motion. If there is any doubt, a CT scan should be performed.

Stability of the DRUJ is ensured mainly by the TFCC [16]. The pronator quadratus and the extensor carpi ulnaris muscles providing its dynamic stability. During supination, the radius rotates about the fixed ulna. The superficial volar and the deep dorsal radioulnar ligament fibers tighten while the deep volar and superficial dorsal fibers become lax. In pronation, the opposite occurs. Dislocation of the DRUJ is usually associated with damage to the supporting joint structures, including the ulnar collateral ligament, the triangular fibrocartilage, the anterior and posterior radioulnar ligaments, and the pronator quadratus [17, 18]. Thus, the dislocation will



Figure 3: Computed tomographyscan and 3D reconstruction.



Figure 4: Post-reduction X-ray.



Figure 5: The 8th day magnetic resonance imaging: Injury of the triangular fibrocartilage complex; no surgery required.

be reducible or not depending on the incarceration of one or more of these soft tissues. In case of irreducibility or instability after reduction, an open reduction with debridement and stabilization will be necessary.

Authors found a risk factor of subluxation/dislocation [19, 20, 21]: A significantly larger arc of the articular surface of the distal radius compared to the smaller arc of the distal ulnar articular surface.

The potential lesions of the capsuloligamentous structures around the DRUJ are important to diagnose [22, 23]. Diagnostic MRI performed 5–8 days after the injury will evaluate the lesions and a surgical reassessment will be necessary to determine if they require surgery. The integrity of the capsuloligamentous structures is essential to achieve perfect clinical results. These therapeutic strategies are only valid in the context of acute trauma. Early diagnosis and treatment of such injuries usually results in excellent functional recovery. In case of chronic dislocation, a first reduction will be performed. In case of failure, it will then be necessary to perform salvage surgery either by late repair of TFCC or radioulnar fusion or resection of the distal extremity of the ulna (Darrach) or by osteotomy of the distal ulnar metaphysis and arthrodesis of the DRUJ (SauveKapandji) [24].

Finally, it is interesting to discuss the choice of the anesthesia technique for the reduction; in this case, we perform the reduction under general anesthesia. With the development of wide-awake local anesthesia no tourniquet (WALANT) [25], a

Table 1: Evolution of the range of motion (percentage of contralateral side)

	6 th week	12 th week	6 th month	1 year
Flexion	50	90	100	100
Extension	60	80	100	100
Pronation	66	75	95	100
Supination	25	60	80	100
Ulnar deviation	40	70	90	100
Radial deviation	50	75	90	100

local anesthesia allows the surgeon to perform active motor tests of the patient and to test stability under muscular efforts/strains, it could have been useful to test the stability of the post-reduction DRUJ. This anesthesia is already used in many surgical procedures in upper limb surgery [26]. Recently, two cases of dorsal dislocation of the DRUJ were reduced under WALANT, actively tested, and immobilized in a splint. The results were reassuring.

Conclusion

Isolated volar dislocation of the DRUJ is an uncommon injury which can be easily missed. Missed or late diagnosis may lead to significant morbidity as delayed management is less likely to restore satisfactory joint stability and function. Early diagnosis and treatment of such injuries usually results in excellent functional recovery.

Clinical Message

Limitations in pronosupination of the DRUJ should alert the clinician to search for DRUJ dislocation. Mechanism of trauma orients the diagnosis. Clinic can be misleading and palpation of dislocation difficult due to edema. In case of doubt, the surgeon must use advanced radiological tools (i.e., CT scan).

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Consent: The authors confirm that Informed consent of the patient is taken for publication of this case report

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