



Acute isolated volar distal radioulnar joint dislocation: first surgery or conservative?

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ABSTRACT

Isolated distal radioulnar joint (DRUJ) dislocations are referred to as dorsal or volar of neglected isolated volar DRUJ dislocation which was detected at the second dislocations concerning the position of the ulnar head in relationship to the radius. In contrast to large joint dislocations such as a shoulder dislocation, the clinical picture may mimic a simple soft tissue injury and the dislocation may be missed. In this article, we aimed to present a case presentation to the emergency department. Our patient who had no complaint other than wrist pain was diagnosed with volar dislocation on lateral radiography and closed reduction was performed in the emergency department with sedation. There was no recurrence in the follow-up and we achieved a satisfactory result with a painless and unrestricted wrist joint at six months. DRUJ and the ligaments stabilize the joint work in anatomical coordination and play an important role in forearm rotation movement. Traumatic injuries to these structures range from isolated tears to severe fractured dislocations. Isolated DRUJ dislocations are rare. Initial treatment of this injury is closed reduction, post-reduction stability is important and fixation is required in case of instability. Although surgical treatment is performed in cases that cannot be closed reduced and in the presence of instability after reduction, it is possible to obtain successful results in acute cases with closed reduction performed with sedation in emergency departments. For this reason, a conservative approach should be tried before making a surgical decision in these injuries that require special attention in diagnosis.

Introduction

The classification of injuries affecting the distal radioulnar joint (DRUJ) of the wrist depends on the extent and nature of the damage, with the two main categories being simple or complex injuries. Simple injuries of the DRUJ typically involve subluxations of the joint without any fractures, dislocations, or significant ligamentous damage. In simple injuries, the joint may be momentarily displaced from its normal position but return to its proper alignment without any persistent instability. Contrary to simple injuries, complex injuries of the distal radioulnar joint are characterized by their severity and the presence of additional complications. Such complications can involve fractures of the ulnar head or ulna, fractures of the proximal or distal radius, and joint dislocations accompanied by fractures [1]. The dislocations of the distal radioulnar joint can be categorized as either dorsal or volar dislocations

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based on the position of the ulnar head about the radius. Dorsal dislocations, where the ulnar head is displaced towards the back, are more frequently observed compared to volar dislocations, where the ulnar head is displaced towards the palm [2]. These injuries may be neglected due to their uncommon occurrence and isolated dislocation without fracture. While DRUJ instability may be seen with high-energy trauma and fractures of the radius or ulna, isolated volar or dorsal dislocations occur after more moderate trauma. The diagnosis greatly relies on the crucial role of the examining doctor in the process [3]. In this article, we aim to present a missed case of isolated acute volar distal radioulnar dislocation who presented to the emergency department for the second time with the same complaints. In these cases where surgical treatment was performed using fixation materials such as sutures and k-wires, we think that a stable joint can be achieved with closed reduction under sedation in emergency conditions and closed reduction can be tried in emergency conditions without making a surgical decision.

Case report

A 50-year-old male patient was evaluated in the emergency department for pain in the right wrist. He was a school teacher by occupation and his right hand was dominant. The pain in the right wrist started 1 day ago due to a fall and the patient presented to the emergency room after the fall. At the first presentation, the patient was assessed, radiographs of the wrist were obtained and no fracture was seen. The patient was discharged after an elastic bandage was applied and non-steroidal anti-inflammatory drugs (NSAIDs) were given for the pain. The patient was consulted one day later when he re-presented with increasing pain and limitation of movement in the wrist which were not congruent with soft tissue trauma. The patient's medical history was negative for any comorbidities and chronic medication use. Physical examination revealed that the ulnar head prominence had been lost on the dorsal aspect of the wrist (Fig. 1). The patient had stabilized the wrist in pronation. Palpation revealed pain on the ulnar side of the wrist. Wrist flexion and extension were normal. Wrist supination and pronation movements were painful and severely restricted from the beginning. Neurovascular examination was normal and no swelling or hematoma was found in the wrist compared to the unaffected



Fig. 1. There is no ulnar head protrusion on the right side (blue arrow), but there is also no swelling or ecchymosis compared to the intact wrist (red arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

wrist. Anteroposterior and lateral radiographs of the wrist showed no fracture but the ulnar head was displaced to the volar (Fig. 2). A diagnosis of distal radioulnar joint volar dislocation was made. The patient was given sedative anesthesia and closed reduction was decided. The elbow was flexed 90   and mutual traction was applied with one assistant holding the elbow and the other assistant holding the fingers. Under traction, pronation was increased and the ulnar head was pressed from the volar side with forced pronation. The procedure was terminated after the feeling and sound of dislocated sitting were improved with joint reduction. The wrist radiographs confirmed the successful reduction (Fig. 3). After reduction, a splint was applied to the wrist in a neutral position for 6 weeks. In the 6th week, the splint was terminated and He was directed to follow progressive physical therapy protocols after being referred. The patient was finally seen again at 6 months and physical examination did not reveal any feeling of unreliability or instability. Wrist radiographs showed that the distal radioulnar joint reduction was appropriate (Fig. 4). No complaints of pain or limitations were reported, and the joint range of motion (ROM) was found to be comparable to that of the intact wrist (Fig. 5).

Discussion

The forearm joint is stabilized by three key components: the proximal radioulnar joint, the distal radioulnar joint, and the interosseous membrane. During supination and pronation, the radius and hand rotate around the ulna, which remains relatively stationary. These movements are essential for tasks such as turning a doorknob or using a screwdriver. Although both the proximal radioulnar joint and the distal radioulnar joint play a role in forearm rotation, it is primarily the distal radioulnar joint that is responsible for this movement [4]. The DRUJ can be described as a diarthrodial trichoid joint positioned between the concave ulnar head and the convex distal surface of the radius bone. The ulnar head exhibits controlled movement in the dorsal and volar directions within physiological limits during pronation and supination. This movement within the DRUJ is essential for facilitating proper forearm pronation and supination, thereby contributing to the overall range of motion at the wrist joint [5].

Fractures are commonly associated with injuries involving the distal radioulnar joint. One specific type of injury is known as a Galeazzi fracture-dislocation, where a traumatic dislocation of the distal radioulnar joint occurs concurrently with a fracture of the radial shaft [6]. Essex-Lopresti injuries occur when the distal radioulnar joint becomes dislocated while also experiencing a fracture of the radial head. These injuries are typically caused by a tear in the interosseous membrane, which connects the radius and ulna bones [7]. Researchers have also explored instabilities in the distal radioulnar joint that are accompanied by fractures of the ulnar styloid [8]. Such injuries are commonly observed following high-energy trauma, and surgical intervention is considered the primary treatment approach.



Fig. 2. Anterior-posterior and lateral radiographs of volar distal radioulnar joint dislocation.



Fig. 3. Anterior-posterior and lateral radiographs of the wrist after closed reduction.



Fig. 4. Radiographs at 6 months showing the continuity of distal radioulnar joint reduction at the wrist.

Isolated injuries of the distal radioulnar joint typically occur due to tears in the triangular fibrocartilage complex, which plays a critical role in maintaining joint integrity. The severity of the injury and the specific structures affected can determine the presentation, ranging from joint stability with pain symptoms to joint instability. Consequently, isolated dislocations of the distal radioulnar joint can occur. Hypersupination injuries often result in isolated volar dislocations, where the dorsal radioulnar ligament is affected. In contrast, hyperpronation is the mechanism behind dorsal dislocations. Dorsal dislocations are more frequently observed compared to volar dislocations [5,9].

Dislocations of the DRUJ are considered rare and account for a small proportion of overall bone injuries. The reported incidence of DRUJ dislocations is approximately 0.02 % of all fractures. However, a challenge with these dislocations is that they can often be



Fig. 5. Supination and pronation images at 6 months follow-up. No limitation in the wrist joint range of motion.

overlooked or misdiagnosed, leading to delayed or missed diagnoses. According to a reference, approximately 36 % of cases experience delayed or missed diagnoses [10]. While the physical examination is a significant aspect of evaluating DRUJ dislocations, obtaining a high-quality lateral x-ray of the wrist is essential for visualizing the dislocation and confirming the diagnosis. The lateral view on the X-ray allows for an accurate assessment of the alignment and relationship between the radius and ulna at the distal radial-ulnar joint [10,11]. In our case, the diagnosis was missed even for 1 day. The initial evaluation in the emergency department contributed to this as the physical examination findings were unclear. Findings such as pathologic posture, swelling, and ecchymosis, which are seen in wrist fractures and which guide the physician, were absent in our case. The absence of any findings that could be detected by inspection other than isolated pain and disappearance of the ulnar head prominence was interpreted as a soft tissue injury and overlooked by giving only NSAIDs. After the patient consulted us on the second admission, a diagnosis of volar distal radio-ulnar dislocation without fracture was made in the lateral radiograph evaluation of the wrist.

The primary approach for treating acute DRUJ dislocations is closed reduction, typically performed under local anesthesia with or without sedation to ensure patient comfort. However, when dealing with DRUJ dislocations, achieving closed reduction can be more difficult for volar dislocations compared to dorsal dislocations. The challenge arises from the contraction and tension of the pronator quadratus muscle, which can impede the reduction process. To achieve a closed reduction in cases of volar DRUJ dislocations, pressure is applied on the ulnar head from the volar aspect while the forearm is in a pronated position. This technique helps to counteract the contraction of the pronator quadratus muscle and guides the ulnar head back to its normal position concerning the radius [12]. If closed reduction attempts prove unsuccessful, the open reduction becomes necessary as the next course of action.

In the medical literature, these types of injuries are typically documented and shared through case reports. For instance, a case report described a patient who experienced a distal radius fracture along with DRUJ dislocation, leading to median nerve neuropathy. The patient underwent open reduction, and fixation was achieved using a vicryl suture [2]. In a case report involving an isolated dorsal dislocation of the distal radioulnar joint (DRUJ), the dislocation was successfully reduced using closed reduction techniques. Following reduction, the joint was stabilized by fixation using K-wires [11]. In a separate study, a volar capsule injury was observed alongside a volar dislocation. In this particular case, surgical intervention was employed. After failed attempts at closed reduction, the joint was successfully reduced through an open reduction procedure. Subsequently, fixation using anchors was performed to provide stability and support to the joint [13].

In the presence of failure of closed reduction or fractures with dislocation, surgical treatment is at the forefront. However, we think that even in emergency room conditions, closed reduction with sedation is the first treatment to be tried in acute dislocations. In patients with sedation and adequate pain control, it is also possible to determine whether the joint is stable after reduction.

Even if a stable joint is achieved after closed reduction, it is a fact that fixation will be safer in patient follow-up. However, some disadvantages such as the risks associated with surgery such as infection, complications of general anesthesia, and the stress of the idea of surgery on the patient cannot be denied in a case that can be treated conservatively. Therefore, closed reduction with appropriate maneuvers and conservative treatment should be given priority in isolated DRUJ acute dislocations with sedation, such as simple shoulder dislocation or elbow dislocation cases.

There is no common practice and consensus for the duration of immobilization after closed reduction of wrist DRUJ dislocations. The healing time of the triangular fibrocartilage complex after these injuries has been evaluated as 6–8 weeks [14]. For this reason, some patients were treated with a wrist splint for a minimum of 6 weeks after closed reduction [11,15]. However, some patients have been followed up with immobilization periods of less than 6 weeks and successful results have been shared [16,17]. Since internal fixation is not performed after closed reduction, it is safer to apply an above-elbow splint for the control of wrist movements and reduction control.

In our case, an above-elbow splint was applied for 6 weeks after closed reduction. The important point here is that there is no loss of reduction and painless joint movements after healing is provided. Weekly outpatient visits should be performed if necessary for patient orientation and reduction follow-up, and continuity of reduction should be confirmed with wrist radiography.

Conclusion

In many cases, the primary symptom experienced by the patient with an isolated DRUJ dislocation is pain, which can be similar to other soft tissue injuries. Healthcare professionals should remain vigilant and maintain a heightened level of suspicion, particularly when dealing with cases involving a history of trauma or significant force applied to the wrist and forearm. A thorough examination of the radiographs can help identify signs of displacement or incongruity between the radius and ulna, which may suggest the presence of a dislocation. Additionally, indications such as rotational malalignment, overlapping of the radius and ulna, or abnormalities in the joint space can serve as further clues to diagnose a DRUJ dislocation. The initial treatment approach for DRUJ dislocations should involve closed reduction performed with sedation. In suitable cases, conservative treatment yields satisfactory outcomes.

Patient consent for publication

A written informed consent was obtained from the patient.

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Declaration of competing interest

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Data sharing statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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