

An Extraordinary case report: Bilateral pure perilunate dislocation

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World Journal of Advanced Research and Reviews, 2024, 21(01), 1564–1569

Publication history: Received on 07 December 2023; revised on 15 January 2024; accepted on 17 January 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.21.1.0123>

Abstract

Introduction: Perilunate dislocation of the carpus is an unusual injury, requiring high-energy trauma. The simultaneous bilateral form is so rare that is worthy of report, with only a few cases mentioned in the literature. We present the case of a patient with an open volar dislocation of the right wrist associated with a closed dorsal dislocation of the left wrist and distal radioulnar subluxation.

Case report: A 30-year-old, right hand dominant male, suffered injuries to both wrists after being involved in a high-speed car accident. Examination of the patient revealed diffuse swelling and tenderness to both wrists with a lacerated wound over the dorsum of right wrist. Anteroposterior and lateral X-rays of both wrists were obtained, which showed bilateral perilunate pure dislocations: volar in the right side and dorsal the left side combined with a dorsal subluxation of the distal radioulnar joint.

Discussion: Perilunate dislocations are relatively rare injuries involving approximately only 7% of all injuries of the carpus. It is often overlooked in primary evaluations, approximately 25% of perilunate injuries were missed. A better comprehension of the injury's mechanism and its full extent has led to better management strategies. It is recommended in the literature, that the best treatment of these injuries is open reduction, restoration of carpal bones relationship, repair of the ligaments and a proper rehabilitation and physiotherapy program.

Keywords: Perilunate dislocation; Bilateral dislocation; Volar perilunate; Open perilunate dislocation

1. Introduction

Perilunate dislocation of the carpus is an unusual injury, requiring high-energy trauma(1). Generally resulting of an indirect mechanism of injury, consisting of an extreme extension of the wrist, associated with variable degree of ulnar deviation and radiocarpal/midcarpal supination(2). According to Mayfield the disruption of ligaments due to perilunate dislocation is not random but follows the progressive perilunate instability, lunate dislocation occurs when all perilunate ligaments are torn, and represents the fourth and last stage of perilunate dislocation(3). However, the simultaneous bilateral form is so rare that is worthy of report, with only a few cases mentioned in the literature(4–8). We present the case of a patient with an open volar dislocation of the right wrist associated with a closed dorsal dislocation of the left wrist and distal radioulnar subluxation. To our knowledge this combination of injury has never been reported in the literature.

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2. Case report

A 30-year-old, right hand dominant male with no known medical problems, suffered injuries to both wrists after being involved in a high-speed car accident, he was the driver hitting another car holding the wheel with both hands. Examination of the patient revealed diffuse swelling and tenderness to both wrists with a lacerated wound of around 3 cm over the dorsum of right wrist (figure 1). Distal neurological examination showed full range of motion of his digits and intact sensation to light touch. Anteroposterior and lateral X-rays of both wrists were obtained, which showed bilateral perilunate pure dislocations: volar in the right side and dorsal the left side combined with a dorsal subluxation of the distal radioulnar joint (figure 2). Because of the open dislocation, patient was admitted to the emergent surgery where he underwent ORIF. Under general anesthesia and tourniquet, the dislocations were treated by open reduction using dorsal approach. Cartilage damage was apparent around the lunate and on the head of the capitate in the right wrist. The dislocated lunate bone was reduced and carpal bones were fixed using Kirschner wires. We repaired the intercarpal ligaments directly or by suturing them to the edge of the bones. The same procedure was repeated for the left wrist associated with a distal ulnar radial K-wire transfixation (figure 3). Short arm casts were applied, with gentle finger range of motion exercises as tolerated. At 6 weeks, the cast and K-wires fixing the lunate were removed. Intensive rehabilitation and physiotherapy have been prescribed. Unfortunately, we lost sight of the patient, he showed up only after 14 months, he didn't undergo rehabilitation. At this time, patient had pain-free wrists with a range of motion of 45° of dorsiflexion, 50° of palmar flexion, 60° of pronation and 75° of supination in the right wrist, and 35° of dorsiflexion, 40° of palmar flexion, 35° of pronation and 45° of supination. He could resume his work as a barman after 16 weeks, satisfactory grip strength at both sides (figure 4). Posteroanterior and lateral X-rays showed subtle structural deformity with mild loss of carpal height in the left wrist, with the left lunate showing more deformation than the right, the radioulnar K-wire was fractured (figure 5). However, there were no signs of carpal instability or excessive degenerative changes in either carpus.



Figure 1 A: Right wrist with dorsal lacerated wound B: Left wrist with diffuse swelling and tenderness



Figure 2 Anteroposterior and lateral X-rays of both wrists showing: A: Right wrist with volar pure perilunate dislocation; B: Left wrist with dorsal pure perilunate dislocation combined with distal radioulnar joint

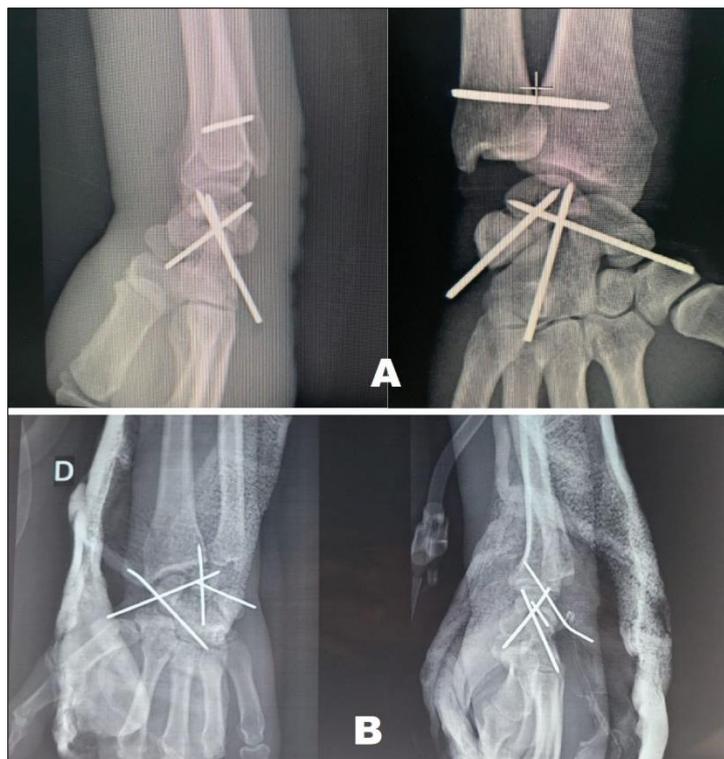


Figure 3 Postoperative radiographs showing good alignment of both carpus A: left wrist B: right wrist



Figure 4 Radiological assessment at 14 months follow-up showing good alignment of both carpus with subtle structural deformities of both lunates

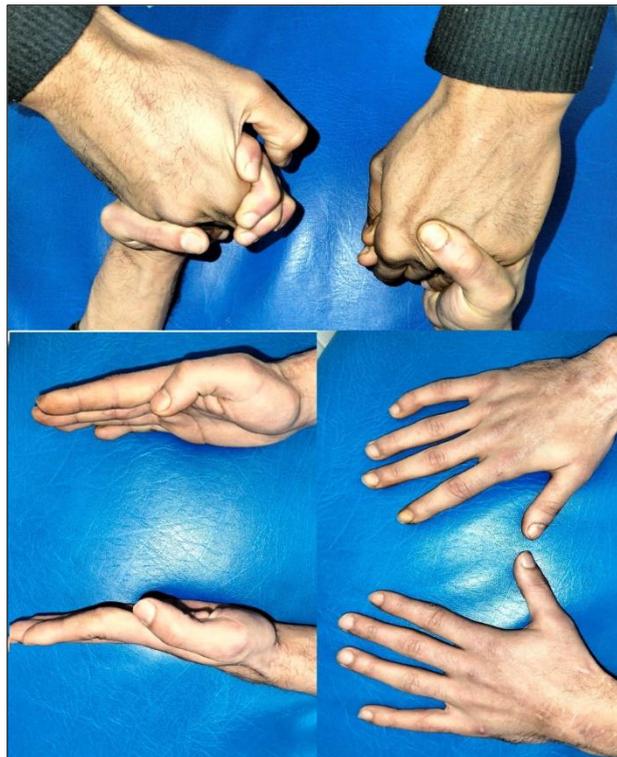


Figure 5 Clinical assessment at 14 months follow-up, showing a fair range of motion and a grip strength

3. Discussion

Perilunate dislocations are relatively rare injuries involving approximately only 7% of all injuries of the carpus (3). They most often result from high-energy trauma, including motor vehicle accidents, falls from a height, or contact sporting activities, and thus are often associated with other significant trauma. It is often overlooked in primary evaluations, according to a retrospective multicenter study, approximately 25% of perilunate injuries were missed (1). Correct diagnosis and treatment of these injuries is imperative in order to restore wrist motion and function. The typical presentation of an acute perilunate dislocation includes pain and swelling about the wrist. Deformity may be more subtle than expected. The carpus is usually displaced dorsally. In a lunate dislocation, the lunate can come to lie within the carpal tunnel; therefore, thorough neurovascular assessment of the upper extremity is important.

Open perilunate dislocation or fracture-dislocation is an orthopedic emergency, require emergent trip to the operating room for irrigation and debridement, followed by repair of the injured structures, and potentially an external fixator application in cases of an unstable carpus(9).

A better comprehension of the injury's mechanism and its full extent has led to better management strategies. Closed manipulative reduction and immobilization do typically fail to effectively restore and sustain proper carpal alignment and lead to poor results (10). Despite the general consensus that open reduction and internal fixation is the treatment of choice for restoring carpal alignment in acute perilunate dislocations, the optimal surgical approach is less explicit(11,12). There are three basic surgical approaches that can be used: volar, dorsal, and combined dorsal-volar approach.

The volar approach enables procedures such as carpal tunnel release, realignment of the lunate bone, and repair of both the volar lunotriquetral ligament and scapholunate ligament. Additionally, it facilitates the repair of the capsule at the space of Poirier(13). The dorsal approach usually helps in fixing carpal fractures, giving the exposure needed for alignment restoration and repair of the scapholunate interosseous ligament, which affects long-term functional scores(13,14). Combined dual dorsal and volar approaches provide the advantages of both approaches, and hence it is usually preferred by many surgeons(11).

Percutaneous and arthroscopic techniques have been reported in treating perilunate injuries(15). Under fluoroscopy guidance, procedures like fracture reduction, guide wire placement and assessment of major ligament injuries are performed. Arthroscopy aids in identifying occult injuries and confirming proper alignment(16). While these techniques may reduce the need for extensive soft tissue dissection seen in open surgeries, there's insufficient evidence to demonstrate their superiority in outcomes compared to traditional open operative approaches(11).

4. Conclusion

As it is recommended in the text and literature, we believe that the best treatment of these injuries is open reduction, restoration of carpal bones relationship, repair of the ligaments and a proper rehabilitation and physiotherapy program. This case has an acceptable range of motion and minimal pain in activity after 14 months. But as reported in literature instability and degenerative joints disease are major complications of these injuries so we decided to do long term follow up in order to find out the final results.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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