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Arthroscopic-Assisted Fracture Fixation and Ligamentous Repair in Dumontier Group 2 Dorsal Radiocarpal Fracture-Dislocation: A Case Report

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ABSTRACT

Radiocarpal fracture-dislocations are complex and uncommon injuries often caused by high-energy trauma, characterized by volar or dorsal dislocation of the carpus with or without associated distal radius fracture. Due to the rarity of this injury, the definitive treatment for this injury has not been well defined. We report a case of Dumontier group 2 dorsal radiocarpal fracture-dislocation in a 26-year-old patient that occurred after a motorcycle accident. We performed an arthroscopic assisted ligament repair and radial styloid internal fixation with a Herbert screw. After 6 weeks of rehabilitation, she gained 80° of wrist flexion, 75° of wrist extension, 90° of forearm pronation, 90° of forearm supination, and 87% grip strength compared to the contralateral hand with no ulnar translation of the carpus. The outcome was satisfactory.

Keywords: radiocarpal fracture-dislocation; minimally invasive; case report

INTRODUCTION

Radiocarpal fracture-dislocations are complex and uncommon injuries often caused by high-energy trauma, characterized by volar or dorsal dislocation of the carpus with or without associated distal radius fracture. It is estimated to occur in 3% of distal radius fracture cases. They often present as fractures and can be complicated by nerve injury, radiocarpal, and intercarpal ligament tears.[1,2] The most commonly used classification system was developed by Dumontier et al. They classified radiocarpal fracture-dislocations into two groups: group 1 included purely ligamentous injuries or those associated with a small radial styloid avulsion, and group 2 included a radial styloid fracture involving at least one-third of the scaphoid fossa.[3,4]

Various treatment techniques have been described. The goals of the surgery described by Ilyas and Mudgal are achieving a concentric reduction of the radiocarpal joint, decompressing neurovascular structures, treating associated intercarpal injuries, and repairing the osseous-ligamentous avulsions.[1,4] Because of the rarity of this injury, the definitive treatment of this injury has not been well defined. Recent reports have recognized the instability of this injury and reported treatment with open reduction and internal fixation.[1,5] We report a case of Dumontier group 2 dorsal radiocarpal dislocation treated with arthroscopic-assisted ligament repair and internal fixation with a Herbert screw.

CASE REPORT

A twenty-six-year-old right-hand-dominant female presented with pain in her right wrist after a motorcycle accident. She bumped into a fence while turning right and fell from her bike. She had a left cheek bruise and no significant neurological symptoms. Neurological examination on the affected extremity showed mild numbness on the dorsal and palmar surfaces of her hand. There were a deformity and pain with active wrist movement. There was diffuse swelling and tenderness on her wrist. She had a full range of motion on the ipsilateral elbow and shoulder without pain. Radiograph of the wrist demonstrated a dorsally dislocated radiocarpal joint with a radial styloid fracture (Fig. 1). Closed reduction with Tavernier technique and cast application were performed in the emergency department. Computed tomography scan after closed reduction revealed a well-reduced radiocarpal joint and a radial styloid fracture involving more than ⅓ of the scaphoid fossa (Fig. 2). The patient was admitted for definitive surgery 2 days later.

FIGURE 1: X-ray showing a dorsal radiocarpal dislocation.

FIGURE 2: CT-scan showing radial styloid fracture involving >1/3 of the scaphoid fossa after closed reduction.

The patient was put under general anesthesia. Definitive fixation of the radial styloid fragment and arthroscopic-assisted reduction of the fragment using 3-4 and 4-5 portals were performed, and the fragment was fixed with a 2.5 mm Herbert screw under image intensifier control (Figure 3). During arthroscopy, the ulnolunate, lunotriquetral, and long radiolunate ligaments were found to be torn (Figure 4). Ulnolunate and lunotriquetral ligaments were repaired with the inside-out technique using a 19-G epidural needle. Two 2-0 PDS sutures were applied. The long radiolunate ligament was repaired in the midsubstance with the outside-in technique using two lasso loops tied with a sliding knot (Figure 5). After the ligament repair, the distal radioulnar joint was tested to be stable in neutral, pronated, and supinated positions.

FIGURE 3: Radial styloid fixation with 2.5 mm Herbert screw.

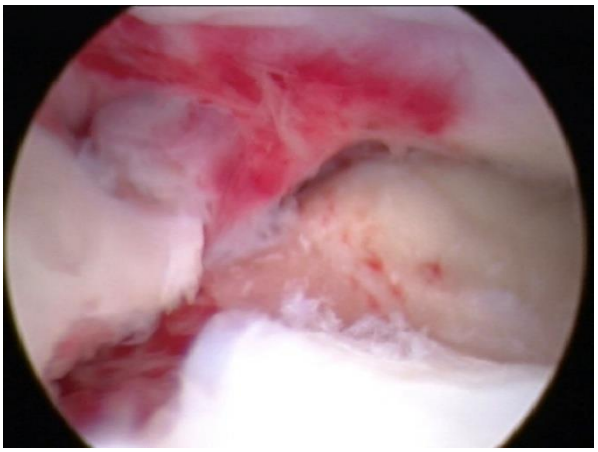

FIGURE 4: Torn volar radiocarpal ligament seen during arthroscopy.

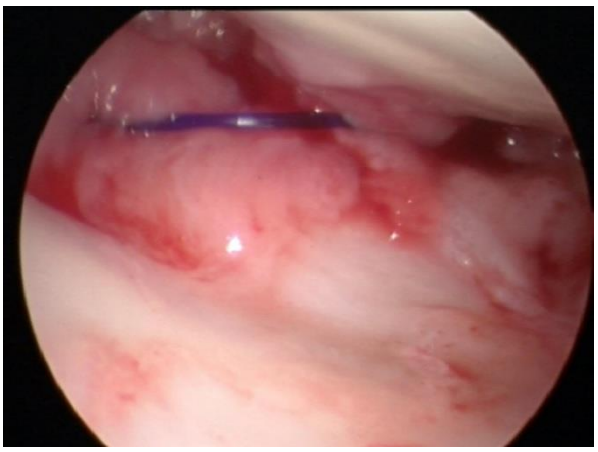

FIGURE 5: Sutured volar radiocarpal ligament.

After the surgery, the patient was put on a volar splint for 2 weeks until the swelling subsided, then a long arm cast was applied for 6 weeks.

After the cast was removed, the patient underwent a range of motion and gradual muscle strengthening exercises in the rehabilitation department. After 6 weeks of rehabilitation, she gained 80° of wrist flexion, 75° of wrist extension, 90° of forearm pronation, 90° of forearm supination, and 87% grip strength compared to the contralateral hand with no ulnar translation of the carpus (Figure 6).

FIGURE 6: Clinical picture after 6 weeks of rehabilitation.

DISCUSSION

This case report demonstrates a group 2 dorsal radiocarpal fracture-dislocation successfully treated with arthroscopic assisted percutaneous fixation of the radial styloid fragment and repair of the ligaments. Dorsal radiocarpal dislocation is rare and often ends with devastating functional consequences.[6–8] Due to the rarity of this case, the optimum therapeutic strategy has not been well defined.

There are three important components to achieve during management. First, ligament repair, mainly the radioscaphocapitate and long radiolunate ligaments, to prevent ulnar translocation of the carpus. Second, repair of the bony component of the distal radius. Third, repair of the intracarpal component, which may become a source of chronic pain and intracarpal instability.[9]

Even with aggressive management, it is often challenging to preserve normal radiocarpal alignment. Inadequate healing of the ligaments can lead to ulnar translation of the carpus. If these treatments failed, a salvage procedure such as radioscaphoid, radiolunate, or complete wrist fusion may be required. Because of this, some authors have suggested performing primary arthrodesis as the initial procedure.[10]

Arthroscopic treatment for radiocarpal dislocation allows direct visualization of intercarpal and midcarpal injuries as well as intercarpal ligaments. Most importantly, arthroscopic treatment of these injuries can observe, manipulate, and correct the problem with minimal soft tissue damage.[5]

To date, there have only been 2 case reports about the management of radiocarpal fracture-dislocation, but they only performed arthroscopic evaluation, closed reduction, and percutaneous pinning. None of the studies performed any arthroscopic ligamentous repair despite the extensive ligamentous injury.[5,11] Kamal et al. demonstrated an excellent result in group 1 radiocarpal fracture-dislocation treated with closed reduction, arthroscopic evaluation, and percutaneous pinning without repair of the extrinsic ligaments. Although they described an excellent clinical outcome with a return of 92% of grip strength, 130° wrist range of motion, full pronation, and supination[5], they did not mention ulnar translocation in the case, which is a frequent complication due to insufficient ligamentous healing.[12,13] In contrast, arthroscopic repair of the ulnolunate, lunotriquetral, and long radiolunate ligament was performed in our case, which successfully prevented ulnar translocation of the carpus.

In this case, we performed arthroscopic-assisted anatomical reduction of the radial styloid fragment as recommended by Dumontier[3] and arthroscopic repair of ulnolunate, lunotriquetral, and long radiolunate ligaments. This is the first reported technique of arthroscopic treatment of Dumontier group 2 palmar radiocarpal fracture-dislocation. It was possible to diagnose and treat the patient arthroscopically. It has the advantages of clear diagnosis of the pathology, precise fracture reduction and fixation, ligament repair without extensive soft tissue damage so that patient had minimal scar, and shorter recovery time.

CONCLUSION

This case demonstrates a successful management of a Dumontier group 2 dorsal radiocarpal fracture-dislocation using arthroscopic-assisted fracture fixation and ligamentous repair. The minimally invasive approach allowed precise reduction, soft tissue preservation, and early rehabilitation, resulting in excellent functional recovery. This is the first reported case using arthroscopic diagnosis and ligament repair for this injury, suggesting it as a promising alternative to open surgery.

REFERENCES

[1] Ilyas AM, Mudgal CS. Radiocarpal fracture-dislocations. *J Am Acad Orthop Surg*. 2008;16(11):647-655. doi:10.5435/00124635-200811000-00005

[2] MUDGAL CS, PSENICA J, JUPITER JB. Radiocarpal Fracture-Dislocation. *J Hand Surg Am*. 1999;24(1):92-98. doi:10.1016/S0266-7681(99)90047-5

[3] Dumontier C, Meyer zu Reckendorf G, Sautet A, Lenoble E, Saffar P, Allieu Y. Radiocarpal dislocations: classification and proposal for treatment. A review of twenty-seven cases. *J Bone Joint Surg Am*. 2001;83(2):212-218. doi:10.2106/00004623-200102000-00008

[4] Potter MQ, Haller JM, Tyser AR. Ligamentous Radiocarpal Fracture-Dislocation Treated with Wrist-Spanning Plate and Volar Ligament Repair. 2014;1(212):265-268.

[5] Kamal RN, Bariteau JT, Beutel BG, DaSilva MF. Arthroscopic reduction and percutaneous pinning of a radiocarpal dislocation: a case report. *J Bone Joint Surg Am*. 2011;93(15):e84. doi:10.2106/JBJS.J.01306

[6] Cheong W, Keung W, Yiu W. Uncommon Dorsal Radiocarpal Fracture Dislocation Complicated With Median Nerve Palsy: Case Report, Review of the Literature, and a New Classification System Guiding the Management. *J Orthop Trauma Rehabil*. 2012;16. doi:10.1016/j.jotr.2011.07.005

[7] Grabow RJ, Catalano L 3rd. Carpal dislocations. *Hand Clin*. 2006;22(4):485-500; abstract vi-vii. doi:10.1016/j.hcl.2006.07.004

[8] Mourikis A, Rebello G, Villafuerte J, Moneim M, Omer GEJ, Veitch J. Radiocarpal dislocations: review of the literature with case presentations and a proposed treatment algorithm. *Orthopedics*. 2008;31(4):384-386. doi:10.3928/01477447-20080401-24

[9] Bargemon JDV, Soudé G, Levadoux M, Viaud-ambrosino S, Peras M, Camuzard O. Orthopaedics & Traumatology : Surgery & Research Radiocarpal fracture-dislocation : Review of the literature, new classification and decision algorithm. 2023;109. doi:10.1016/j.otsr.2023.103547

[10] Obafemi A, Pensy R. Palmar radiocarpal dislocation : a case report and novel treatment method. Published online 2012:114-118. doi:10.1007/s11552-011-9374-0

[11] Hardy P, Welby F, Stromboni M, Blin JL, Lortat-Jacob A, Benoit J. Wrist arthroscopy and dislocation of the radiocarpal joint without fracture. *Arthroscopy*. 1999;15(7):779-783. doi:10.1016/s0749-8063(99)70014-9

[12] Penny WH 3rd, Green TL. Volar radiocarpal dislocation with ulnar translocation. *J Orthop Trauma*. 1988;2(4):322-326. doi:10.1097/00005131-198802040-00009

[13] Rayhack JM, Linscheid RL, Dobyns JH, Smith JH. Posttraumatic ulnar translation of the carpus. *J Hand Surg Am*. 1987;12(2):180-189. doi:10.1016/s0363-5023(87)80268-x