Case report

Transstyloid radiocarpal dislocation: A case report

Adnene Benammou, Mehdi Bellil, Mohamed Amin Jaouadi, Walid Balti, Mondher Kooli, Mohamed Ben Salah

Department of orthopedic surgery, Charles Nicolle’s hospital, Boulevard 9 Avril, Tunis, Tunisia

ARTICLE INFO

Keywords:
- Radiocarpal dislocation
- Fracture-dislocation
- Radiocarpal fracture-dislocation
- Radiostyloid marginal fracture

ABSTRACT

Introduction and importance: Transstyloid radiocarpal dislocation is a rare injury. It is due to high-energy trauma. It usually associates a radiocarpal dislocation, a fracture of the radial and/or cubital styloid process, and a cortical volar/dorsal margin avulsion.

Case presentation: We present a case of a 31-year-old male who sustained a fall from a 4 m height causing a transstyloid radiocarpal dislocation. He was treated with a radial styloid process pinning and wrist arthrorisis with and splint immobilization.

Clinical discussion: Different treatment options can be available for this type of injury with or without ligaments reconstruction.

Conclusion: Although it is rare, the transstyloid radiocarpal dislocation has a good outcome with different types of treatment.

1. Introduction

Radiocarpal dislocation represents 0.2% of all dislocations [1,2]. This injury was first described by Malle in 1838 [3]. It is usually associated with fractures of the anterior or posterior cortical margin and/or radial or ulnar styloid. Watanabe and Nishikimi [2] described it as Trans-styloid radiocarpal dislocation. It occurs after a high-energy wrist trauma. It must be differentiated from a shearing or a rim fracture of the radius in which there is still a contact with the carpus [4]. Due to its rarity, treatment and outcomes are not well defined. Dumontier et al. [5] proposed a classification with two types to help guide the treatment. Type 1 is a pure radiocarpal dislocation or a fracture-dislocation associated with the fracture of the tip of the radial styloid. Type 2 is a fracture-dislocation detaching a larger fragment. Moneim et al. [6] proposed a classification in two groups where group 1 are patients without intracarpal lesions and group 2 are patients with intracarpal lesions. We present a case of a transstyloid radiocarpal dislocation associating a radial styloid fracture, a dorsal cortical margin avulsion and a radiocarpal dislocation. We aim to study by means of our case report the clinical and radiological features as well as the management of this type of injury.

2. Presentation of case

A 31-year-old male fell from a height of 4 m at work. The patient had no medical history, family medical history or drug history. He has a 20 pack-year smoking history. He presented to the emergency room of our teaching hospital with abdominal pain, a deformity, and an ache of the left wrist. There was no hemodynamic, respiratory or neurological distress. Plain radiographs of the wrist showed fracture of the radiocarpal joint (Fig. 1). Fully body CT-scan was operated and showed a liver injury. A wrist CT-scan was also done and confirmed the radial styloid and the posterior marginal avulsion with the radiocarpal dislocation (Fig. 2). The diagnosis of transstyloid radiocarpal dislocation was retained. The liver traumatic injury was managed conservatively. The radial styloid was reduced and maintained percutaneously k-wires. The radio-carpal joint was reduced then and maintained with arthrorisis k-wires (Fig. 3). The reduction was stable. The procedure was performed by an orthopedic surgery resident. In postoperative, a short arm splint was applied for 3 weeks. After the immobilization, the arthrorisis k-wires were removed and the radial styloid k-wires were maintained for 3 more weeks. At 6 weeks, radiographs of the wrist showed consolidation of the radial styloid. K-wires were then removed (Fig. 4). Physical therapy was started 6 weeks postoperatively. At 3 months follow up, the

* Corresponding author.

E-mail addresses: Adnene.benammou@gmail.com (A. Benammou), drbellilmehdi@gmail.com (M. Bellil), jaouadimohamedamin@gmail.com (M.A. Jaouadi), Baltiwalid@ymail.com (W. Balti), mondher.kooli@rns.tn (M. Kooli), mbenalah9494@gmail.com (M. Ben Salah).

https://doi.org/10.1016/j.ijscr.2021.106665

Received 20 October 2021; Received in revised form 1 December 2021; Accepted 1 December 2021

Available online 7 December 2021

2210-2612/© 2021 The Author(s). Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).
patient had no wrist pain. The range of motion was (right/left) $85^\circ/70^\circ$ at dorsal flexion, $80^\circ/70^\circ$ at palmar flexion, $40^\circ/20^\circ$ at ulnar deviation and $10^\circ/5^\circ$ at radial deviation. DASH score was at 9.16 which was classified as good [7]. Radiological follow-up showed a consolidated radial styloid with minimal malalignment and a non-union of the dorsal cortical margin of the distal radius. However, there was no radio-carpal malalignment. The patient returned to work and was satisfied with the clinical outcome (Fig. 5).

3. Discussion

Radio-carpal fracture dislocation is a rare injury. In our case, we opted for a surgical treatment with pinning and immobilization without ligamentous repair. Functional outcome was satisfying. Most publications are case reports with few reports of series [8]. It is usually due to a high energy trauma. Dumontier et al. [5] defined 2 groups of patients. Group 1 included patients with pure radiocarpal fracture or with a fracture of the tip of the radial styloid process (involving less than the third of the width of the scaphoid fossa). Group 2 included patients with a radio carpal dislocation with a fracture of the styloid radial process bigger than a third of the width of the scaphoid fossa. The authors recommend that group 1 patients should have ligamentous repair of the radio-lunate and radio-scaphoidal protected by an external fixator or pinning. Group 2 patients should have anatomic reduction of the radial styloid process via a dorsal approach with internal fixation and immobilization with a cast or an external fixator without ligament repair. Biondi and Lauri [9] proposed a new classification for this type of injury. The injury of our patient which associates a dorsal radiocarpal dislocation with involvement of the dorsal wall and radial styloid with no depression of intra-articular fragment is classified type IIA of this new classification. The authors suggest a dorsal approach to restore the dorsal bone support by a buttress plate with accurate reduction of the radial styloid. Spiry et al. [10] recommend suturing the dorsal capsule and the dorsal radiocarpal ligaments [10]. However, Cornu et al. [8] did

---

Fig. 1. Anterior-posterior and lateral radiograph of the wrist showing a fracture of the radial styloid, a dislocation of the radiocarpal joint and an avulsion of the posterior cortical margin of the radius.

Fig. 2. CT-scan of the wrist showing the posterior radiocarpal dislocation and the posterior cortical margin avulsion.
not perform any ligaments reconstruction in their series of 14 patients. No ulnar translation or radiocarpal subluxation occurred. The authors concluded that internal fixation with wrist rigid immobilization is sufficient to achieve ligament healing. In our case, we did not perform any ligament repair and at the last follow up, there was no ulnar translation or residual subluxation. Mudgal et al. [4] believe that restoration of the radial and ulnar styloid can restore the wrist stability through the restoration of the attached length of the ligaments. Dahmani et al. [11] found that a loss in range of motion is constant and independent from the type of fracture. Functional results depend on the articular damage and the associated wrist injuries [5]. Major complications are wrist arthritis, radiocarpal subluxation, ulnar translation and loss of range of motion [6,8,10,12]. The unicity of our case is that we conducted a full percutaneous treatment without any approach, ligaments repair or plate fixation.

4. Conclusion

Radiocarpal fracture dislocation is a rare entity. Some authors tried to create a classification with a treatment algorithm. However, authors did not agree on a unique treatment option for each type of fracture. The outcome is in most cases satisfying with a loss in the range of motion. In our case, we performed a radial styloid process pinning with a wrist arthrosis for 3 weeks. The patient was satisfied with the result with a minimal loss in the range of motion. Further studies with case series need to be realized to define a clear surgical strategy.

Statement

This work has been reported in line with the SCARE criteria [13]. This work has been reported in line with the SCARE 2020 criteria [14].
Provenance and peer review
Not commissioned, externally peer-reviewed.

Sources of funding
The authors declare no funding source for this research.

Ethical approval
N/a.

Consent
Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Research registration
N/a.

Guarantor
AB.

CRediT authorship contribution statement
AB: Writing the paper.
MB: Study concept.
MAJ: Literature research.
WB: Study concept.
MK: Supervision.
MBS: Supervision.

Declaration of competing interest
The authors have no financial, consultative, institutional, and other relationships that might lead to bias or conflict of interest.
The authors declare that no funding was received for this study.

References
[1] A.W. Dunn, Fractures and dislocations of the carpus, Surg. Clin. N. Am. 52 (1972) 1513-1538, https://doi.org/10.1016/s0039-6109(16)39895-4.
[2] K. Watanabe, J. Nishikimi, Transstyloid radiocarpal dislocation, Hand Surg. 06 (2001) 113-120, https://doi.org/10.1142/2021801040100436.
[3] D.L. Fernandez, J.B. Jupiter, Fractures of the Distal Radius, Springer New York, New York, NY, 2002, https://doi.org/10.1007/978-1-4613-0033-5.
[4] C.S. Mudgal J. Posenica J.B. Jupiter, Radiocarpal fracture-dislocation, (n.d.) 7.
[5] C. Dumontier, G. Meyer zu Reckendorf, A. Sautet, E. Lenoble, P. Safrar, Y. Allieu, Radiocarpal dislocations: classification and proposal for treatment: a review of twenty-seven cases 83 (2001) 212-218, https://doi.org/10.2106/00004623-200102000-00008.
[6] M.S. Moneim, J.T. Bolger, G.E. Omer, Radiocarpal dislocation-classification and rationale for management, Clin. Orthop. 199-209 (1985).
[7] P.L. Hudak, P.C. Amadio, C. Bombardier, Development of an upper extremity outcome measure: the DASH (disabilities of the arm, shoulder and hand) [corrected], The Upper Extremity Collaborative Group (UECG), Am. J. Ind. Med. 29 (1996) 602-608, https://doi.org/10.1002/(SICI)1097-0274(19960629)29:6<602::AID-AJIM4>3.0.CO;2-L.
[8] A. Cornu, N. Sturbois-Nachef, M. Baudoux, T. Amouyel, M. Saab, C. Chantelot, Radiocarpal dislocation: a retrospective study of 14 patients, Orthop. Traumatol. Surg. Res. 105 (2019) 1611-1616, https://doi.org/10.1016/j.otsr.2019.08.017.
[9] M. Biondi, G. Lauri, Dorsal fracture-dislocation of the radiocarpal joint: a new classification and implications in surgical treatment, J. Hand Surg. Eur. 45 (2020) 700-708, https://doi.org/10.1177/1753193420926801.
[10] C. Spiry, G. Bacle, E. Martinez, B. Charrasau, J. Lualan, Radiocarpal dislocations and fracture-dislocations: injury types and long-term outcomes, Orthop. Traumatol. Surg. Res. 104 (2018) 261-266, https://doi.org/10.1016/j.jotsr.2017.12.016.
[11] O. Dahmani, M. Elbchiri, M. Shimi, A. ElMrini, La luxation radiocarpienne (à propos de neuf cas), Chir. Main 32 (2013) 30-36, https://doi.org/10.1016/j.main.2012.12.005.
[12] P.R. Yang, A.D. Patel, A.N. Esmail, Dorsal radiocarpal joint fracture-dislocation: a case report, JBJS Case Connect. 8 (2018), https://doi.org/10.2106/JBJS.CC.17.00275 (e50-e50).

[13] R.A. Agha, M.R. Borrelli, R. Farwana, K. Koshy, A.J. Fowler, D.P. Orgill, H. Zhu, A. Alawadi, A. Noureldin, A. Rao, A. Enam, A. Thoma, M. Bashashati, B. Vasudevan, A. Beamish, B. Challacombe, R.L. De Wilde, D. Machado-Aranda, D. Laskin, D. Murumdar, A. D’Cruz, T. Manning, D. Healy, D. Pagano, P. Goel, P. Ranganathan, P.S. Pai, S. Raja, M.H. Ather, H. Kadiozlu, I. Nixon, I. Mukherjee, J. Gómez Rivas, K. Raveendran, L. Derbyshire, M. Valmasoni, M. Chalkoo, N. Raison, O. Muensterer, P. Bradley, R. Coppola, R. Afifi, D. Rosin, R. Klappenbach, R. Wynn, S. Giordano, S. Basu, S. Surani, P. Suman, M. Thorat, V. Kasi, The SCARE 2018 statement: updating consensus Surgical Case Report (SCARE) guidelines, Int. J. Surg. 60 (2018) 132–136, https://doi.org/10.1016/j.ijsu.2018.10.028.

[14] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, A. Kerwan, SCARE Group, The SCARE 2020 guideline: updating consensus Surgical Case Report (SCARE) guidelines, Int. J. Surg. Lond. Engl. 84 (2020) 226–230, https://doi.org/10.1016/j.ijssu.2020.10.034.