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Case Report

Complete Dorsal Lunate Enucleation

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Abstract

Perilunate dislocation is a serious injury that represents about 5% of all wrist injuries. It is regularly unseen or misdiagnosed and inappropriately managed. Lunate is usually dislocated to the palmar site and can be classified into three grades using the Witvoët and Allieu classification, but dorsal enucleation of the lunate is unique and non-described. We present the case of a 32-year-old man with a complete dorsal lunate enucleation associated to a fracture of the 5th, 4th and 3rd metacarpal base. The lunate lost its normal articulation with both the capitate and the radius and is completely displaced dorsally. The capitate remained aligned with the radius while the scaphoid is displaced anteriorly and proximally to the distal radius. Using a dorsal approach to the wrist, we reduced and stabilized the lunate with three Kirshner wires (K-wires). The right wrist was immobilized in a cast for 4 weeks. Mobilization was allowed after 4 weeks and the K-wires were removed after 6 weeks. At 3 months follow-up, the patient regained full wrist range of motion.

Keywords: *Lunate; Enucleation; Wrist; Dorsal Enucleation*

Introduction

Carpal fractures and dislocations are serious injuries, regularly unseen or misdiagnosed and inappropriately managed [1]. Lunate dislocation is rare with an usual dislocation to the palmar site [1]. Still, dorsal dislocation of the lunate is more rarely, even unique and non-described by Witvoet and Allieu [2] in their classification. Here, we present a very exceptional case of a 32-year-old man with a complete dorsal lunate enucleation associated to a fracture of the 5^{th}, 4^{th} and 3^{rd} metacarpal base.

Case Presentation

A 32-year-old man with no relevant medical history was admitted to our department for a closed trauma of the right wrist caused by high energy trauma (truck driver colliding with a car). Initial examination found pain, swelling, and deformation of the right wrist. Examination of the ipsilateral elbow and shoulder was pain-free and neurovascular injuries were not apparent. The preliminary evaluation allowed us to suspect a fracture or fracture-dislocation of the right wrist. The anteroposterior x-ray, lateral x-ray and CT-scan (Figure 1) showed a complete dorsal lunate enucleation with a fracture of the 5^{th}, 4^{th} and 3^{rd} metacarpal base and no clear signs of fracture of other carpal bone. The lunate lost its normal articulation with both the capitate and the radius and is completely displaced dorsally. The capitate remained aligned with the radius while the scaphoid is displaced anteriorly and proximally to the distal radius. The surgery was done on the same day. Using a dorsal approach to the wrist, we reduced and stabilized the lunate with three 1.8 mm Kirshner wires (K-wires).

These K-wires were inserted under fluoroscopic guidance to transfix the scapho-lunate, luno-triquetral and luno-capitate intervals, and to protect the lunate from re-dislocation. The right wrist was immobilized in a cast for 4 weeks. Postoperative radiographs confirmed anatomical reduction of the lunate (Figure 2). Mobilization of the right wrist was allowed after 4 weeks and the K-wires were removed after 6 weeks. At 3 months follow-up, the patient regained full wrist range of motion and was able to return to his job and daily activities

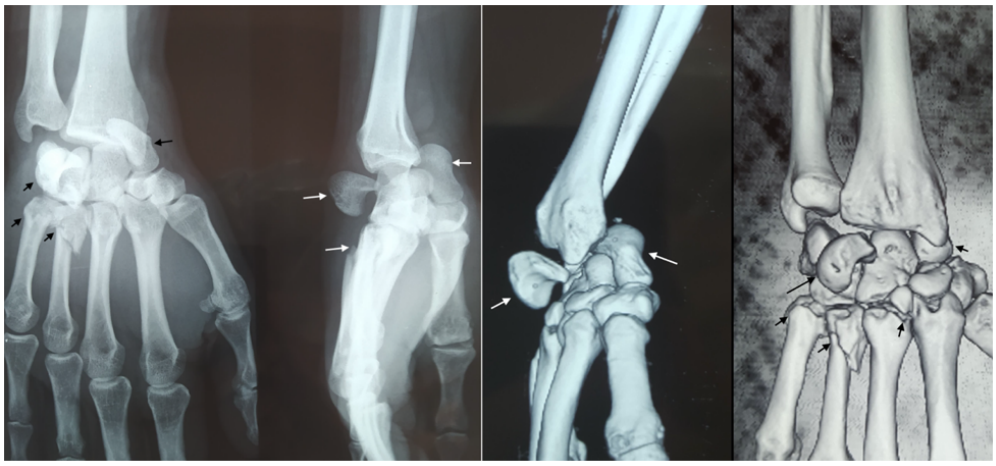

Figure 1: *Radiography and CT-scan of the right wrist showing a complete dorsal lunate enucleation with a fracture of the 5th, 4th and 3rd metacarpal base and no clear signs of fracture of other carpal bone.*

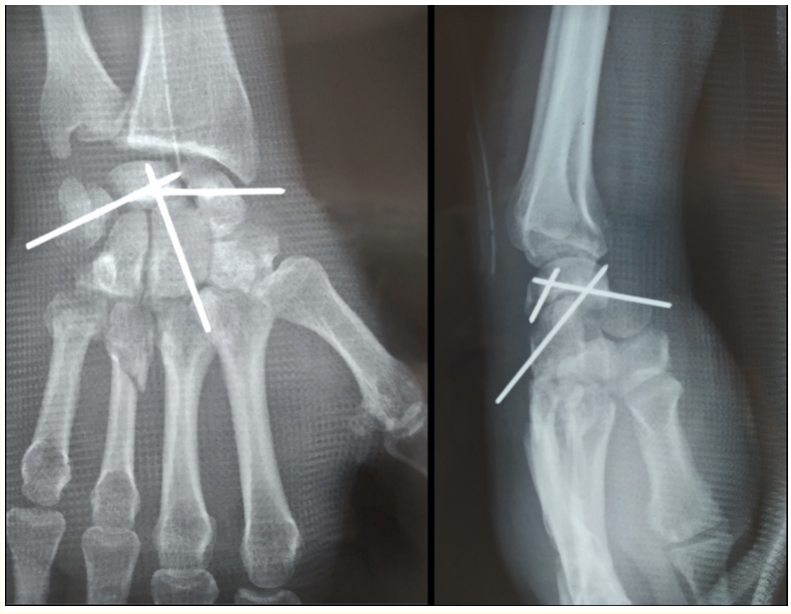

Figure 1: *Postoperative radiographs confirmed anatomical reduction of the lunate that we fixed with 3 K-wires through the scapho-lunate, luno-triquetral andluno-capitate intervals, protecting the lunate from re-dislocation.*

Discussion

Perilunate dislocation represents about 5% of all wrist injuries [3] and only 18% of hand fractures involve carpal bones with the scaphoid fracture being most common [4]. Lunate dislocation and fracture-dislocation is a rare and serious injury [1]. Classically, this injury occurs in young male adults after a high-energy trauma. The diagnosis is easy with a clinical exam and standard radiographs [5]. The Witvoët and Allieu classification is the most used for perilunate dislocation and describe three grades [2]. Usually, the lunate dislocates to the palmar site, although the dorsal displacement does not appear in any classification [1]. High-force traumas, such as motor vehicle accidents, are necessary to disrupt theses strong ligaments (scapho-lunate, radio-lunate, radio-scapho-lunate and luno-triquetral ligaments) and to push the lunate out of its natural position [1]. In our case, the mechanism of the injury should be a wrist hyperflexion leading the capitate to push the lunate backwards. Only a limited cases of dorsal lunate enucleations are reported in the literature. Herzberg., *et al.* [6] reviewed x-ray images of 166 patients and found only 5 patients with a dorsal perilunate dislocation or perilunate fracture dislocations. Siddiqui., *et al.* [7] reported a case of dorsal lunate dislocation after a sudden pull by a dog while the patient was holding the lead. He treated the patient with a closed reduction and percutaneous K-wires followed by a short immobilization. Bilos., *et al*. [8] described two cases of dorsal lunate dislocation, the first was an amateur boxer and the second fell on the flexed hand. Bjerregaard., *et al.* [9] reported a trans styloid dorsal lunate luxation in a truck driver colliding with a train. Neaving., *et al.* [10] reported a case of a Dorsal Dislocation of the Lunate with Distal Radius Fracture in a 51-year-old man involved in a high-speed rollover truck collision. Schwartz., *et al*. [11] reported the case an old dorsal lunate dislocation with associated multiple extensor tendon ruptures. Since there is an absence of guidelines, the treatment of dorsal lunate enucleation remains controversial and still supported by some cases theses class V cases reports. Simple closed reduction and cast immobilization is not enough, open reduction with internal fixation using K-wire and ligament repair through dorsal approach is recommended [12]. The temporary arthrodesis using K-wire is necessary for the healing of the dorsal lunotriquetral ligament who is responsible for the anteroposterior stability of the lunatum [13].

Conclusion

Dorsal dislocation of the lunate is extremely serious injuries that can be regularly unseen or misdiagnosed. That's why wrist injuries demand an exhaustive initial examination and in case of any doubts, a CT or MRI is strictly recommended to rule out further damage to the carpus [9]. Our case offers a meaningful insight into carpal injury patterns and can be added to the previous ones hoping for a better understanding of this pathology and helping surgeons to more efficiently treating it.

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