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Case report

Transcapho perilunate dislocation with palmar extrusion of the scaphoid proximal pole

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Summary. Perilunate fracture-dislocations usually combine ligament ruptures, bone avulsions, and fractures in different patterns. Rarely a displaced fracture of the scaphoid can coexist with a scapho-lunate dissociation and can result in enucleation of the proximal pole. We report about a case of trans-scaphoid perilunate dislocation with palmar extrusion/enucleation of the scaphoid proximal pole, treated with scaphoid fracture open reduction and internal fixation with screw, scapho-lunate ligament repair with an anchor and vascularization of the scaphoid proximal pole with the 2nd intermetacarpal artery. At 52 months follow up we had good clinical and radiographic results. In conclusion, scientific literature including our experience about this rare complex lesion of the wrist is too weak to support an effective strategy of management but we think that the careful analysis of the single problems can be the key to solve the complexity. Goal of the treatment should be complete revascularization and healing of the scaphoid, avoiding non union and avascular necrosis; simultaneously a proper ligament reconstruction is fundamental to re-establish carpal stability. Prevention of carpal collapse for a SNAC o SLAC situation is essential to reach a good level of Quality of Life and satisfaction of the patient. (www.actabiomedica.it)

Key words: transscaphoid, radiocarpal fracture dislocation, scaphoid fracture, carpal dislocation, perilunate dislocation, scapho-lunate dissociation, vascularisation, transcapho perilunate dislocation

Introduction

Most of the perilunate fracture-dislocations combine ligament ruptures, bone avulsions, and fractures in a variety of clinical forms. The most frequent is the dorsal trans-scaphoid perilunate dislocation. Approximately 60% of perilunate dislocations present with a displaced scaphoid fracture, with most of them (72%) transverse and located in the middle third. Usually, the proximal fragment remains normally connected to the lunate, even if this has undergone a palmar dislocation. The exceptions are rare instances in which there is a concomitant scapho-lunate dissociation, with the proximal scaphoid being extruded dorsally (1).

Palmar dislocation of the scaphoid is a rare injury. Two clinical forms have been reported: isolated anterolateral dislocation of the proximal pole of the scaphoid (type I) and scaphoid dislocation associated with an axial derangement of the capitate-hamate joint (type II). The most probable mechanism of type I injuries involves a violent hyperpronation injury to the extended and ulnarly deviated wrist, causing scapho-lunate dissociation first, followed by the enucleation of the proximal pole of the scaphoid around the radio-scapho-capitate ligament. These injuries also could be the result of a self-reduced palmar perilunate dislocation, the scaphoid having been left unreduced by capsular interposition. None of these mechanisms, however, has been proved (1).

Both authors contributed equally to this manuscript and thus are to be considered both 1st author

We report about a rare case of trans-scaphoid perilunate dislocation with palmar extrusion/enucleation of the scaphoid proximal pole.

Case report

A 32 years old male quad biker had a racing accident which resulted in a scaphoid fracture with the proximal pole volar luxation (Fig. 1). He complained of wrist pain with edema and complete loss of movement with paresthesia in the territory of the median nerve. The day after trauma he underwent surgery.

The **surgical procedure** was performed under a brachial plexus axillary block anesthesia with the placement of an arm tourniquet at 90 mmHg higher than the patient's systolic blood pressure.

A volar incision was made at the distal forearm where the median nerve appeared to be very compressed due to edema and thus was surgically decompressed. The proximal pole of the scaphoid was found extruded on the volar surface of the distal radius.

Another incision was performed on the dorsum of the wrist over the fourth extensor compartment with a personal approach as previously described (2, 3). The dorsal articular capsule was ruptured. The posterior interosseus nerve was cauterized under low voltage and articular debridement of the lunate bone fragments was performed. The lunate's proximal articular surface was partially broken. Scaphoid fracture reduction by means of posterior access was performed with a 24 mm "Twin Fix" screw. Pin fixation through the scaphoid and lunate, and through scaphoid and capitate was performed and scapho-lunate ligament reconstruction was then performed using a "Mitek" anchor (Fig. 2). The second intermetacarpal vascular bundle was isolated using loop magnification and it was inserted into the scaphoid's proximal pole through a 2mm drilled hole (4, 5).

The patient's wrist was then immobilized in a plaster cast for 45 days.

Figure 1. X-ray examination showing the scaphoid fracture with the proximal pole volar dislocation. a) A/P view; b) L/L view

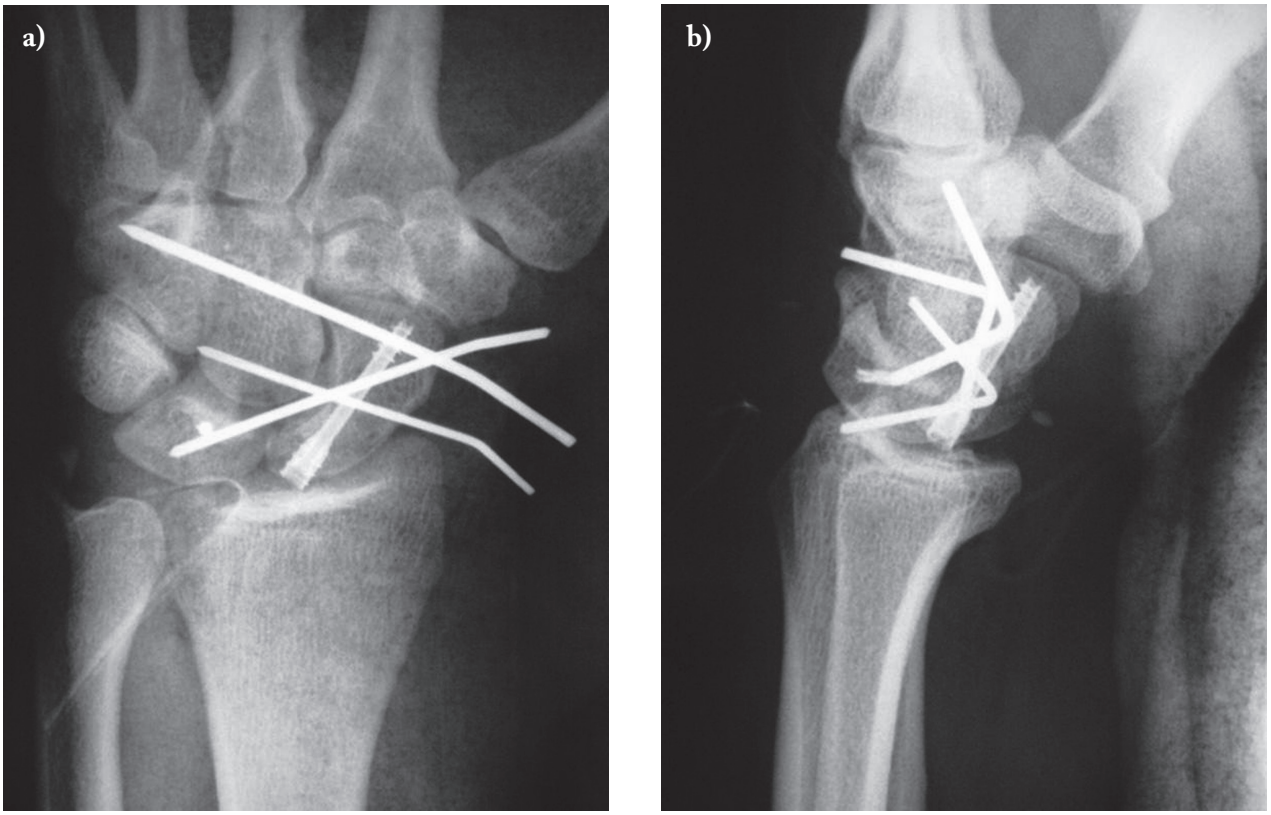

Figure 2. Postoperative X-ray examination showing scaphoid fracture reduction and osteosynthesis with a screw, scapho-lunate ligament reconstruction with an anchor and a carpal provisional stabilization with Kirschner wires. a) A/P view; b) L/L view

Follow up results

The patient was followed up to 52 months by clinical and radiographic examination (Fig. 3).

Clinically he complained no wrist pain at all (VAS=0), wrist Range of Movement (ROM) was 50° in flexion, 60° in extension and 160° in prono-supination, grip strength was 80% of the controlateral side. The patient is still motorbike racing.

X-rays showed complete healing of the scaphoid fracture with vital bone tissue of the proximal pole.

Discussion

Various patterns of traumatic carpal injury have been described in the literature. Although the combination of scaphoid fracture and scapho-lunate ligament rupture in the same injury has been reported and these lesions can no longer be considered mutually exclusive, little information is available on management methods and the long-term results of such seemingly paradoxical complex injuries. The study by Cheng et al. (6) reviews 11 previously described cases and reports an additional two cases of concurrent scaphoid fracture with scapholunate ligament rupture. This concurrent injury has two presentations; namely perilunate fracture-dislocation, which is the most common presentation, and complex scaphoid fracture. No single mechanism of injury exists that accounts for these complex injuries. High-energy trauma was the only characteristic common to all these cases (6-8). Most cases had unsatisfactory radiographic results including scaphoid nonunion, avascular necrosis of the lunate or the proximal pole of the scaphoid and arthritic wrist changes at an average follow-up of 11 months. Managing these difficult problems needs critical recognition and repair of both bony and ligamentous damage (6).

Figure 3. X-rays at 52 months follow up, showing complete healing of the scaphoid fracture with vital bone tissue of the proximal pole

In our experience we aimed to surgically fix the scapho-lunate dissociation together with the scaphoid fracture considering also the risk of avascular osteonecrosis.

Timing in surgical repair can also be an important factor influencing the outcome. Many times these complex lesions are not diagnosed immediately because they occur together with other life threatening once. In our case, wrist involvement was isolated, so we could diagnose and treat it within the first 24 hours.

In conclusion, scientific literature including our experience about this rare complex lesion of the wrist is too weak to support an effective strategy of management but we think that the careful analysis of the single problems can be the key to solve the complexity. Goal of the treatment should be complete revascularization and healing of the scaphoid, avoiding non union and avascular necrosis; simultaneously a proper ligament reconstruction is fundamental to re-establish carpal stability. Prevention of carpal collapse for a SNAC o SLAC situation is essential to reach a good level of Quality of Life and satisfaction of the patient (9).

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