

## CASE REPORT

# ISOLATED FRACTURE OF THE CAPITATE WITH PROXIMAL POLE DORSAL DISLOCATION. A CASE REPORT

E. REBUZZI

**Isolated fractures of the capitate are uncommon. We report a rare case of isolated fracture of the capitate with dorsal dislocation of the proximal pole. After open reduction and K-wire fixation the fracture united, and a full range of wrist motion was achieved. No signs of avascular necrosis were observed after 3 years.**

**Keywords** : fracture ; carpal bone ; capitate.

**Mots-clés** : fracture ; carpe ; grand os.

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### INTRODUCTION

Isolated fractures of the capitate are uncommon and dislocation of a fragment is even rarer. In 1962 Adler and Shaftan (1) reviewed 42 isolated fractures from the literature, and reported six cases of their own (three of these with no follow-up). In 1982 Rand *et al.* (8) in a retrospective review identified three patients with acute isolated fractures of the capitate among 978 patients with carpal fractures (0.3%). In 1989 Gibbon and Jackson (5) reported an isolated fracture in a 9-year-old boy. In 1990 Hopkins and Amman (7) reported two cases. In 1990 Richards *et al.* (9) and in 1993 Guiral *et al.* (6) reported respectively a case of isolated fracture with a volarly dislocated fragment. In 1999 Calandruccio and Duncan (3) reported a case of isolated nondisplaced waist fracture diagnosed by MRI. The author is unaware of any report of isolated fracture of the capitate with dorsal dislocation of the proximal pole rotated 180°.

### CASE REPORT

An 18-year-old male student was involved in a motorcycle accident. He sustained a hyperflexion injury to his right wrist, with pain, dorsal swelling and limitation of motion. Radiographs of the wrist showed an isolated fracture at the level of the proximal pole of the capitate with a dorsal dislocated fragment rotated 180° (fig. 1 a,b). A dorsal transverse approach was employed (fig. 1 c) to expose, reduce and stabilize the fragment by two Kirschner wires (fig. 1 d). The proximal pole was completely detached. The patient was immobilized in a short arm cast for 6 weeks. At this time the K-wires were removed, and the patient started motion and grip exercises. The fracture healed in 3 months. After 3 years the radiographs showed normal carpal alignment (fig. 1 e). The patient has now regained normal painfree function similar to the contralateral wrist (80° flexion, 70° extension, 30° ulnar deviation, 15° radial deviation). Grip strength was 40 kg in the right hand and 38 in the left.

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Department of Orthopedic Surgery, Civil Hospital of Oderzo  
USSL 9 (TV), Via Luzzatti 33 Oderzo - Italy.

Correspondence and reprints : Enrico Rebuzzi, Via  
Garibaldi 73, 33080 Cecchini di Pasiano (Pordenone), Italy.  
E-mail: [rewesch@libero.it](mailto:rewesch@libero.it).



**Fig 1.** — a, b : anteroposterior and lateral radiographs of the wrist, on the day of injury, showing an isolated fracture of the capitate with a dorsal dislocated proximal fragment (arrow). c : the dorsal approach to expose the dislocated fragment. d : the fracture stabilized by 2 K-wires. e : good healing 3 years postoperatively.

## DISCUSSION

Three mechanisms may cause fracture of the capitate (1). The first is direct trauma to the dorsal surface of the bone. The second, a fall on the palm with the wrist in forced extension, is the most frequent. The third, a fall on the forcefully flexed hand, is rare. In the cases described by Adler and Shaftan (1) the mechanism was a fall on the palm in 11 cases, on the dorsum in 6 and a direct blow in 2. Rand *et al.* (8) reported a dorsiflexion mechanism in 6 patients, direct dorsal trauma in one and an unknown mechanism in 6.

A particular lesion is the scaphocapitate fracture syndrome described by Fenton in 1956 (10). It might be caused by hyperextension. The scaphoid

is fractured first, and the posterior lip of the radius produces a fracture of the neck of the capitate. The proximal fragment may pivot anteriorly through 90° and when the hand returns to neutral position, it remains fixed so that it is twisted through 180° (10).

The case we report, without scaphoid fracture, was caused by an inverse mechanism of injury. In extreme flexion the anterior lip of the radius hit the capitate directly, causing a fracture. When the wrist was straightened the distal fragment of the capitate slipped behind the proximal fragment and induced its dorsal dislocation. The upper fragment was twisted 180° as the lower fragment came back into place. We replaced the avulsed fragment to save midcarpal joint stability. Although we obtained

complete healing, this kind of fracture and dislocation is at great risk for nonunion and avascular necrosis (2) because the capitate has a tenuous intraosseous vascular pattern based on large areas supplied by a single intraosseous vessel. Gelbermann *et al.* (4) showed that the capitate has vessels that enter the distal portion of the bone and extend proximally to supply the head. Seventy percent of capitates in his series did not have intraosseous anastomoses and 50% of those lacking anastomoses had vessels supplying the head from the palmar surface only. This report suggests that an immediate and adequate reduction and K-wire fixation with additional immobilization in a plaster cast can lead to a successful outcome following capitate fracture with severe displacement of the proximal fragment.

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#### SAMENVATTING

*E. REBUZZI. Geïsoleerde fractuur van het os capitatum met dorsale verplaatsing van het proximaal fragment.*

Geïsoleerde fracturen van het os capitatum zijn zeldzaam. Wij beschrijven een fractuur van het os capitatum met dorsale verplaatsing van het proximaal fragment, behandeld met open reductie en Kirchnerfixatie. De fractuur consolideerde en de polsmobiliteit werd volledig herwonnen. In de observatieperiode van drie jaar trad geen avasculaire necrosis op.

#### RÉSUMÉ

*E. REBUZZI. Fracture isolée du grand os avec luxation dorsale du fragment proximal: présentation d'un cas.*

Les fractures isolées du grand os sont rares. Les auteurs rapportent un cas de fracture du grand os avec luxation dorsale du fragment proximal, qui a été traité par réduction à foyer ouvert et fixation par broches. La consolidation a été obtenue avec récupération d'une mobilité complète du poignet. A trois ans, il n'y a aucun signe d'ostéonécrose avasculaire.