

SCAPHO-CAPITATE SYNDROME : DISTANT FRAGMENT MIGRATION

C. MUDGAL, M. LOVELL

The authors wish to report a case of scapho-capitate syndrome with distant migration of the head of the capitate, an injury previously undescribed in English literature. The head of the capitate in this case, was found to lie just proximal to the transverse carpal ligament, deep to the median nerve which was tented over it. It was retrieved and replaced in its anatomical location. Following fixation of both fractures, satisfactory stability was restored in the wrist. The patient was followed for a period of nine months, at the end of which, his wrist was non-tender with a functional range of motion.

Keywords : scapho-capitate syndrome ; fracture ; carpus.

Mots-clés : syndrome scaphoïde-capitatum ; fracture ; carpe.

INTRODUCTION

Scapho-capitate fractures are characterized by transverse fractures of the scaphoid as well as the capitate. The proximal portion of the capitate, in addition undergoes a rotation through 90° or 180° after fracture. Distant migration of the capitate is most likely to render the displaced fragment susceptible to avascular necrosis. However, it has been suggested that despite migration, if the fragment is replaced accurately, avascular necrosis may not always occur (5). The present case confirms the value of early open reduction and internal fixation with accurate capitate repositioning, in the management of this difficult injury.

CASE REPORT

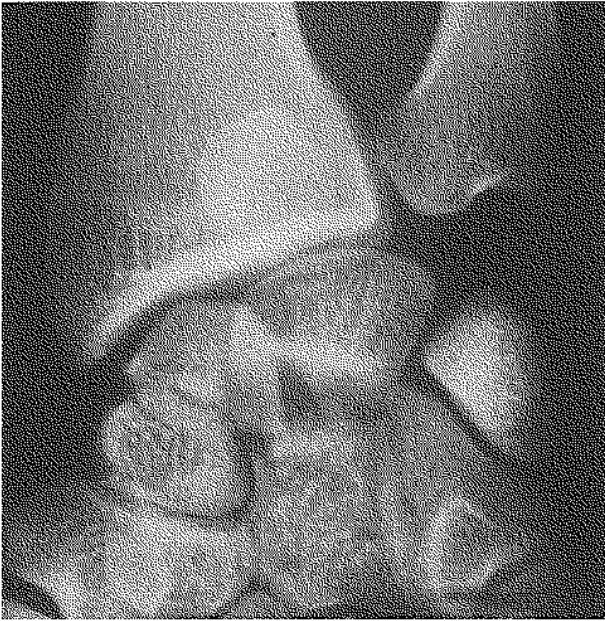
A. M., a 19-year-old unemployed right-handed male fell 30 feet from a bridge and was admitted to our hospital. Besides a fracture of the fourth cervical vertebra, he also had a very swollen and bruised right wrist. He complained of numbness in the three radial digits, and had pronounced hypoesthesia in the distribution of the median nerve in his right hand. Radiographs revealed displaced fractures of the scaphoid and the capitate. The proximal pole of the capitate was displaced far proximally and volarwards and was lying proximal to the volar lip of the radius (figs. 1, 2).

An emergency open reduction was performed through a volar approach. The proximal pole of the capitate was lying just deep to the median nerve, which was tented over it. The fragment had no soft tissue attachments. The scaphoid was comminuted at the site of fracture. The capitate fragment was cleaned and preserved in saline. Attempts to reduce and fix the scaphoid were not successful due to the tendency of the proximal pole of the scaphoid to migrate medially into the hiatus left by the displaced fragment of the capitate.

Volar relocation of the capitate was not possible. Hence, a second incision was made dorsally, be-

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Figs. 1 and 2. — Initial radiographs of the wrist showing fractures of the scaphoid and capitate, with displacement of the proximal pole of the capitate.

tween the third and fourth compartments. The dorsal capsule was intact. After exposure of the fractured capitate, the proximal pole was anatomically reduced, which immediately increased the stability. It was then possible to reduce the scaphoid. Both fractures were fixed in the best possible position with Kirschner wires (figs. 3, 4). A meticulous closure was performed. The patient's wrist was protected postoperatively in a short-arm plaster cast.

His preoperative symptoms resolved within 48 hours. The cast and the wires were removed three months after injury.

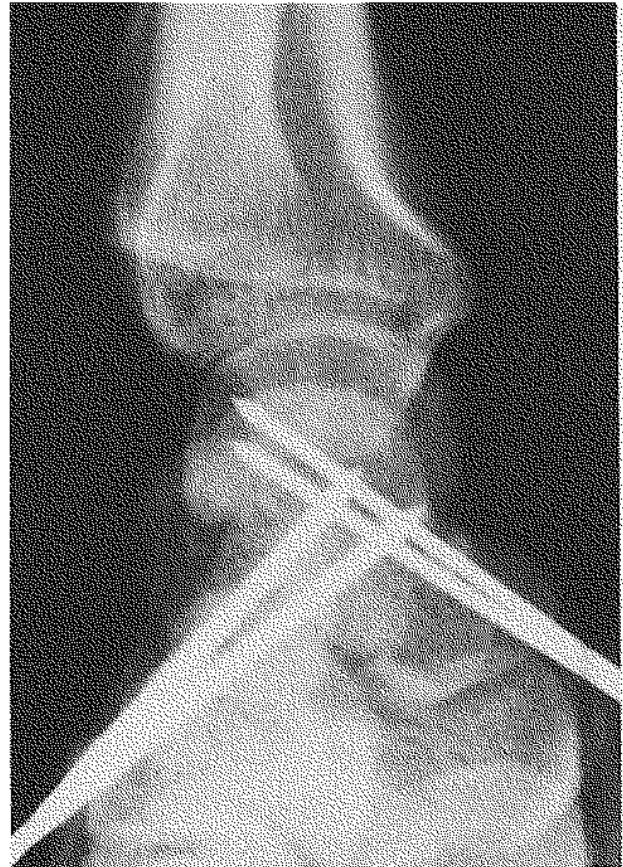
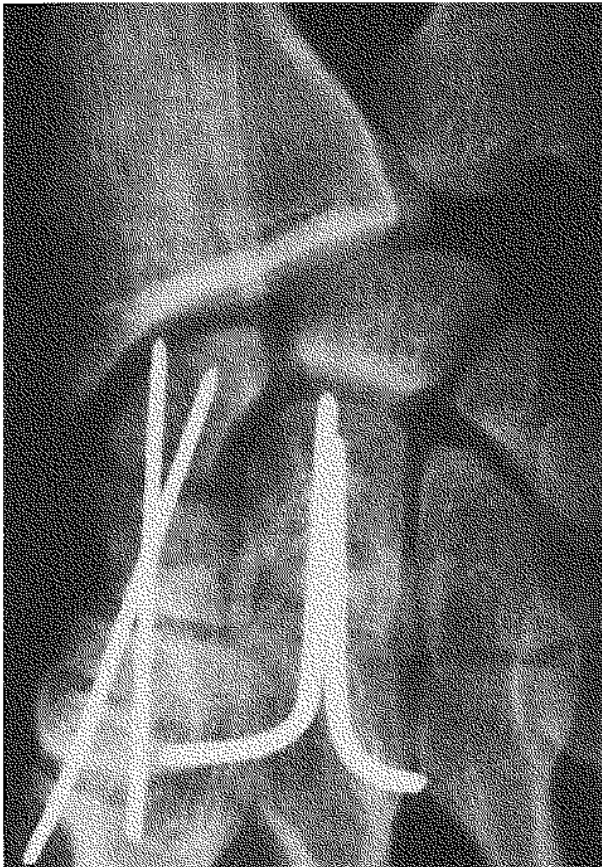
On examination at the end of nine months, his wrist was nontender over both the scaphoid and the capitate. Movements of the wrist and forearm were as follows: 40° of flexion, 45° of extension, 15° of ulnar deviation, 10° of radial deviation,

70° of supination and 72° of pronation. The patient is recovering from a quadriplegia caused by his cervical spine injury, and uses his right hand for activities of daily living, as much as possible.

DISCUSSION

Fenton (1) coined the term naviculocapitate fracture syndrome to describe this injury. He believed it resulted from a fall on a hyperextended, radially deviated wrist, with the radial styloid responsible for causing both fractures. Stein and Siegel (3) disputed this theory and suggested that direct compression of the capitate by the dorsal lip of the radius during hyperextension of the wrist, was responsible for this injury.

During recent years, it has been suggested that such an injury can be produced by extremes of



Figs. 3 and 4. -- Post-operative radiographs.

hyperflexion at the wrist as well. However, most authors believe that this injury is a variety of transscaphoid transcipitate perilunate fracture-dislocation, the dislocation having reduced spontaneously. Vance *et al.* (4), in a comprehensive review of this subject, have classified scaphocapitate fractures into six different types, depending on the fragment geometry and displacement. The present case does not appear to fit into any of these categories, and should perhaps be classified as Type VII.

Excision of the displaced capitate fragment has been recommended (1, 3). Some investigators believed that if a capitate fracture is associated with other carpal injuries, these other injuries are important in determining the prognosis, and they described a case in which the fragment was allowed to heal in the rotated position, with seemingly good results.

While this may be possible in the short term, it is very likely that such a disordered carpus would not be compatible with satisfactory long-term function. There are numerous vascular foramina in the waist and neck of the capitate, distal to the head which articulates with the lunate and is covered by articular cartilage. Studies by Vander Grend *et al.* (5) have shown that palmar vessels contribute most to the blood supply of the capitate. The proximal pole of the capitate is dependent on distal-to-proximal flow across the waist, analogous to the blood supply of the scaphoid. The more proximal the fracture, the greater the risk of avascular necrosis.

A fracture through the neck of the capitate, therefore, may be expected to result in avascular necrosis of the head fragment. However, Meyers *et al.* (2) were among the earliest authors to

document the ability of the head of the capitate to revascularize, if it was replaced anatomically and immobilized until the fracture healed. They believed that since the articular cartilage covering the head of the capitate is nourished by synovial fluid, if the fragment is prevented from collapsing, the articular cartilage will not degenerate as a consequence of trauma. In our patient, anatomic repositioning of the capitate resulted in a satisfactory outcome.

Anatomic repositioning and fixation of both fractures is extremely difficult if not impossible, using only a volar approach. Hence, usually both volar and dorsal approaches are required to achieve satisfactory reduction and fixation.

The critical first step in open reduction should be reduction and fixation of the capitate fracture. Failure to do so precludes accurate reduction of the scaphoid, the proximal pole of which migrates into the hiatus left by the displaced head of the capitate.

The Herbert screw has been recommended for fixation of scaphoid fracture types B, C and D, and scaphocapitate syndrome may be classified as type B4. Prompt open reduction and internal fixation using Herbert screws would constitute ideal treatment of this injury. Bone grafting after primary open reduction and internal fixation has also been recommended.

To date in the English literature, we have been able to find only two articles dealing with scapho-capitate syndrome treated with Herbert screw fixation. These authors among others found the Herbert screw to provide stable fixation, if precise techniques were used. Fixation of capitate fractures with the Herbert screw is relatively simple, and the shape of the capitate may allow free-hand insertion of the screw. As Herbert screw instrumentation is not available at our institute, Kirschner wires were used to fix both fractures.

This case report illustrates the capability of the head of the capitate to migrate to a distant location. Despite the loss of all soft tissue attachment, accurate repositioning of the capitate fragment gave a satisfactory result. Fixation of both fractures with Herbert screws, if possible at the earliest opportunity, would be ideal.

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SAMENVATTING

C. MUDGAL, M. LOVELL. Scapho-capitatum syndroom: fragment migratie op afstand.

De auteurs rapporteren één geval van scapho-capitatum syndroom, met migratie op afstand van het caput van het capitatum; dit letsel werd voorheen in de engels-talige literatuur niet beschreven. Het caput van het capitatum werd net craniaal van het ligamentum carpi transversum gevonden, posterior van de nervus medianus, die op het stuk gespannen lag. Het fragment werd verwijderd en in anatomische stand herplaatst. De fracturen werden gefixeerd; de functionele recuperatie was vervolgens bevredigend. Patiënt werd gedurende 9 maanden gevolgd; de functionele recuperatie was nadien volledig, met pijnvrijheid.

RÉSUMÉ

C. MUDGAL, M. LOVELL. Syndrome scaphoïde-capitatum: migration a distance d'un fragment.

Les auteurs présentent un cas, jusqu'à présent non décrit dans la littérature anglo-saxonne, de syndrome du «scaphoïde-capitatum» avec migration à distance de la tête du capitatum.

Ce fragment fut retrouvé en position proximale par rapport au ligament transverse du carpe, au contact de la face postérieure du nerf médian qui était tendu sur lui. La tête fut extraite et replacée en position anatomique. Les fractures furent fixées à l'aide de broches de Kirschner, avec une stabilité satisfaisante. Le patient fut suivi pendant 9 mois; à la fin de cette période, le poignet était indolore et la récupération fonctionnelle complète.