Capitate Fracture-Dislocation Accompanied by Scaphoid Distal Pole Fracture: A Case Report of Scapho-Capitate Syndrome.

Vasileios Giannatos MD[1], Theodoros Stavropoulos MD[1], Harry Charalambous[1], Panagiotis Antzoulas MD, Msc[1], Andreas Panagopoulos MD, PhD[1], Zinon Kokkalis MD, PhD[1]

[1]University Hospital of Patras

ABSTRACT

We present a rare case of scapho-capitate syndrome on a 25-year-old man with volar dislocation of the capitate's fragment deep to the median nerve. X-rays and CT scan was performed and the patient was treated few hours after the injury by a hand specialist to prevent median neuropathy and avascular necrosis. Open reduction and internal fixation utilizing a Herbert screw and 3 K-wires was performed. Immediately post-operatively the acute neural symptoms had subsided and good reduction was acquired radiologically. At 6 months follow-up good fracture healing of scaphoid and capitate were observed and a full painless ROM was possible.

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CONTACT

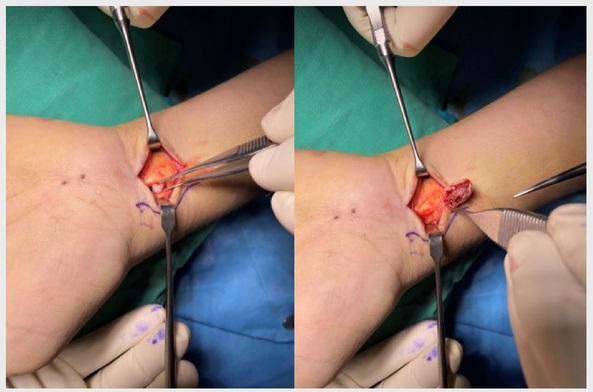
Kokkalis Zinon
drkokkalis@gmail.com

INTRODUCTION

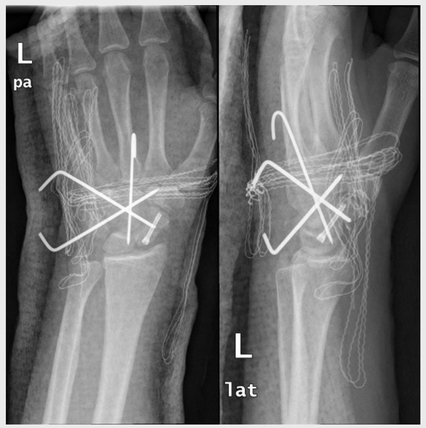
The wrist consists of distal radius and ulna, the 8 carpal bones and the 5 proximal bases of the metacarpals. Scaphoid, lunate, triquetrum and pisiform consist the proximal carpal row with no tendinous insertion, while trapezium, trapezoid, capitate and hamate consist the distal carpal row. The distal carpal row is tightly connected and motion in between the bones is considered negligible, while the capitate is the biggest carpal bone lying in the center of the carpus. Scaphoid fractures comprise 2% of all fractures and 90% of carpal fractures, being a high incidence injury. Isolated capitate fractures on the other hand are rare injuries accounting for 1% of carpal bone fractures, but a much higher incidence is reported as part of multiple carpal bone fracture injuries. The combined fracture of scaphoid and capitate, along with 90 or 180 degrees rotation of the proximal capitate fragment, is described as scapho-capitate syndrome in the literature, a special case of perilunate fracture-dislocation, and was first described by Fenton in 1956. We present a severe case of scapho-capitate syndrome, where the proximal capitate fragment did not rotate, but migrated deep to the median nerve. Few scapho-capitate syndrome cases have been reported and only one similar to ours has been described in the literature.

CASE PRESENTATION

A 25-year-old left-handed man presented to the Emergency Department (E.R) of our University Hospital, after being transferred from a rural hospital following a motor-vehicle collision driving a motorcycle. He was suffering a left-hand injury with severe oedema and pain and he was reporting paresthesia at the first three fingers. X-rays revealed a dislocated osseus fragment volarly at the level of the distal radius, but no clear diagnosis could be set. Consultation by a fellowship trained hand surgeon was acquired immediately. CT scan was ordered and revealed a scaphoid distal pole unstable A1 Herbert fracture, along with a transverse proximal capitate fracture. The dislocated fragment was attributed to the capitate.
Surgery was performed within 4 hours from the patient's entry to the hospital on an emergent basis. Careful physical examination along with CT scan revealed skin tenting volarly proximal to the proximal wrist crease at the midline. Esmarch bandaging technique was utilized and a tourniquet was inflated. A 2cm longitudinal volar incision was performed and the median nerve was revealed immediately. After retracting the flexor tendons, the osseous fragment was revealed deep and radially to the median nerve and it was excised. The volar incision was closed and the wrist was incised dorsally, extending from the Lister's tubercle to the base of the 2nd metacarpal through the third dorsal compartment. Inspection revealed a capitate and scaphoid fracture, in accordance to CT. A Herbert screw was put through the scaphoid to hold the dislocated fragment compressed into place. An open reduction of the capitate using the fragment that was retrieved earlier was performed and three Kirschner wires were drilled to transfix all the carpal bones under fluoroscopic control with C-arm. The scapholunate and lunotriquetrum ligaments were examined and were found intact and both the proximal and distal row were functioning as a unit. Lateral radiographs revealed normal scapholunate angle after the trans-fixation. Immediately post-operatively the patient reported that the paresthesias had subsided. The patient presented to our outpatient clinic 6 months after the operation, showing a painless passive and active ROM, with no flexion or extension deficits. Post-op X-rays revealed good fracture healing with no scaphoid pseudarthrosis and good carpal bones alignment.



Distal capitate fragment migration, volarly to the median nerve causing nerve entrapment. Intraoperative image



Anteroposterior and lateral wrist radiograph immediately post-operatively. Good fracture reduction achieved with three K-wires and one Herbert screw.

Radiological control 6-months post-operatively. Good fracture healing and good carpal alignment noted.

DISCUSSION

The scapho-capitate syndrome is associated with a high energy mechanism of wrist hyperextension during motor-vehicle accidents or fall from heights and it is considered a special case of trans-scaphoid and trans-capitate perilunate fracture-dislocation, a greater arc injury with difficult prognosis. Fenton suggested that the wrist is radially deviated and hyperextends as the radial styloid comes in contact first with the scaphoid and then with the capitate, fracturing both bones, whereas more hyperextension leads to the proximal capitate fragment rotation. Stein and Siegel suggest that as the wrist extends, the capitate is compressed against the dorsal radius border. It is important to recognize early all concomitant injuries utilizing CT scan in addition to X-rays, as a delay in diagnosis can lead to wrist instability and osteoarthritis. In our case, complete radiological control (CT and X-rays) was performed immediately and the patient was examined and treated within few hours from injury by a hand specialist, minimizing the risk of avascular necrosis. Open anatomical reduction utilizing compression screws or K-wires is suggested for both fractures when part of the scapho-capitate syndrome. Intraoperatively, the scaphoid appeared to be A1 according to Hebert classification and unstable, thus a Herbert screw was utilized, gaining adequate fixation. The capitate fracture was classified as transverse-low and was fixed with a K-wire. Two more K-wires were used to stabilize the carpal bones for direct bone and ligament healing. Capitate avascular necrosis (AVN) is one of the most common complications as the capitate receives most of its vasculature retrogradely, but most capitates receive proximal pole vessels as well, explaining the low rates of proximal pole avascular necrosis among certain cohorts. Despite the low transverse fracture in our case associated with the risk of AVN, our short time from injury to surgery creates favorable circumstances for healing. Although not adressed here, in high energy carpal injuries a high level of suspicion intraoperatively should be maintained not only for the osseus fractures, but for the ligamentous injuries as well, as injuries such as scapholunate ligament rupture can lead to carpal instability, DISI and SLAC with devastating results. Open anatomical reduction with K-wires or compression screws should be the goal in scapho-capitate syndrome showing favorable results.