

CASE REPORT

SCAPHO-CAPITATE FRACTURE SYNDROME A CASE REPORT

A. KUMAR, A. P. THOMAS

A rare injury of the wrist, scapho-capitate fracture syndrome, in a young patient is reported. Despite early recognition of the injury and surgical intervention, the scaphoid fracture did not unite and another attempt to achieve union with bone grafting and internal fixation also failed. The wrist continued to be painful and stiff. Radiographs of the wrist, 18 months after the injury, showed nonunion of the scaphoid, avascular necrosis of the scaphoid and the lunate and carpal collapse with midcarpal joint arthritis. Due to persistent and disabling symptoms arthrodesis of the wrist had to be carried out. Possible causes for the bad outcome after this injury are discussed. We recommend open reduction for the fracture of the capitate and open reduction and internal fixation with primary bone grafting for a displaced comminuted scaphoid fracture.

Keywords : trans-scaphoid ; trans-capitate ; perilunate ; fracture-dislocation.

Mots-clés : scaphoïde ; grand os ; fracture ; luxation périlunaire.

INTRODUCTION

Fracture of the scaphoid and the capitate with perilunate dislocation is a rare injury and only a few cases have been reported in English literature (2, 3, 5, 9-12). Jones described this injury as a trans-scaphoid trans-capitate perilunar dislocation (9) whereas, Fenton coined the term naviculo-capitate fracture syndrome (5). Later, this term was updated to scapho-capitate fracture syndrome by Monahan and Galasko (11). The injury usually follows a fall on the outstretched hand and two

mechanisms have been suggested. According to Fenton, following a fall in a position of dorsiflexion and radial deviation of the wrist, force is transmitted from the radial styloid process to the scaphoid and then to the capitate causing fracture of both bones (5). Stein and Seigel found from studies on cadavers that the radial styloid process does not strike the scaphoid in radial deviation and they suggested that acute dorsiflexion causes the scaphoid fracture and in maximum dorsiflexion the dorsal lip of the radius strikes the neck of the capitate causing it to fracture (12). This injury has been treated by both conservative and surgical methods with variable results. We report another case of scapho-capitate fracture syndrome.

CASE REPORT

A 29-year-old, right handed scaffolder, presented to the emergency department with injury to his left hip and left wrist after falling from a height. He sustained a displaced fracture of the neck of the left femur and displaced fracture of the scaphoid and the capitate with perilunate dislocation of the carpus (fig. 1). The left wrist was swollen and tender with normal circulation and sensations. The patient was taken to theatre for closed reduction and internal fixation of the left hip with cannulated screws.

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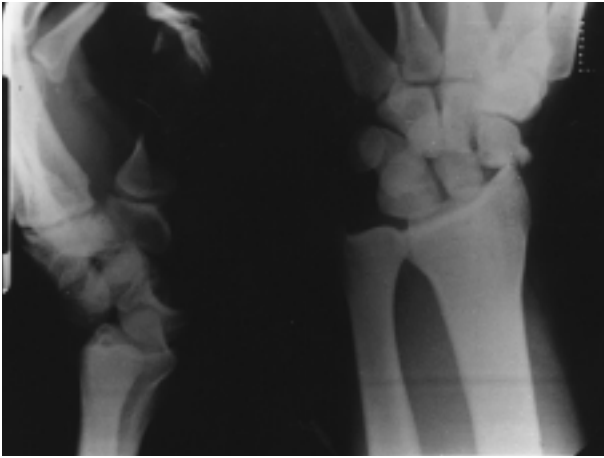


Fig. 1. — Radiographs of the wrist after the injury showing trans-scaphoid, trans-capitate perilunate dislocation of the carpus.

The wrist injury was treated by closed reduction of the lunate followed by open reduction of the proximal fragment of the capitate which had rotated through 180° . The scaphoid fracture was found comminuted and displaced. The scaphoid fragments were reduced and fixed using a Herbert screw (fig. 2). The capitate fracture was stable after fixation of the scaphoid and was not fixed. Twenty four hours later, the patient complained of tingling and numbness in the median nerve distribution for which a carpal tunnel decompression was carried out. The wrist was immobilised in a plaster cast for six weeks. The median nerve functions fully recovered in the next seven days. After six weeks, the cast was removed and gentle physiotherapy was started. The fracture of the neck of femur united uneventfully. The patient started complaining of pain in the wrist which slowly worsened. Radiographs of the wrist showed nonunion of the scaphoid but the capitate fracture had healed in a satisfactory position (fig. 3). It was decided to revise the scaphoid fixation with bone grafting. The fracture ends were freshened and grafted with cancellous bone and fixed with another Herbert screw. Postoperatively, the wrist was again protected in a scaphoid cast for six weeks. The fracture still did not unite and the patient continued to have increasing pain in the wrist on moderate activity. Radiographs of the wrist, 18 months after injury (fig. 4),

Fig. 2. — Radiographs of the wrist, 3 weeks after the injury, showing satisfactory position of the scaphoid and the capitate.



Fig. 3. — Radiographs of the wrist, 10 months after the injury, showing nonunion of the scaphoid. The capitate fracture had healed satisfactorily.

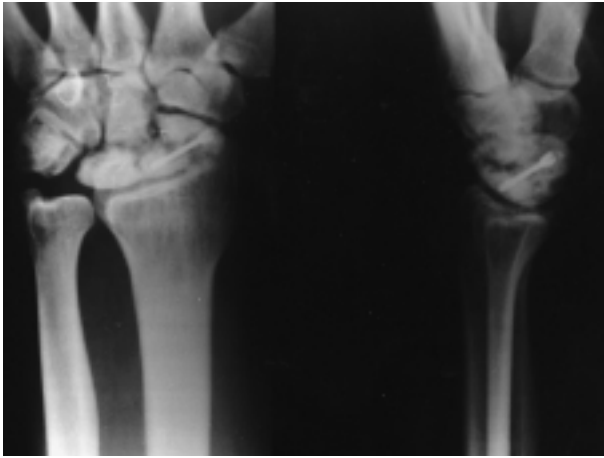


Fig. 4. — Radiographs of the wrist, 18 months after injury and 7 months after bone grafting and re-fixation of the scaphoid, showing nonunion of the scaphoid and avascular necrosis of the scaphoid and the lunate, carpal collapse and midcarpal joint arthritis.

showed nonunion of the scaphoid, avascular necrosis of the scaphoid and the lunate and carpal collapse with midcarpal joint arthritis. Due to persistent and disabling symptoms of pain and weakness of the grip, arthrodesis of the wrist was carried out. At one year follow-up, the patient was symptom free and able to play golf.

DISCUSSION

Scapho-capitate fracture syndrome is a rare injury and it is important to recognise the pathological anatomy of the wrist at the time of presentation in the emergency department. The proximal fragment of the capitate rotates through full 180° such that the articular surface faces the distal fragment. The perilunate dislocation is usually reduced by closed manipulation and the scaphoid fracture is treated by either a cast or internal fixation.

There has been a controversy about the treatment of the capitate fracture in this syndrome. Good results have been reported after wrists, with an unreduced capitate fracture, were immobilised in a cast. In one case, the proximal capitate fragment revascularised after early avascular necrosis with good functional result at one year (9), whereas in another case, avascular necrosis of the proximal

fragments of the capitate and the scaphoid was noted after eight months but the wrist was painless (2). Andreasi *et al.* failed to get a satisfactory result following conservative treatment after closed reduction of the capitate and recommended surgical treatment (3). Fenton recommended the excision of the proximal fragment of the capitate because of the possibility of avascular necrosis and treated the scaphoid fracture in a cast. He reported good results in his two patients after six months and three years (5). Good results have also been reported following open reduction of the capitate with internal fixation of the scaphoid after four years (10) and without fixation of the scaphoid after 5.5 months (11).

The incidence of avascular necrosis of the scaphoid is higher in a more proximal fracture as both dorsal and volar blood vessels enter the scaphoid through the distal half of the bone (8). Various factors which may lead to failure of revascularisation of the proximal fragment include severe trauma, gross instability, anatomical variations, damage to the scapholunate ligament (6) and the absence of significant intraosseous anastomosis between dorsal and volar branches (8). Nonanatomical reduction of the scaphoid has been reported to result in as high as 75 percent incidence of avascular necrosis and non-union (1). In our patient the scaphoid fracture was severely comminuted and displaced indicating a high velocity trauma. Although open reduction and internal fixation was achieved with a Herbert screw, the fracture failed to unite. Primary bone grafting of the scaphoid might have been appropriate at the time of first operation considering the degree of comminution and displacement. The capitate fracture healed well with no evidence of avascular necrosis. A classic Kienböck's disease, though reported, is rare after fracture dislocation of the carpus due to presence of rich extraosseous blood supply with consistent dorsal and volar nutrient vessel and internal anastomoses (14). Sometimes transient ischaemia of the lunate may occur with a relative increase in radio-density after an injury. These cases can recover with complete resolution of symptoms and abnormal density and should not be confused with Kienböck's disease (4, 13). In our case the lunate

gradually developed avascular necrosis progressing to carpal collapse. It has been suggested that trauma could play a role in development of Kienböck's disease in about 8% of the lunates in which a significant area of the bone is supplied by a single volar or dorsal vessel (7).

Factors which may have contributed to the bad result in our case would include the severity of the initial injury, associated unrecognised ligamentous injury, multiple surgery, the short time of immobilisation (six weeks), the pre-existing anatomy and the blood supply of the scaphoid and the lunate. This injury needs an aggressive management to avoid multiple surgical interventions. We recommend open reduction for the fracture of the capitate to achieve union and a normal anatomical alignment. The displaced scaphoid fracture should be treated by internal fixation with primary bone grafting to achieve a stable anatomical construct and enhance bone healing.

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SAMENVATTING

A. KUMAR, A. P. THOMAS. *Perilunaire luxatie met fractuur van os naviculare en os capitatum. Gevalstudie.*

Alhoewel dit zeldzaam letsel tijdig werd vastgesteld en heelkundig behandeld bij de jeugdige patiënt in kwestie, ontstond een pseudartrose van het os naviculare, die bleef bestaan na osteosynthese met aanbrengen van botgreffen. De pols bleef pijnlijk en stijf. Achttien maanden na het ongeval wezen de röntgenfoto's op pseudartrose van het os naviculare necrose van genoemd bot, en van het os lunatum, collaps van de carpus, en medio-carpale artrose. Wegens de blijvende pijn bleek een artrodesse noodzakelijk. De auteurs gaan na wat de mogelijke oorzaken waren van deze ongunstige afloop. Ze stellen voor, dergelijke letsels te behandelen via open reductie van os capitatum, samen met open reductie, osteosynthese en greffage van het os naviculare. Dit laatste wegens de comminutie met verplaatsing.

RÉSUMÉ

A. KUMAR, A. P. THOMAS. *Fracture du scaphoïde et du grand os avec luxation périlunaire : présentation d'un cas.*

Les auteurs rapportent une observation d'une fracture de scaphoïde et du grand os avec luxation périlunaire, chez un patient jeune. Malgré un diagnostic initial correct et un traitement chirurgical, la fracture du scaphoïde a évolué vers la pseudarthrose, malgré une reprise par greffe osseuse et ostéosynthèse. Le poignet restait douloureux et raide. Les radiographies à 18 mois du traumatisme montraient une pseudarthrose du scaphoïde, une nécrose avasculaire du scaphoïde et du semi-lunaire ainsi qu'un collapsus du carpe avec arthrose médio-carpienne. Une arthrodesse du poignet fut nécessaire en raison de la persistance de douleurs invalidantes. Les

auteurs discutent les causes possibles du mauvais résultat chez ce patient. Ils recommandent de traiter de telles lésions par réduction à foyer ouvert de la fracture du grand os et, pour le scaphoïde, par réduction à foyer ouvert et ostéosynthèse avec greffe osseuse d'emblée, nécessaire devant une fracture comminutive avec déplacement interfragmentaire.