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A case of translunate luxation of the carpus

Raymond Ruijters and Joost Kortmann

A rare case of carpal injury is presented in which a longitudinal fracture of the lunate bone was associated with a volar dislocation of the capitate bone. The injury was treated closed. Ten months after the trauma, there was nonunion of the lunate fracture and an instability of the capitate-lunate joint.

Reviews of fractures and dislocations of the carpus seldom deal with lunate fractures (Brolin 1964, Borgeskov et al. 1966, Stewart and Cross 1968, Linscheid et al. 1972, Dunn 1973, Fountain et al. 1973, Pellegrino and Peterson 1973, Beckenbaugh et al. 1980, Panting et al. 1984). Fresh lunate fractures were reported by Noble and Lamb (1979), Cetti et al. (1983), and Møller (1983). We present a rare case of a longitudinal fracture of the lunate bone with volar dislocation of the capitate.

Case report

A 22-year-old student crashed with his glider from an altitude of 300 meters. The dominant injuries were to the left wrist, the right ankle, and the lumbar spine. Radiographic examination of the wrist showed multiple fractures with a volar dislocation of the capitate together with a volar fragment of the lunate as the major injury (Figure 1).

The patient arrived at our hospital 1 day after the trauma, and closed reduction under regional anesthesia was undertaken. The reduction was stable with the wrist in dorsiflexion, and an above-the-elbow circular plaster cast was applied including the proximal phalanx of the thumb. After 4 weeks, the above-the-elbow cast was replaced with a forearm plaster cast with the wrist in the neutral position. By 4 months, the lunate fracture appeared to be consolidated. Five months after the accident, the patient had returned to his daily activities including sports.

At review 10 months after the accident, the patient complained of impaired grip strength, pain in the wrist during prolonged dorsiflexion, and a tripping sensation with ulnar and radial deviations. Wrist flexion, extension, ulnar and radial deviations were decreased 30, 5, 25, and 5 degrees, respectively, as compared with the right hand. The grip strength was slightly diminished. Radiographs showed nonunion of the lunate fracture without displacement of the fragments and without signs of necrosis. On the posterior-anterior views, the space between the scaphoid and the lunate was normal and did not change during ulnar or radial deviation (Figure 1). The space between the trapezium and the first metacarpal was widened, and the joint surface of the trapezium was irregular. The patient had, despite the radiographic findings, only slight complaints and could participate in sports without limitations.

Discussion

Injuries to the lunate bone are usually due to a dorsiflexion trauma from a fall or strenuous push on the heel of the hand (Dobyns et al. 1975). Dislocations of the carpus are generally caused by acute dorsiflexion of the hand in combination with axial compression. In our case the mechanism of trauma was a forceful axial compression and only slight dorsiflexion of the hand. This probably

Department of Orthopedics, Catharina Hospital, Michelangelolaan 2, P.O. Box 1350, NL-5602 ZA, Eindhoven, The Netherlands

Correspondence: Dr. Kortmann

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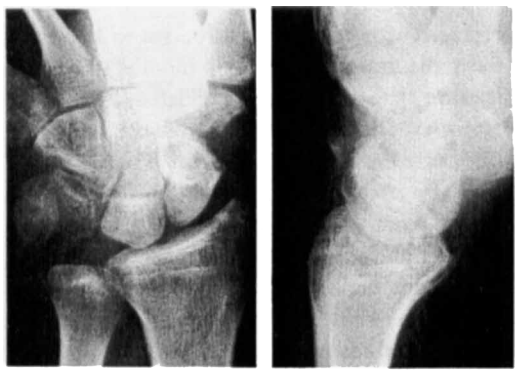

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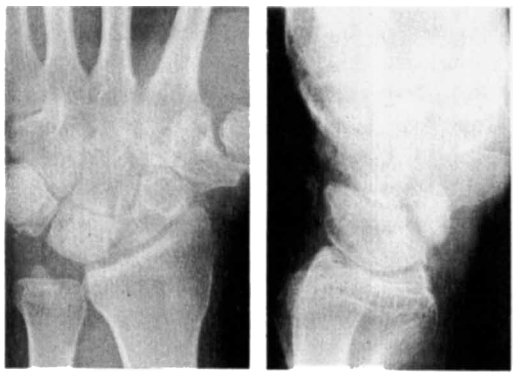

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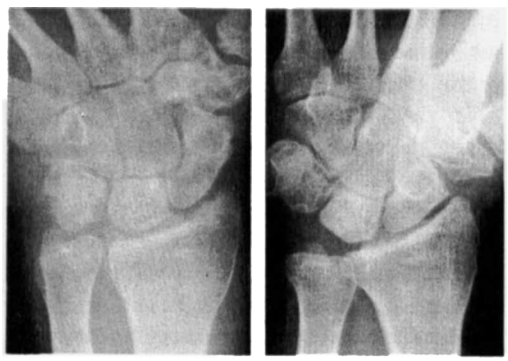

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Figure 1. A translunate luxation of the carpus in a 22-year-old man. A. At injury. There is a longitudinal fracture of the lunate with volar dislocation of the capitate together with the volar fragment of the lunate, a compression fracture of the trapezium, an avulsion of the radial styloid, and dorsally a small fragment, probably from the triquetrum.

B. Three and a half months after the trauma. The lunate fracture seems to be consolidated. The fracture of the trapezium has healed with deformation, and there is partial consolidation of the fracture of the radial styloid.

C. Ten months after the injury. Nonunion of the lunate fracture is evident. There are no signs of necrosis. The scapholunate angle is 48° and the capitate-lunate angle is +12°.

D. Ten months after the injury. The space between the scaphoid and the lunate is not widened and does not change in ulnar and radial deviation.

explains why the translunate fracture-dislocation occurred. Panting et al. (1984) pointed out that a considerable amount of dorsiflexion occurs at the radiocarpal joint, but that during extreme dorsiflexion the final arc of movement occurs at the midcarpal joint.

The head of the capitate is then forced dorsally upon the lunate; and this point of contact acts as a pivot, resulting in the volar ligamentous connections between the lunate and capitate coming under tension. If the forces are great enough, these ligaments will rupture, producing a lunate or perilunar dislocation. Because of the slight dorsiflexion in our case, it is reasonable to suppose that the volar capitate-lunate ligaments remained intact. As stated by Brolin (1964), axial

forces on the capitate bone will be propagated through the center of the lunate, which will be compressed between the carpal bones and the radius and ulna. In this situation the lunate is vulnerable to injury. So the mechanism of trauma can explain why, in our case, the capitate was driven directly into the distal joint surface of the lunate, producing a translunate fracture-dislocation.

In our case, a good and stable position was achieved by closed reduction. However, nonunion of the lunate fracture and an instability of the capitate-lunate joint eventually became manifest.

Linscheid et al. (1972) offered a classification of the carpal instabilities based on radiographic findings. The angle between the longitudinal axis of the scaphoid and of the lunate normally is 30–60 degrees. In our case the scapholunate angle was 48°. This means that the stabilizing function of the scaphoid was maintained, but there was an isolated dorsal instability of the capitate-lunate joint. This instability is possibly explained by the nonunion of the lunate fracture, which, by widening the distal concave articular surface of the lunate, allowed a greater rotational and translational movement of the capitate.

Fracture dislocations of the carpus are probably better treated with open reduction and internal stabilization.

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