

Musculoskeletal case 17. Diagnosis

Dislocation of the lunate bone

The diagnosis is lunate dislocation with associated rupture of the scapholunate ligament. Typically, this condition is diagnosed from plain radiographs. In this case the patient underwent magnetic resonance imaging before plain radiography. Fig. 1 (see presentation, page 260) demonstrates the dislocated lunate lying in a volar position. Fig. 2 shows abnormal rotation of the scaphoid bone with a gap of approximately 5 mm separating it from the triquetral bone. In addition the capitate bone is in a slightly proximal location. Fig. 3, a dorsovolar plain radiograph, demonstrates that the lunate has lost its normally rectangular shape and now appears “triangular,” a typical finding in lunate dislocation. This has been termed the “pie sign.” The lateral view (Fig. 4) shows the lunate bone dislocated in a volar direction with loss of the normal articulation with the radius, giving a characteristic “tipped teacup sign.” The capitate again appears more proximally located than normal.

In the normal anatomy, the alignment of the radius, lunate, capitate and third metacarpal should be in a straight line along their longitudinal axes. A break at any point in this line is pathognomonic of subluxation or dislocation. Similarly, in the dorsovolar projection, disruption of 1 or more of the 3 carpal arcs described by Gilula^{1,2} suggests disruption of the carpal alignment. Fig. 5 shows the normal appearance of Gilula’s arcs, and Fig. 6 shows the associated disruption that occurs in lunate dislocation.

Dislocation of the carpal bones is

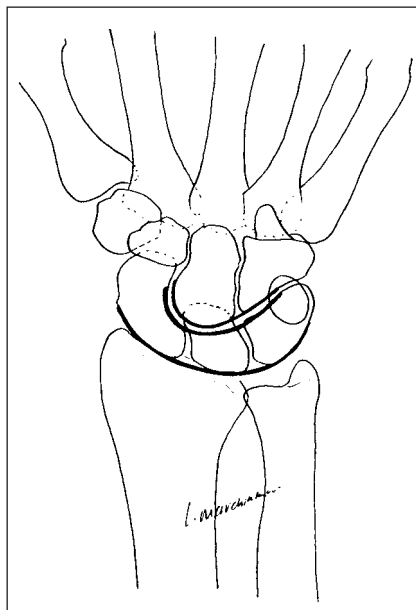


FIG. 5.

usually the result of extreme flexion or extension injuries of the wrist. The integrity of the lunate–capitate relationship is the most crucial factor in all wrist dislocations. The most frequent types of carpal dislocations are scapholunate, perilunate, and midcarpal and lunate. Fractures, dislocations and subluxations of the carpus account for approximately 6% of all fractures. Of these, scaphoid fractures account for 60% to 70% of injuries, with carpal fracture–dislocations accounting for 10% and lunate fractures accounting for 3%.³ Such injuries may have a poor outcome if not recognized in a timely fashion, and can endanger wrist and hand function.⁴

Mayfield⁵ described 2 patterns of injury: lesser arc (a curve around the lunate connected to the radius and ulna) injuries, resulting in rotatory subluxation of the scaphoid as well as perilunate, midcarpal and lunate dislocations; greater arc (curve passing

from radial styloid through the waist of the scaphoid, proximal capitate, base of the hamate bone, lunar surface of the triquetrum and ulnar styloid) injuries involving fractures of any of the bones adjacent to the lunate (i.e., scaphoid, capitate and triquetrum).

Mayfield,⁵ Yeager and Dalinka⁶ and later Gilula and Yin² described 4 sequential stages of lesser arc injuries: stage 1 — scapholunate dissociation and rotatory subluxation of the scaphoid; stage 2 — dorsal dislocation of the capitate (i.e., perilunate dislocation owing to failure of radiocarpal ligament or fracture of the radial styloid process); stage 3 — further ligament disruption, resulting in triquetral malrotation, triquetrolunate diastasis or triquetrolunate fracture; and stage 4 — disruption of the dorsal radiocarpal ligament, leading to complete lunate dislocation. The case described is Mayfield stage 4.