PROXIMAL ROW TRANSCARPAL FRACTURE FROM A PUNCHING INJURY

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We describe an unusual case of a 31-year-old woman who injured the right dominant wrist when she punched an assailant's shoulder. She described a mechanism of direct compression, with the wrist in hyperextension, radial deviation and the forearm in pronation. She sustained an oblique transverse fracture of the proximal pole of the scaphoid and a coronal plane fracture of the lunate and the triquetrum. This unusual proximal row transcarpal fracture is in conflict with the Mayfield sequence and was caused by a low velocity injury.

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Most carpal instabilities are generally the result of a hyperextension injury (Linscheid et al., 1983). Mayfield et al. (1980) loaded cadaveric wrists in extension, ulnar deviation and intercarpal supination and introduced the concept of progressive perilunate instability (PLI). Reagan et al. (1987) suggested that lunotriquetral dissociation may be the result of "reversed" PLI if the wrist is forced into hyperextension and radial deviation, causing tearing of the ulnar constraints before the radial ones. We report a patient who sustained a proximal row transcarpal fracture which is in conflict with the Mayfield sequence and was caused by a low velocity injury.

CASE REPORT

A 31-year-old woman injured the right dominant wrist by punching an assailant's right shoulder. She felt only mild pain in her right hand and because she had a full range of movements she thought it was a simple wrist sprain. The pain in the right wrist increased and 5 days after the injury she attended an Accident and Emergency department. Physical examination showed the right wrist to be mildly swollen and painful with pressure over the scaphoid snuffbox and the dorsum of the wrist. There was moderate restriction of movement. There were no signs of ulnar or median nerve compression.

X-ray examination showed a fracture of the proximal pole of the scaphoid, a fracture of the triquetrum and a possible fracture of the lunate (Fig 1). CT showed an oblique transverse fracture of the proximal pole of scaphoid, and minimally displaced fractures of both the lunate and the triquetrum in the coronal plane (Fig 2).

The injury was treated with a short arm scaphoid plaster. Clinical and radiographic examination 10 weeks later revealed that the scaphoid fracture was not united and there was partial union of the lunate and triquetral fractures. The scaphoid fracture was graded as Type D2 using the modified Herbert classification (Filan and Herbert, 1996). The scaphoid fracture was fixed with a 1.5 AO minifragment lag screw using the dorsal approach. All three carpal fractures have since gone on to clinical and radiographic union.

Fig 1 Anteroposterior radiograph of right wrist.

DISCUSSION

Mayfield et al. (1980) introduced the concept of progressive perilunate instability to explain the sequence of ligamentous disruptions in lesser arc injuries that lead to eventual lunate dislocation. The position of the hand

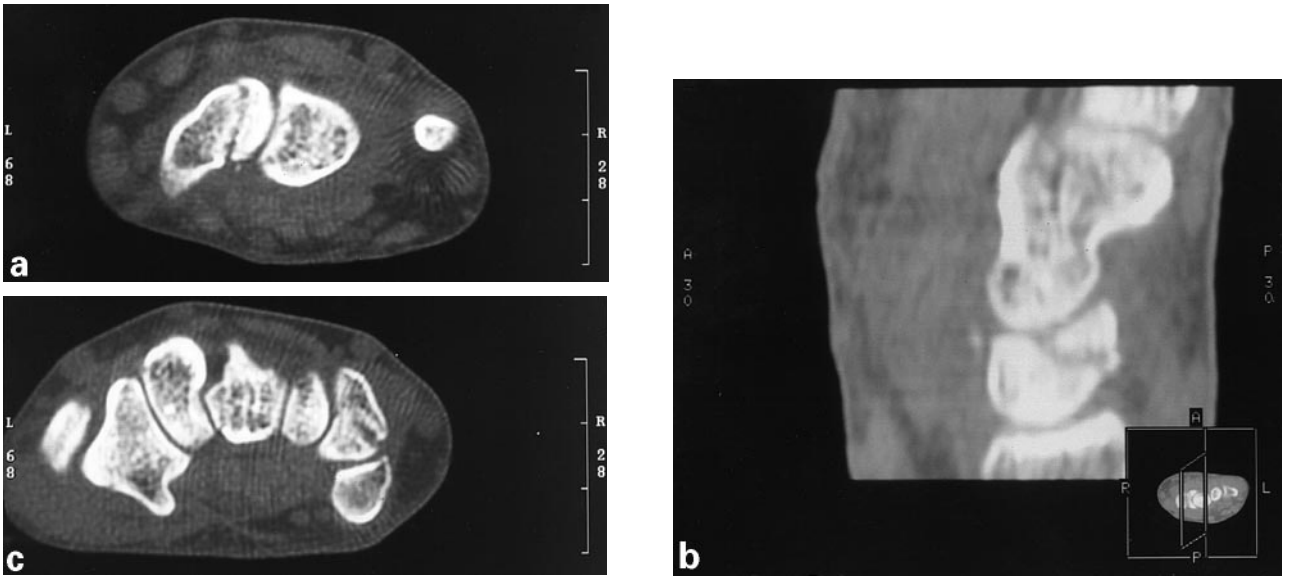

Fig 2 (a) CT scan showing oblique transverse fracture of the proximal pole of the scaphoid. (b) Lunate fracture in the coronal plane. (c) Triquetral fracture in the coronal plane.

at the moment of impact influences the type of injury that occurs. The mechanism for perilunate instability includes extension, ulnar deviation and intercarpal supination. This patient described a mechanism of direct impact with the wrist in hyperextension and radial deviation, with the forearm in pronation. Generally, perilunate instability is produced by high energy forces, however, in this case, the mechanism was of low energy.

Proximal row transcarpal fractures are rare and the diagnosis can be difficult. Computerized tomography of the wrist and reconstruction of the carpal bones was very helpful in this case to demonstrate the fracture configuration and the complexity of the injury. We believe the actual mechanism and this fracture configuration is in conflict with Mayfield's sequence. The fractures to the proximal row occurred in different planes which implies that different forces were generated at separate stages. We think that acute hyperextension of the wrist fractured the scaphoid bone first. Simultaneously the hand started to supinate whilst the wrist remained in pronation. The injury generated forces in the coronal plane which fractured the lunate and subsequently the triquetrum by avulsion (Fig 3). On examination under general anaesthetic 12 weeks after injury the wrist was unstable in the frontal plane but was completely stable after internal fixation of the scaphoid fracture. The scaphoid fracture united 2 months after the operation and the patient has regained a full functional range of motion to the right wrist.

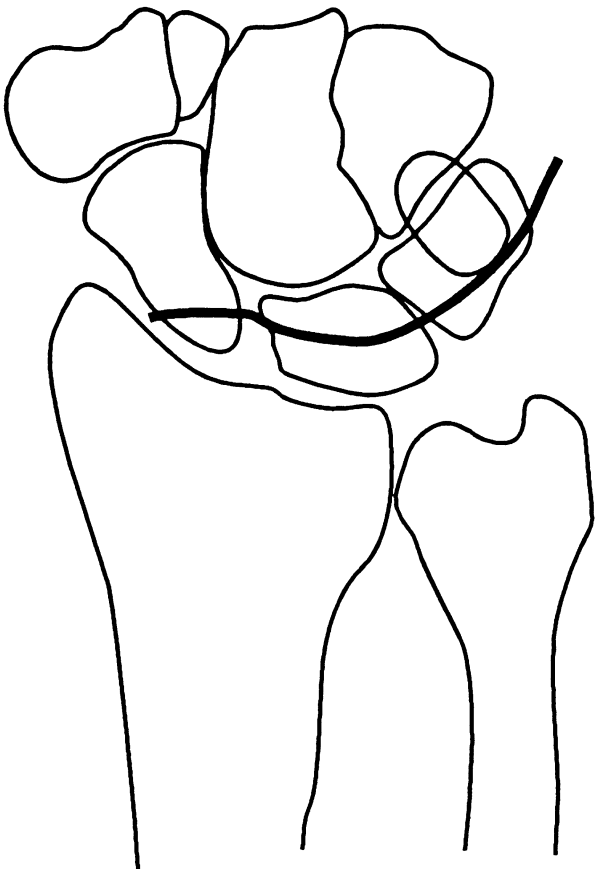

Fig 3 Diagram of proximal row transcarpal fracture.

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