

Isolated Capitate Fracture in a Collegiate Lacrosse Player

Alison M. Gardiner-Shires, PhD, ATC • West Chester University

The incidence of hand and wrist injuries in sports is reported to be between 3–9% of all sports injuries.¹ Fractures of the capitate are extremely rare, accounting for 1–2% of all carpal injuries.² Capitate fractures typically occur as a result of high-energy trauma, and are almost exclusively associated with fracture of the scaphoid waist (i.e., occurring as a trans-scaphoid and trans-capitate variant of the perilunate dislocation).³ Isolated capitate fractures are the result of a direct blow or an “indirect axial load through the third metacarpal with the wrist flexed.”⁴ Standard antero-posterior, lateral and oblique radiographs are usually sufficient to diagnose capitate fractures,⁴ but nondisplaced capitate fractures are often missed on review of initial radiographs.^{5,6}

KEY POINTS

- ▶ Isolated capitate fracture is extremely rare.
- ▶ Initial radiographs often fail to demonstrate the existence of an isolated capitate fracture.
- ▶ Accurate diagnosis and proper management are essential to avoid long-term complications.

The purpose of this report is to present a unique case of an isolated capitate fracture.

Background

A 17-year-old female collegiate lacrosse player tripped over a teammate’s foot during an indoor preseason practice. She landed on flexed knees and outstretched hands. Her momentum caused her to lacerate her

chin upon ground contact. After controlling laceration bleeding, the athletic trainer performed bilateral wrist evaluations. Mild nonspecific tenderness (4/10) was evident along the left distal radioulnar joint and distal carpal bones. No tenderness was elicited by palpation of the right wrist. Both the active and passive ranges of all wrist motions were within normal limits for both extremities. Manual muscle tests of the wrist and hand were 5/5 in all directions bilaterally. Radioulnar percussion and compression tests were negative bilaterally. She reported a history of a left wrist fracture in elementary school, but she could not recall specifically where the fracture was located. On the basis of her mild nonspecific pain, the working diagnosis was a grade 1 left wrist sprain. She was referred to the emergency room for chin laceration suturing and was instructed to return for a follow-up assessment the next day.

Treatment

The athlete received seven sutures in her chin, and radiographs of her left wrist were interpreted to be negative. The following day, she presented mild swelling on the dorsum of the left wrist and over the anatomical snuff box. Palpation elicited tenderness (5/10) along the palmar and dorsal scaphoid and lunate bones. No limitations in wrist or hand strength were evident. The differential

diagnoses included soft tissue contusion, carpal sprain, and carpal fracture. Although the clinical examination findings did not suggest a strong likelihood of carpal fracture, it was included in the differential diagnosis because of the fact that a nondisplaced carpal fracture can be undetected on an initial radiograph.

Treatment goals included decreasing pain and swelling, and maintaining pain-free range of motion, while allowing the athlete to participate in daily lacrosse activities as tolerated (wearing a soft splint for protection). Rehabilitation exercises included active and passive range of motion for wrist flexion, extension, pronation, supination, ulnar deviation, and radial deviation. Cryotherapy (i.e., ice bag for 20 minutes) was administered to the dorsal surface of her wrist. On day 3 after the injury, light effleurage was administered to facilitate lymphatic drainage of edema.

Approximately one month after the injury, the athlete continued to complain of left wrist pain that was localized to the area of the scaphoid. She was evaluated by the team physician, who ordered an MRI that revealed a nondisplaced fracture of the left capitate (Figure 1). She subsequently was referred to an orthopedic hand specialist. Due to insurance restrictions and schedule conflicts, she was unable to see the specialist until 3 months after the injury. His evaluation revealed no point tenderness, deformity, swelling, or discoloration in the area of the capitate. Range of motion and strength of the left wrist were within normal limits. Despite the positive MRI, the patient reported no pain during activity. The specialist allowed activity without

the splint, instructed the athlete to avoid pushups, and ordered a follow-up MRI in 4 weeks. The follow-up MRI indicated that the capitate had fully healed. The athlete subsequently resumed full participation in lacrosse without pain.

Discussion

Capitate fractures typically occur through either the neck or body, and often are associated with avascular necrosis, delayed union, or nonunion.^{2,4} Blood flow to the capitate is similar to that of the scaphoid, which places the proximal pole at risk for avascular necrosis when the capitate is fractured at mid-level. Avascular necrosis typically is associated with high-energy fracture-dislocations, but is reported to be rare for isolated capitate fractures.⁴ Nonunion of isolated fractures of the capitate has been reported to occur in more than 50% of cases.⁷ Because initial radiographs often fail to identify a nondisplaced capitate fracture,^{5,6} persistent follow-up is critical to avoid delayed union, nonunion, and further injury.⁸

Nondisplaced capitate fractures are treated with cast or splint immobilization for 6-8 weeks.^{2,4,6,8} Activity should be restricted, because of high risk for fracture displacement. As little as 1 mm of displacement can adversely affect fracture healing.² Cast or splint removal should be allowed only after signs of healing are confirmed by radiographs.² Mid-carpal arthritis is a possible consequence of improper management.⁴

For the case reported, the patient did not experience pain in the area of the capitate. Discomfort initially was generalized, and tenderness was later localized to the scaphoid, which highlights the importance of follow-up evaluation when wrist pain persists. Because the correct diagnosis of a capitate fracture was delayed, the patient was not removed from activity and cast immobilization was not used. While wearing a splint, the patient was able to participate in activity without limitations. She is fortunate that the fracture remained stable (i.e., nondisplaced) and no complications were encountered. The patient continued to participate in lacrosse and has had no subsequent limitations.

Conclusions

An isolated capitate fracture is now diagnosed more frequently than has been the case in the past, which is likely due to heightened awareness of the injury.²



Figure 1 MRI indicating isolated capitate fracture in the left wrist (arrow).