Ulnolunate Ligament Avulsion Fracture of the Lunate: A Case Report

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Abstract

Keywords

- traumatic lunate fracture
- ulnolunate ligament
- surgical treatment
- carpal injuries
- intercarpal ligament

Traumatic lunate fractures are very rare and those treatments require an understanding of anatomical features. We present a case of an ulnolunate ligament avulsion fracture of the lunate that was successfully repaired by surgical fixation with open reduction and internal fixation. We believe that restoration of ulnolunate ligament function is important to prevent further deterioration of wrist function after this injury.

Acute traumatic lunate fractures are rare injuries that are usually caused by high-energy trauma. Lunate fractures, except for Kienböck disease, account for 0.5 to 1.0% of all carpal fractures^{1,2} and often accompany other carpal injuries.

Inadequate treatment causes persistent wrist instability and severe functional deficit. Various treatments exist, such as nonoperative immobilization using plaster, open reduction and internal fixation, and wrist arthrodesis or carpectomy of the proximal row if there are multiple carpal injuries. Cast treatment is acceptable for traumatic undisplaced fractures, but reduction and fixation is required for destabilizing fractures of the poles,³ which are the attachment points of several major ligaments.

Here, we present a case of ulnolunate ligament avulsion fracture of the lunate that was successfully repaired by surgery.

Case Report

A 26-year-old man fell from a 28-inch-high structure and landed on his right hand with the wrist in an extended position. He complained of tenderness on the dorsal side of the triquetrum and on the palmar side of the lunate. A plain

lateral view radiograph showed a small avulsion fracture volar to the lunate (►Fig. 1A, B). An anteroposterior X-ray view with the wrist in ulnar deviation revealed an increased scapholunate (SL) gap (►Fig. 2A, B). A lateral X-ray showed that the SL angle was 70 degrees (►Fig. 1B). Three-dimensional computed tomography revealed a volar avulsion fracture of the lunate (►Fig. 3A) and a dorsal triquetrum fracture at the attachment of the dorsal intercarpal ligament (►Fig. 3B).

We performed surgical repair of the lunate fracture. Arthroscopic examination revealed incongruity and a step off between the scaphoid and lunate but the probe could not be passed between them. These findings indicated a Geissler grade 2 injury. The ulnolunate ligament was loose with the fragment of the lunate on the distal end (►Fig. 4A, B). For the SL interosseous ligament tear, percutaneous fixation of the SL joint was performed using two 1.0-mm Kirschner wires (Mizuho, Bunkyo, Tokyo, Japan). A volar zigzag incision was used as the surgical approach. The median nerve was protected from injury by reaching the lunate through the ulnar side of the palmaris longus. The ulnolunate ligament avulsion fragment of the lunate was rotated 180 degrees volarly. This fragment was fixed to the original position using two Mitek microsuture anchors (DePuy

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Fig. 1 Preoperative wrist radiographs of a 26-year-old man who sustained a wrist injury secondary to a fall. (A) Anteroposterior and (B) lateral views demonstrate the bone fragment at the palmar side.

Synthes, Raynham, MA). The undisplaced triquetral fracture was treated conservatively.

The right wrist and elbow were initially immobilized in a sugar tong orthosis for 5 weeks. Dart-throwing exercise was initiated 5 weeks postoperatively. The Kirschner wires were removed 8 weeks after surgery. One year after the surgery, there was no displacement of the lunate fragment on plain radiograph (→**Fig. 5B, C**). An X-ray view with the wrist in ulnar deviation showed no increased SL gap (→**Fig. 5D**). The range of active palmar flexion in the wrist was 70 degrees and active dorsiflexion was 70 degrees. Pronation of 80 degrees and supination of 90 degrees were achieved. The patient reported little difficulty in using the right wrist in daily life.

Discussion

We reported a case of ulnolunate ligament avulsion fracture of the lunate accompanied by a tear of the SL ligament and dorsal cortical triquetral fracture, which were successfully repaired surgically.

The ulnocarpal ligamentous complex (UCLC) consists of the ulnolunate, ulnotriquetral, and ulnocapitate ligaments. The UCLC merges firmly with the palmar radioulnar ligament, which is a component of the triangular fibrocartilage complex. The UCLC plays an important role in maintaining the stability of the distal radioulnar joint through the triangular fibrocartilage complex; therefore, impairment of the ulnolunate ligament can cause chronic ulnar wrist pain.^{4,5} In view of

Fig. 2 Ulnar deviation wrist radiograph. (A) Ulnar deviation and (B) radial deviation views show equivocal scapholunate widening.

Fig. 3 Three-dimensional computed tomography scan. There is an avulsion lunate fracture on the (A) palmar side and a triquetrum fracture on the (B) dorsal side.

Fig. 4 Arthroscopic findings. (A) The ulnolunate ligament is loose, with the presence of a (B) bone fragment.

Fig. 5 Serial plain radiographs after surgical repair of the wrist injury. (A) Immediate postoperative period, (B) anteroposterior, (C) lateral views, and (D) ulnar deviated anteroposterior view at 1 year postoperatively.

this, we believe it is important to reattach the UCLC, which can be done through a volar approach.

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Conflict of Interest

None.

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