Irreducible Posterolateral Elbow Dislocation

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Abstract

Elbow dislocations are a high-energy traumatic event resulting in loss of congruence of a stable joint. The majority of elbow dislocations can be reduced by closed means and treated conservatively.

We present a case of an irreducible elbow dislocation with reduction blocked by the radial head buttonholed through the lateral ligamentous complex. We performed open reduction with release followed by repair of the lateral ligamentous complex. Clinicians need to understand this unique variant of an elbow dislocation to appropriately treat this operative injury.

The elbow is a complex joint owing its stability to both osseous and ligamentous structures.[1] Dislocations of the elbow joint constitute 11% to 28% of all elbow injuries.[2] The majority of simple elbow dislocations are treated with a closed reduction of the dislocation. There are very few reports in the literature of irreducible simple elbow dislocations.[3-5] We present a report, literature review, and pathological description of an irreducible simple elbow dislocation. The patient provided written informed consent for print and electronic publication of this case report.

Case Report

An 84-year-old right-hand dominant woman fell from a standing height, striking her left arm on a television. She further fell on her outstretched arm, but the exact position of the arm is unknown. She was seen at an outside institution and diagnosed with a closed posterolateral elbow dislocation. Radiographs showed a small avulsion fracture of the medial epicondyle and a posterolateral dislocation of the proximal radius and ulna relative to the distal humerus (**Figures 1A, 1B**). At the outside facility, an initial attempt at a closed reduction of the elbow dislocation under conscious sedation followed by a second attempt at closed reduction under general anesthesia were both unsuccessful. The patient was then transferred to our facility.

The patient was taken to the operating room where she was given a regional anesthetic and light sedation. Another attempt at closed reduction using a traction-counter traction method of the elbow failed. We then employed an open approach to the elbow joint using a lateral skin incision and dissection between the anconeus and the extensor carpi ulnaris, i.e. a Kocher approach. Upon dissection of the lateral forearm fascia, we discovered that the radial head was herniated posteriorly and laterally through the lateral collateral ligament complex (LCLC). The majority of the radial collateral ligament remained intact while a substantial portion of the lateral ulnar collateral ligament was disrupted (**Figure 2**).

Our team was unable to manually reduce the radial head without disrupting the intact portion of the intact LCLC. With release of this intact portion of the LCLC from its lateral epicondyle origin, the ulnohumeral and radiocapitellar joints were successfully reduced. The medial epicondylar fracture fragment was not dissected and self-reduced with reduction of the elbow joint. Following joint reduction, the elbow remained posterolaterally unstable. The LCLC was repaired using 2 No. 2 non-absorbable grasping sutures placed into the LCLC and then through transosseous holes drilled through the lateral epicondyle. Fluoroscopy images confirmed concentric reduction of the joint of the radiocapitellar and ulnohumeral joints.

Postoperatively, the patient was placed in a long arm ther-

Figure 1. Anteroposterior (A) and lateral (B) radiographs showing a posterolateral dislocation of the elbow with a small medial epicondylar avulsion fracture. Note the close approximation of the radial head to the lateral epicondyle on the anteroposterior view.

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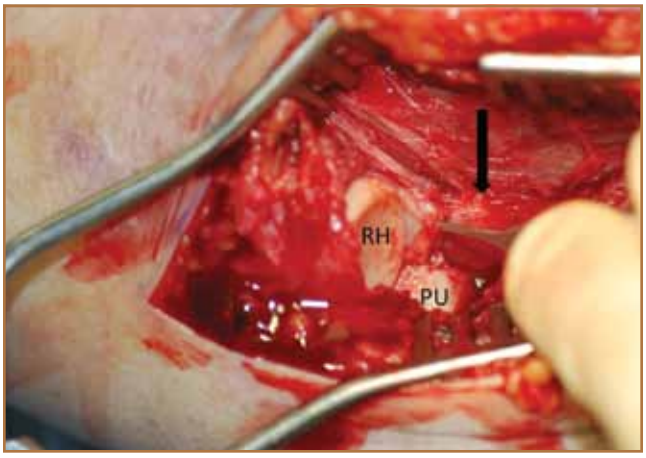

Figure 2. An intraoperative photograph of the elbow. The forceps is holding a portion of the intact lateral collateral ligament complex (LCLC). The radial head (RH) has herniated posterior to the intact portion of the LCLC. The proximal ulna (PU) and lateral epicondyle (black arrow) are also shown.

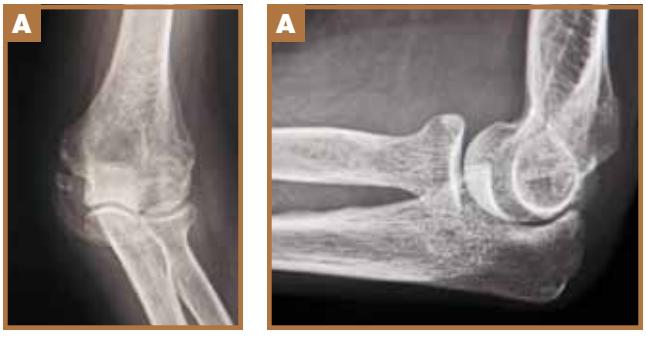

Figure 3. Follow-up anteroposterior (A) and lateral (B) radiographs showing the elbow is concentrically reduced.

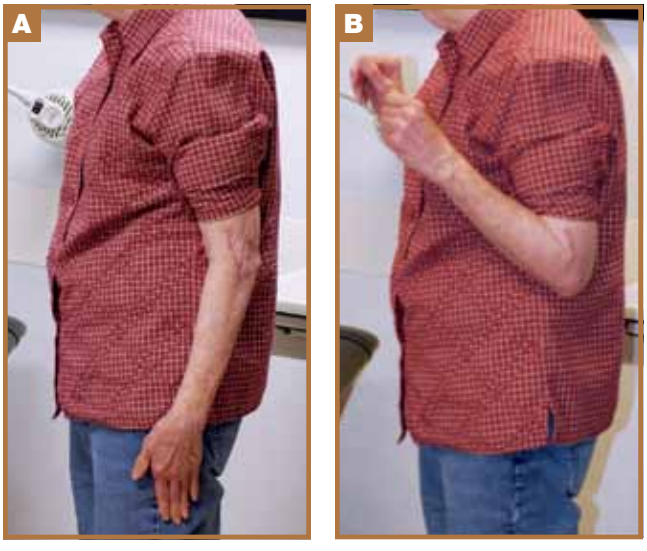

Figure 4. Lateral photographs of the patient showing the degree of elbow extension (A) and flexion (B).

moplastic splint and begun on active and active-assisted range-of-motion exercises within 5 days following surgery. We removed the splint at 6 weeks. At 12-week follow-up, the patient had no pain and the elbow remained concentrically reduced on x-rays (**Figures 3A, 3B**). Elbow motion ranged from 25° to 145° of flexion (**Figures 4A, 4B**). Forearm motion was 80° of pronation and 90° of supination, without signs of instability.

Discussion

Simple elbow dislocations occur at the ulnohumeral joint without an associated fracture of the coronoid, olecranon, or radial head. The classic mechanism of injury is a combination of an axial load with concomitant supination and valgus forces, resulting in a failure of the soft-tissues from a lateral to medial direction.[6] The proximal radioulnar joint remains intact and the radius and ulna jointly dislocates relative to the distal humerus. Complete disruption of both collateral ligaments generally occurs. The mainstay of treatment of these simple dislocations is closed reduction.

Following appropriate analgesia, most elbow dislocations are reducible by closed means via traction on the forearm and counter-traction on the upper arm, as was attempted in this case. One may also need to extend the elbow to manipulate the coronoid past the trochlea.[7] Medial or lateral translation of the proximal radius and ulna is applied depending on the direction of the dislocation. After the coronoid has cleared the trochlea, elbow flexion is applied, thereby reducing the ulnohumeral joint. It is very rare that simple elbow dislocations cannot be reduced in a closed fashion. Most irreducible elbow dislocations are associated with an interposed bony fracture fragment.[8]

In the past 50 years, there have been only 3 prior published case reports of irreducible posterolateral elbow dislocations. In 1967 Devadoss[3] published a report of a 7-year-old girl with a posterolateral elbow dislocation that failed closed reduction. Open reduction revealed that the radial head had buttonholed through the lateral capsule. Pawlowski and colleagues[5] also reported on a case in a 17-year-old adolescent girl with an irreducible posterolateral elbow dislocation that required open reduction. At the time of the operation, the patient was found to have had a portion of the lateral ligamentous complex bowstringing proximal to the subluxed radial head. The most recent report of a 24-year-old man with an irreducible posterolateral elbow dislocation was published by Greiss and colleagues[4] in 1987, and was characterized by the same pathoanatomy as our case described above.

One difference between our patient and the previous reports is the age of our patient (84 years) versus the age of the previously reported patients (7, 17, and 24 years). Surprisingly, our patient presented with, for the most part, a simple elbow dislocation, as opposed to a distal humeral or proximal radial or ulnar fracture. Otherwise the radiographic and clinical presentation is similar. In all patients, the radial head had buttonholed through the elbow LCLC and capsule, resulting in a posterolateral dislocation of the elbow.

The radiographic appearance shown in 2 of the 3 previous

Figure 5. Anteroposterior radiograph of a simple reducible elbow dislocation demonstrating the radial head more distant from the lateral epicondyle than in the radiographs of an irreducible elbow dislocation.

studies[2,7] are similar to our patient. Since a portion of the LCLC is intact, the radial head herniates posterior to an intact portion of the LCLC. Radiographically the radial head remains in close proximity to the lateral epicondyle. This is in contrast to the more common reducible elbow dislocation in which the radial head can be seen more distant from the lateral epicondyle on the anteroposterior view (**Figure 5**). Upon attempting a closed reduction of the elbow dislocation, the intact lateral structures tighten and create a noose-like effect around the radial neck, effectively preventing a successful reduction. With release of the remaining intact portion of the LCLC from the lateral epicondyle, the radial head and ulnohumeral joints are easily reducible. Following joint reduction, repair of the LCLC restores joint stability.

Conclusion

An irreducible elbow dislocation is complicated by buttonholing of the radial head through the LCLC, thereby making closed reduction of the joint impossible. A typical radiographic appearance with close approximation of the radial head to the lateral epicondyle may indicate an irreducible posterolateral elbow dislocation. Open reduction with release of the intact portion of the LCLC allows for reduction of the radiocapitellar and ulnohumeral joints. Repair of the LCLC, once reduction is performed, prevents subsequent posterolateral rotary instability.

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