

Case Report

Engaging Osborne-Cotterill lesion as a cause of irreducible posterior dislocation of the radiocapitellar and ulnohumeral joints: A case report

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A B S T R A C T

Background: Closed reduction of elbow dislocations is carried out primarily in the emergency department and is most likely to succeed in simple dislocations. In rare cases, however, this can fail, and an open reduction becomes inevitable.

Case: We present a case of a 42-year-old male patient who presented with pain and restricted range of motion of the left elbow joint following a fall on the outstretched hand and sustained a combined dislocation of the radiocapitellar and ulnohumeral joints. Two attempts at a closed reduction in the emergency department failed.

Results: At the most recent follow-up, the elbow joint was stable with a painless range of motion and a slight extension deficit of 10°.

Conclusion: This case report describes a rare incidence of posterior dislocation of both radiocapitellar and ulnohumeral joints and engaging of the radial head in an induced impression over the posterior surface of the capitellum with subsequent locking of the elbow and failed closed reduction. Joint irreducibility can be predicted by the presence of an engaging Osborne-Cotterill lesion.

Level of evidence: Level IV, a case report.

1. Introduction

An understanding of the anatomy and kinematics of static and dynamic stabilizers of the elbow joint is imperative for the management of elbow subluxations/dislocations with subsequent instability.¹ Despite the rarity of these injuries, cases of irreducible elbow dislocations were published^{2,3} and were attributed to the interposition of the annular ligament in pediatric patients.^{4,5} On the other hand, the interposition of intra-articular bone fragments in elbow fracture-dislocations is not uncommon and must be addressed openly.⁶ Based on our information, the patient presented in this case represents the first report of dislocation of both the radiocapitellar and ulnohumeral joints with a failed closed reduction due to an engaging Osborne-Cotterill lesion (EOCL). The patient was informed that this case report would be submitted for publication, and he provided consent.

2. Case report

A 42-year-old male patient presented in our emergency department after he slipped on ice and fell on his left outstretched hand. The detailed

history revealed a combination of external rotation of the forearm, axial compression, and valgus stress applied to the left elbow (Fig. 2). The clinical examination showed a swelling and obvious deformity with complete restriction of the range of motion. The injured extremity appeared shortened and was held by the patient in slight flexion. Peripheral vascular and neurological examination was within normal limits.

The conventional x-ray films showed a complete posterior dislocation of both the radiocapitellar and ulnohumeral joints (Fig. 1) and engaging of the radial head in an impression at the posterior margin of the capitellum (Fig. 1B). No interposition of intra-articular bone fragments was detected. Two attempts of closed reduction under general anesthesia in the emergency department using a traction-counter traction maneuver failed.

3. Operative treatment

Urgent open reduction was employed under general anesthesia. The radial head was palpated posteriorly through a standard lateral approach (Kaplan interval). Still, it could not be mobilized first as it was engaged

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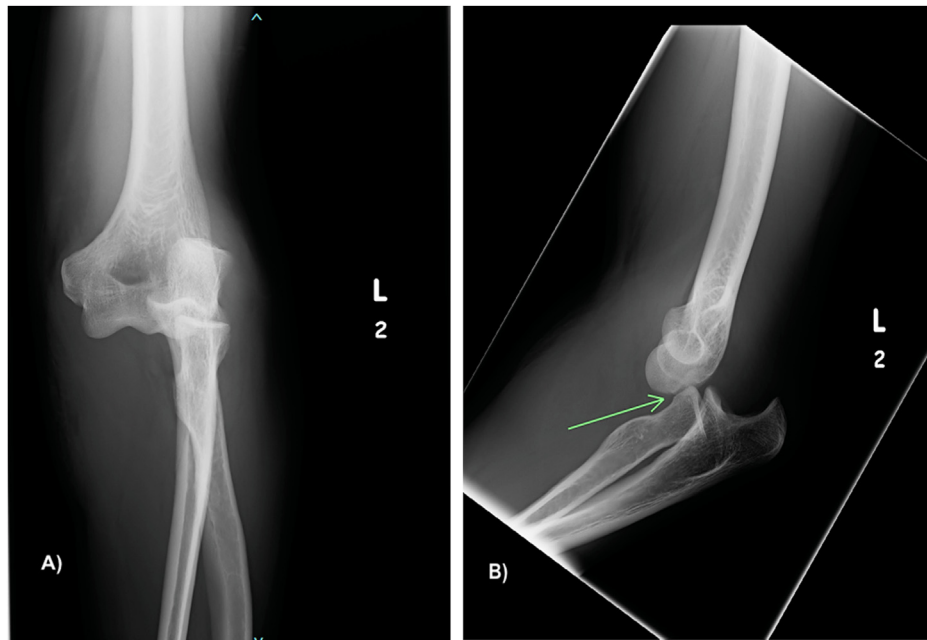


Fig. 1. Anteroposterior radiograph of the left elbow joint showing elbow dislocation with far lateral dislocation of the proximal ulna and radial head **A)**. Lateral view demonstrating a dislocation of the radiocapitellar and ulnohumeral joints with the radial head engaging with an impression (Arrow) over the posterior margin of the capitellum (Engaging Osborne-Cotterill lesion) **B)**.

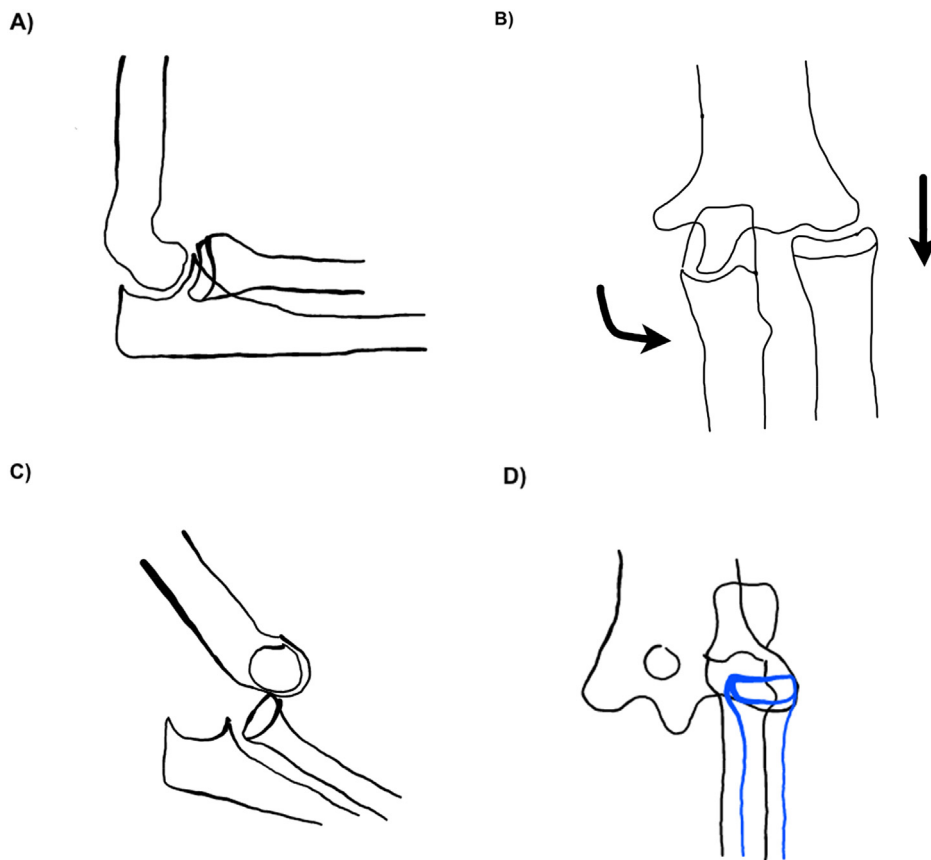


Fig. 2. Illustrations of the presumed mechanism of injury. The extended elbow joint will be slightly flexed once the hand touches the ground **(A)**. A combination of reflective contraction of the supinator muscle pulling the radial head posteriorly, external rotation at the ulnohumeral joint caused by the axial load on the medial head of the triceps brachii, internal rotation of the humerus against the forearm as a result of contraction of the internal rotators and adductors of the abducted shoulder along with a valgus torque at the elbow **(B)**. Dislocated ulnohumeral joint and engaging of the posteriorly dislocated radial head in the capitellar osteochondral defect following internal rotation of the humerus against the axis of the forearm and slight flexion of the elbow along with axial compression **(C,D)**.

with the osteochondral defect over the posterior surface of the capitellum. Passive pronation and supination of the forearm were blocked at this stage. The lateral ulnar collateral ligament (LUCL) was injured at the origin. The joint capsule was released through a column procedure. The

radial head then clunked after further manual manipulation laterally after applying a significant force but laid far ventral to the capitellum **(Fig. 3A)**.

The reduction was successful and confirmed by fluoroscopy as the

radial head was articulated with the capitellum (Fig. 3B and C). A cartilage defect was inspected at the lateral side of the radial head, which resulted from the impact at the posterior capitellar surface (Fig. 1B). The lateral collateral ligament complex (LCLC) and the common extensors tendon were reattached to the lateral epicondyle with $2 \times 3.5\text{mm}$ Twinfix anchors (Fig. 3D). Medial instability was then detected after applying valgus stress (Fig. 3E). Therefore, a decision was made to address it through a medial FCU-split approach. After incision of the Osborne ligament, the flexor-pronator mass appeared intact, while the joint capsule was torn. There was a mid-substance disruption of the medial collateral ligament (MCL). The ulnar nerve was identified and protected. The MCL was then fixed in the same manner with $2 \times 3.5\text{mm}$ Twinfix anchors. Sutures were knotted in 70° flexion of the elbow joint. Congruency and correct articulation of both joints was confirmed by fluoroscopy (Fig. 3F). Irrigation of the surgical site was done, followed by

wound closure in layers. The patient was placed in a long arm posterior-based splint with the elbow in approximately 50° flexion and neutral rotation.

4. FOLLOW-UP and outcomes

For the first 5 days, the left elbow joint remained immobilized in the posterior-based splint. The wound dressing was removed on the 4th postoperative day. The soft tissue swelling was managed with an arm elevation pillow, the application of ice pads, and manual lymph drainage. The postoperative rehabilitation was initially carried out in an Epico-ROM orthosis with a limited maximum range of motion (ROM) at Extension/Flexion 0° – 10° – 120° . At the 12th postoperative week, the limited maximum ROM was set aside, and the patient began passive and active exercises with a full ROM.

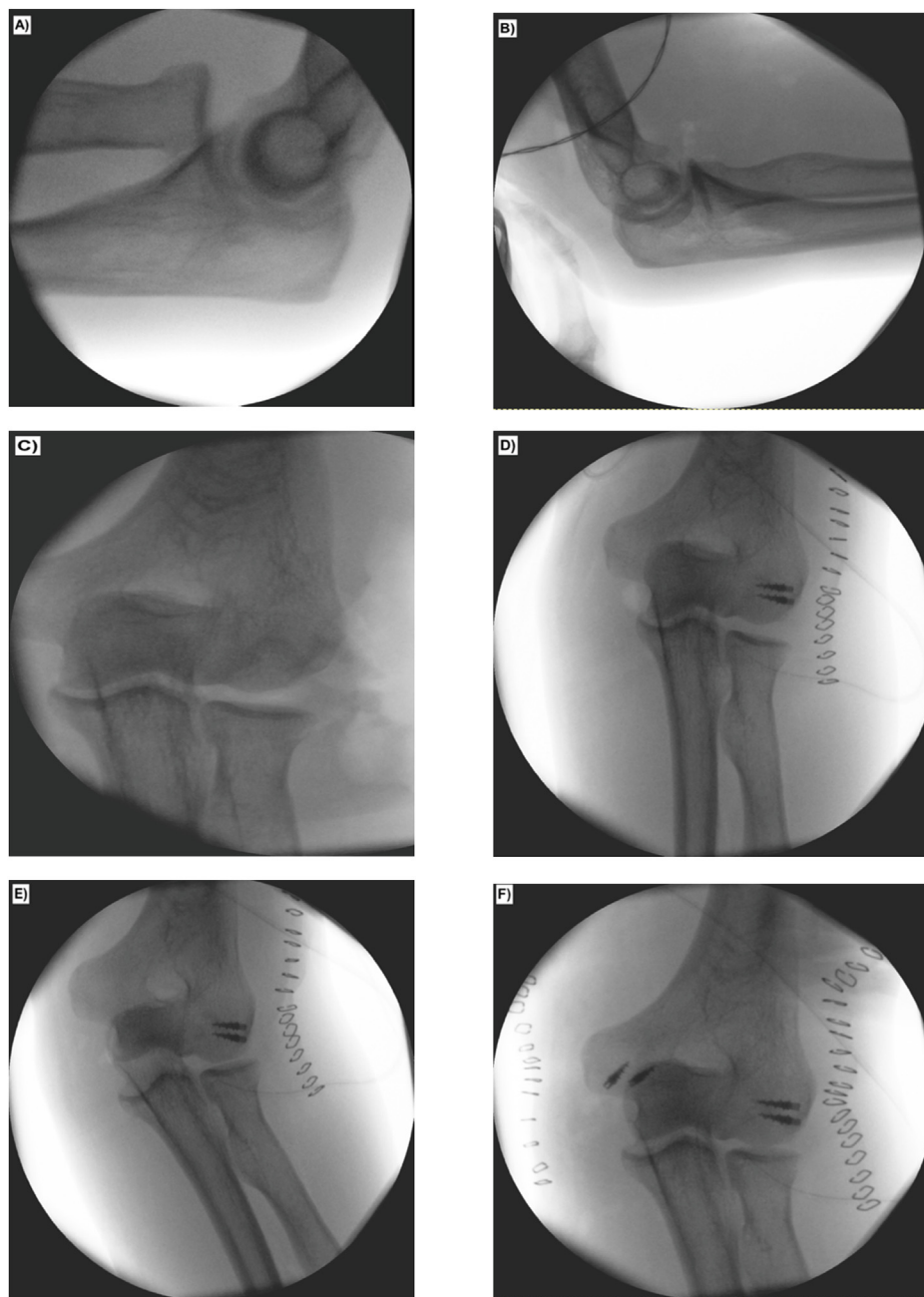


Fig. 3. Intraoperative documentation of open reduction of the elbow dislocation and stabilization of the medial and lateral capsule-ligament apparatus with suture anchors (A–F).

To evaluate the postoperative functional outcome at the 6th postoperative month, the Mayo elbow performance score and the Oxford elbow score were used. The results revealed good and satisfactory joint functions with 85 and 40 points, respectively.

The documented ROM at this point was Extension/Flexion 0° – 10° – 130° (Fig. 4D and E) and Supination/Pronation 40° – 0° – 40° (Fig. 4B and C). The patient reported mild pain when lifting heavy objects but did not report other significant complaints that interfered with daily activities. The surgical scars showed no signs of irritation. To assess the stability of the elbow joint, the lateral Pivot-shift apprehension test was employed, which showed neither apprehension in the patient nor subluxation tendency (Fig. 4F).

Follow-up computed tomography with 3-Dimensional reconstructions was performed 6 months postoperatively; it confirmed the correct articulation of the elbow joint and highlighted the posterior osteochondral defect of the capitellum, in which the radial head was engaged directly after the joint dislocation (Fig. 5A and B).

5. Discussion

Irreducible elbow dislocations are rare injuries and are highly associated with dislocation of the radiocapitellar joint.^{7–9} Several reports attributed the failed closed reduction to buttonholing of the radial head in surrounding structures, such as the LCLC, the brachialis, and the biceps tendons.^{8, 10, 11} Dislocations of the radial head are also associated with Monteggia fracture-dislocations, which should be excluded in such cases, as the radial head is not likely to reduce if malalignment of the ulnar diaphysis persists.¹² Osborne and Cotterill (1960) described a capitellar defect on the posterior surface initially caused by the impaction of the radial head in cases of recurrent elbow instability.¹³ The clinical

relevance of these so-called Osborne-Cotterill lesions was explained by the disruption of the LUCL from the posterior margin of the capitellum leading to posterolateral rotatory instability (PLRI), which required surgical intervention.¹⁴ Weng et al. described a case of irreducible elbow dislocation caused by a Hill-Sachs-like lesion on the posterior surface of the capitellum, in which the coronoid process was trapped.⁷ However, engaging of the posteriorly dislocated radial head in the induced impression over the posterior surface of the capitellum serving as a block to closed reduction was not once reported in the literature. This pathognomonic sign we refer to as engaging Osborne-Cotterill lesion (EOCL) (Fig. 1B) is the main difference between this case report and other previously published cases of irreducible elbow dislocations. We presume that the posterior dislocation of the radial head and subsequent entrapment in the capitellar defect resulted from a sequence of events; including slight flexion of the elbow, reflective contraction of the supinator muscle pulling the radial head posteriorly, internal rotation of the humerus against the axis of the forearm, and axial compression at the elbow joint caused by the force transmitted from the body weight as the hand is stabilized by the ground (Fig. 2).

Describing the pathoanatomy of PLRI, O'Driscoll suggested that fractures of the coronoid process and the radial head in elbow dislocations would be associated with an intact capsule and sparing of the anterior bundle of the medial collateral ligament (AMCL), whereas the absence of skeletal lesions is highly indicative of ligamentous disruption according to what is referred to as the "Horii circle".¹⁵ These conclusions were consistent with the clinical and radiological findings in this report.

After failing two attempts at closed reduction, the radiocapitellar and ulnohumeral articulations were restored through the technique mentioned above (Fig. 3B and C). The temporary volar subluxation of the radial head shown in Fig. 3A would be explained as a reflective



Fig. 4. Documentation of the range of motion and status of the surgical scar 6 months postoperatively. (A–E) Lateral Pivot-shift apprehension test (F).

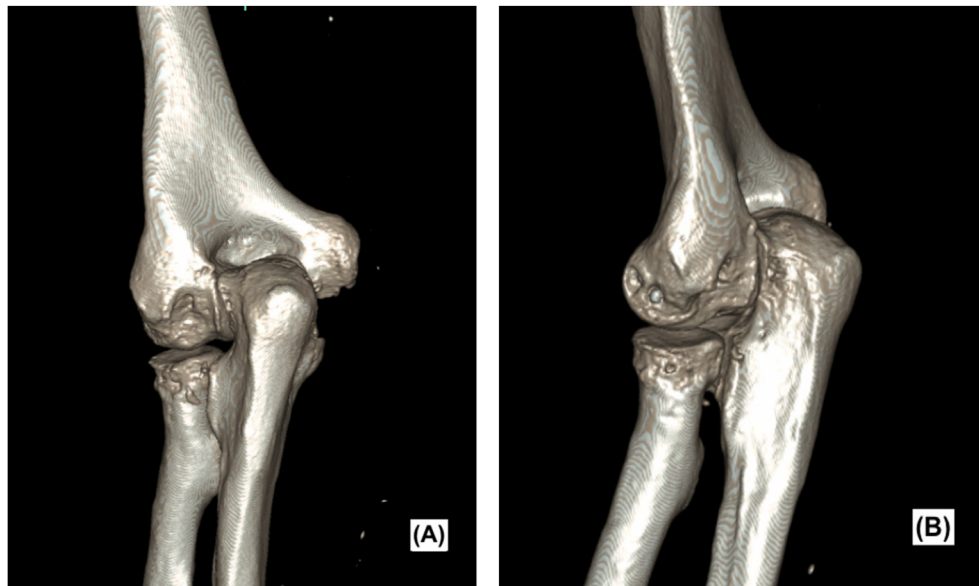


Fig. 5. 6 months postoperative computed tomography with 3-Dimensional reconstruction (A) and (B) of the elbow showing correct articulation of the radiocapitellar and ulnohumeral joints and highlighting the posterior capitellar osteochondral defect induced by the initial impact of the radial head.

entrapment in soft tissue following the release from the impacted posterior margin of the capitellum. Although no magnetic resonance imaging (MRI) was carried out preoperatively, it might have been helpful to achieve a better understanding of the mechanism of injury. Ultimately, the treatment provided for this patient and the postoperative rehabilitation resulted in a satisfactory outcome.

The key findings leading one to consider this etiology are the close approximation and far lateral position of the radial head and proximal ulna near the lateral epicondyle. Also, the presence of an engaging Osborne-Cotterill lesion (EOCL) in the lateral view should draw attention to the possibility of failing closed reduction.

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Informed consent

Written informed consent was obtained for the publication of this case report.

Authors contribution

First Author: Writing, original draft preparation.
Second Author: Review and editing.

Institutional Review board approval

Our institution's ethical committee waived ethical approval for this

case report as it was considered a part of the usual patient care.

Declaration of competing interest

None declared.

Acknowledgment

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