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# Bilateral Transolecranon Fracture-Dislocation Elbow with Bilateral Coronoid and Radial Head Fractures – A Rare Complex Elbow Injury: A Case Report and Review of Literature

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***Authors' contributions***

*This work was carried out in collaboration among all authors. Authors AR, KAS, VM and AA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors VKNS, VBM, AR and VBM managed the analyses of the study. Authors KAS, VM and AA managed the literature searches. All authors read and approved the final manuscript.*

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***Case Report***

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## ABSTRACT

Bilateral olecranon fractures are a rare occurrence. Direct trauma usually results in comminuted fractures and indirect trauma in transverse fractures. We describe a case of bilateral olecranon fracture with a radial head comminuted fracture with coronoid fracture without the involvement of collaterals. Olecranon fractures are usually a result of direct trauma (fall from height/motor vehicle accidents) or indirect trauma. A 22year old male patient presented to the emergency department with complaints of pain and swelling around both elbows following a motor vehicle accident. The patient also sustained trauma to the head and had a history of transient loss of consciousness. CT brain at the time of presentation was normal and the patient was conscious. The Olecranon

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Fracture was fixed with a pre-contoured olecranon locking compression plate (Synthes, USA). In our case, the collaterals were intact and as the radial head was comminuted, we excised the radial head. The radial head being secondary stabilizer of the elbow in injuries to the medial collateral ligament complex. The excision of the radial head would not cause any instability. Bilateral olecranon fractures need to be fixed anatomically, the comminuted radial head was excised and the anterior capsule was repaired.

*Keywords: Bilateral trans olecranon; olecranon fracture; trauma; collateral ligament complex.*

## 1. INTRODUCTION

The incidence of Olecranon Fractures has been reported to be approximately 10% of the traumatic fractures of the upper limb [1]. Olecranon fractures are usually a result of direct trauma (fall from height/motor vehicle accidents) or indirect trauma [2]. These injuries are usually unilateral, and bilateral injuries are very rare. A review of the literature showed five case reports of bilateral traumatic olecranon fractures and two reports of spontaneous bilateral olecranon fractures in patients of rheumatoid arthritis and sarcoidosis [2-9]. Of the five papers describing cases of traumatic etiology, one author reported an associated radio-humeral dislocation [7].

We would like to report a case of a complex elbow injury -Bilateral Transolecranon fracture-dislocation elbow with bilateral coronoid and radial head fractures. We were unable to find such injuries being reported in the English literature. We describe the management of such a complex injury and review the literature.

## 2. CASE REPORT

A 22year old male patient presented to the emergency department with complaints of pain and swelling around both elbows following a motor vehicle accident. This happened when the motorbike hit a truck from behind. The patient also sustained trauma to the head and had a history of transient loss of consciousness. CT brain at the time of presentation was normal and the patient was conscious. A neurosurgery consult was sought.

Physical examination revealed swelling, tenderness, and deformity of both elbows. There were no distal neurovascular deficits. The ipsilateral wrist and shoulder were clinically normal. Plain radiographs of both elbows revealed Bilateral Olecranon Fracture with radial head fracture-dislocation (Figs. 1 & 2). CT scan of both elbows was done following this, which showed olecranon fracture with comminuted fracture of the radial head and coronoid fracture bilaterally (Figs. 3 & 4).

The patient was prepared for surgery. Under general anesthesia, the patient was placed in a right lateral position and the left olecranon fracture was exposed by a posterior midline incision. The radial head was found to be comminuted, dislocated posteriorly, and not reconstructible, and hence a decision for radial head excision was made intra-operatively. The Olecranon Fracture was fixed with a pre-contoured olecranon locking compression plate (Synthes, USA). The elbow was found to be stable at about 100 degrees of flexion. There was no varus or valgus instability. The collaterals were normal. The anterior capsule was repaired but coronoid was not fixed.

The patient was switched to the left lateral position and the same technique was used to the right olecranon fracture fixation. The right side radial head was comminuted, dislocated posteriorly, and was not reconstructible, and hence a decision for radial head excision was made intra-operatively. The Olecranon Fracture was fixed with a pre-contoured olecranon locking compression plate (Synthes, USA). The elbow was found to be stable at about 100 degrees of flexion. There was no varus or valgus instability. The collaterals were found normal. The anterior capsule was repaired but coronoid was not fixed.

Postoperative plain radiographs demonstrated adequate fixation of the olecranon with concentric reduction of ulna humeral joint bilaterally (Figs 5 & 6). Both elbows were splinted in flexion of 100 degrees for 3 weeks and then the range of motion exercises (passive and active-assisted) was initiated. The patient had a full range of flexion-extension and supination- pronation at the end of 16 weeks from the surgery.

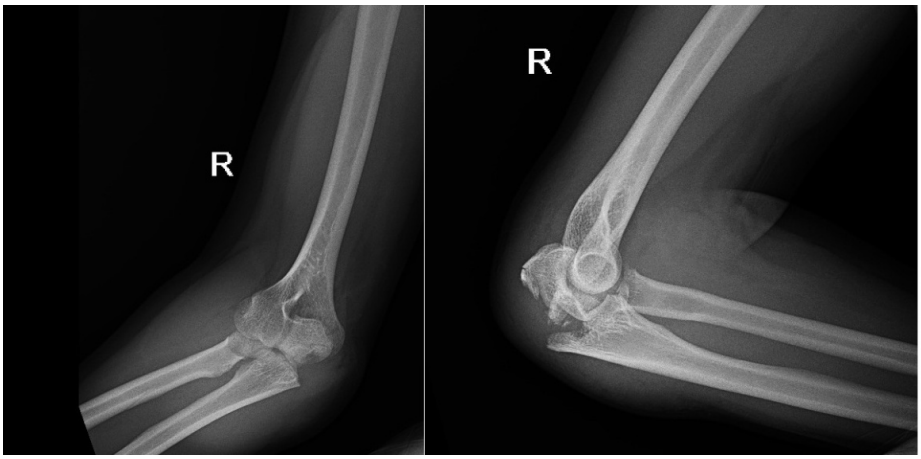


**Fig. 1. x ray pre op R**

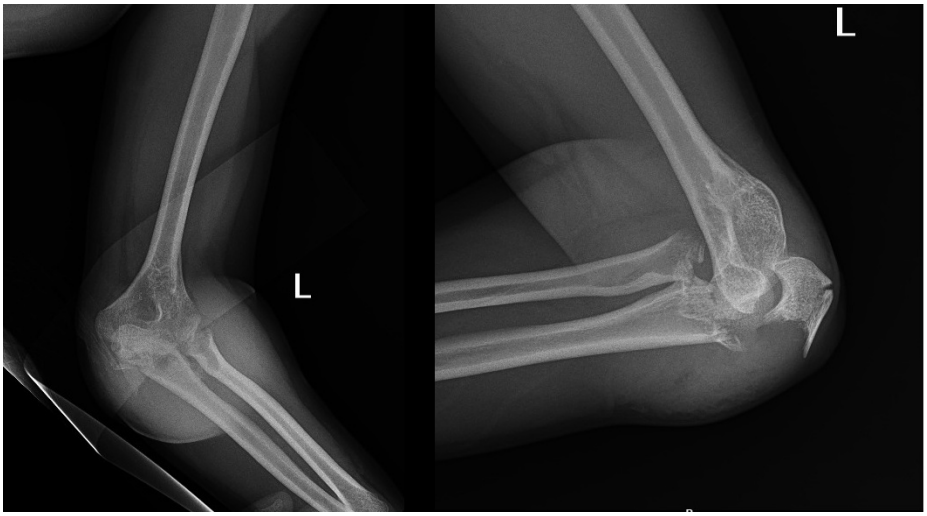


**Fig. 2./ Xray preop L**

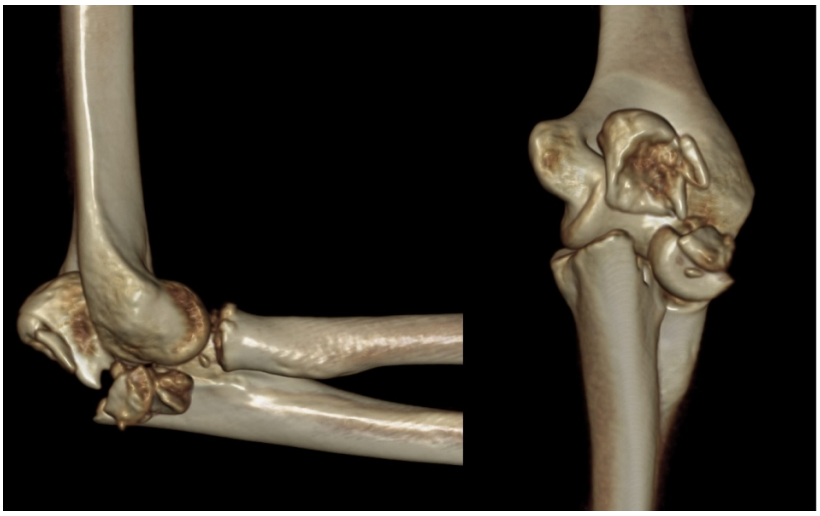

**Fig. 3. 3d r ct final**

**Fig. 4. 3d left final ct**

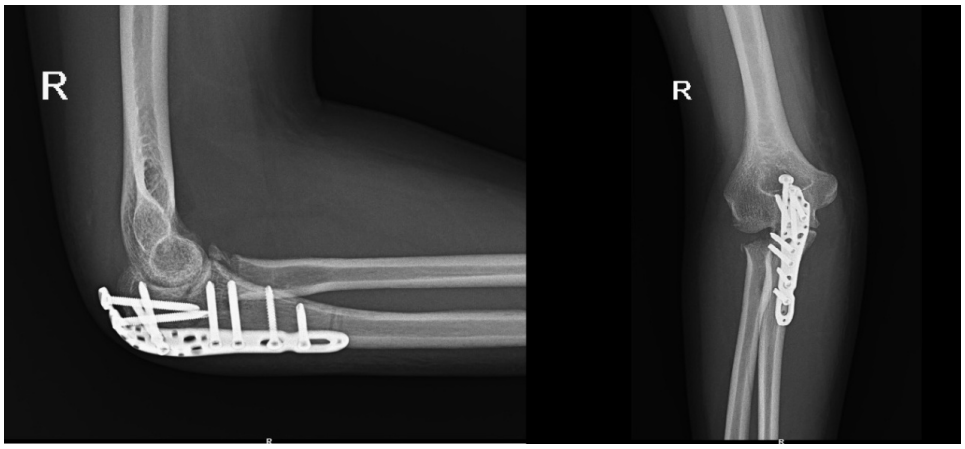


**Fig. 5. Post op X ray R**

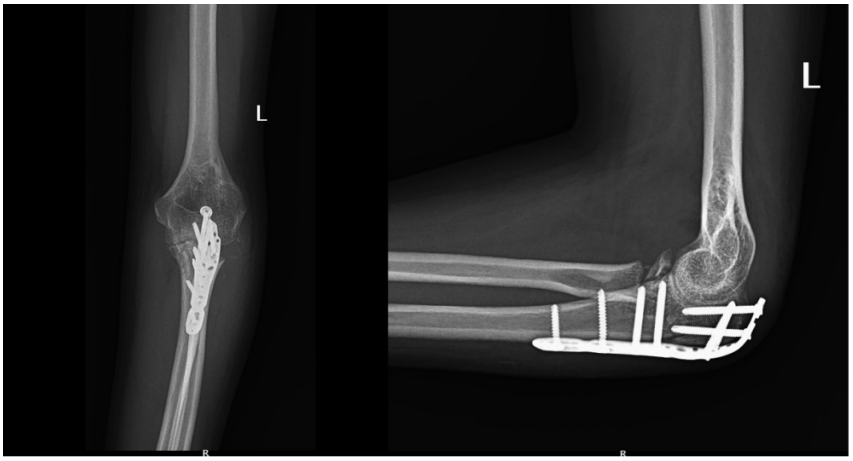


**Fig. 6. Post op x ray L**

## 3. DISCUSSION

Bilateral olecranon fractures are a rare occurrence. Newman et al. [10]. Noted that direct trauma usually results in comminuted fractures and indirect trauma in transverse fractures. We describe a case of bilateral olecranon fracture with a radial head comminuted fracture with coronoid fracture without the involvement of collaterals.

Elbow fractures with ulnohumeral instability tend to occur in general patterns: (1) terrible triad, (2) varus posteromedial rotatory instability (VPMRI), (3) olecranon fracture-dislocation (OFD), (4) radial head fracture with ulnohumeral dislocation, and (5) lateral column fracture of the distal humerus with ulnohumeral dislocation.

Our case did not fall into any of the above categories, as there was trans olecranon fracture with a coronoid fracture with comminuted radial head fracture, dislocation of the elbow with intact collaterals. The comminuted radial head fragments were found dislocated posteriorly on both sides. And due to the bilateral nature of the injury, there was no particular treatment protocol we could follow. However, achieving ulnohumeral stability and good function in both the elbow was crucial in this case. We went on with bone stabilization first in this case. The coronoid fracture was not operatively fixed but the anterior capsule was repaired after the radial head was excised.

In our case, the collaterals were intact and as the radial head was comminuted, we excised the radial head. The radial head being secondary stabilizer of the elbow in injuries to the medial collateral ligament complex (was intact in our case). The excision of the radial head would not cause any instability.

As all olecranon fractures are intra articular [10], the goal of the treatment is to achieve the anatomical reduction of the articular surface, the complete range of motion without extensor lag, and a stable elbow [1]. Non-operative management of these fractures is reserved for undisplaced fractures and patients who are not fit for surgical intervention [10]. The operative treatment options available are – tension band fixation, intramedullary pinning, and plate fixation [10]. Comminuted fractures of the olecranon are not amenable to tension band fixation [1] and hence option of plate fixation was used. Hardware prominence is the most common complaint after plate fixation. The routine removal of the plate may be considered in these patients.

An axial loading injury such as one in our case causes trans-olecranon fracture-dislocations. These injuries typically have disruption of the ulnohumeral joint and the radial head gets displaced anteriorly. The proximal ulna has a complex, comminuted fracture. However, the ulna fracture could be simple or oblique also. The fractures of coronoid are common in these injuries and typically involve more than 50% of the height of the coronoid [11-12]. Concomitant radial head fractures are common, however, the collaterals are spared. [11,12,13,14,15].

These TOFD injuries need to be differentiated from Monteggia's injuries. The Monteggia injuries involve the dislocation of PRUJ (proximal radioulnar joint). The management of TOFD aims to restore the greater sigmoid notch. The focus of the treatment of monteggia type of injuries is the anatomical reduction of the ulnar diaphyseal fracture.

The option for radial head fracture with dislocation is the prosthetic replacement, fixation, or surgical excision. The fixation was not an option in our case as it was comminuted. We did not opt for prosthetic radial head replacement, as the results of prosthetic radial head replacement are fraught with the early loosening of the prosthesis. The proximal migration of the radius after radial head excision could be a problem causing pain in the distal radioulnar joint area. We did not see any such issue in our patients.

The peri-operative considerations in a patient of bilateral elbow trauma requiring operative fixation were to avoid bilateral brachial plexus block and positioning of the patient during surgery. During surgery, we positioned the patient in a lateral position, which helps in good exposure and fixation and assessment of the range of movements and stability of the elbow. The other authors preferred the supine position. We used celecoxib for 4 weeks to prevent heterotopic ossification [16-17]. The range of motion was started 3 weeks after surgery and our patient achieved a good range of motion (10-100 by Goniometer) and strength (as measured according to MRC criteria by the therapist was considered 5) and a stable joint at 12 weeks post mobilization. No additional procedure was required for ligament reconstruction.

At the recent follow-up, fractures were completely healed with the stable elbow and the patient had flexion of 95 degrees with a terminal 10-degree extension block. He did not have any functional restrictions in all his day to day activities.

## 4. CONCLUSION

Bilateral Transolecranon fracture-dislocation elbow with Bilateral coronoid and radial head fractures is a complex elbow injury. This type of a rare injury doesn't fall into any of the types of complex fracture-dislocations of the elbow. There is no set protocol for managing these types of injuries. The bilateral nature of this injury not only makes it challenging to treat but getting a good functional outcome is important in this type of patient. Bilateral olecranon fractures need to be fixed anatomically, the comminuted radial head was excised and the anterior capsule was repaired. The coronoid was not fixed in this case. The collaterals were not involved. Good post-operative rehabilitation after three weeks of immobilization gave good results in our patient.

## CONSENT

As per international standard or university standard, the patient's consent has been collected and preserved by the authors.

## ETHICAL APPROVAL

As per international standard written ethical permission has been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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