



ORIGINAL RESEARCH PAPER

Orthopaedics

AN ATYPICAL CASE OF COMPLEX ELBOW INJURY INVOLVING FRACTURE OF MEDIAL CONDYLE OF HUMERUS AND RADIAL HEAD

KEY WORDS: Complex elbow fractures, Milch Medial condyle fracture Type2, Kilfoyle type 3, Masons Type 4, Radial head replacement.

Dr. Sidhardh R Panickar

Junior Resident, Dept of Orthopaedics, SRMC, Chennai.

Prof. Mohan Choudhary B*

Professor and Unit Head, Dept of Orthopaedics, SRMC, Chennai.
*Corresponding Author

Dr. Kevin Lourdes

Assistant Professor, Dept of Orthopaedics, SRMC, Chennai.

Dr Velmurugan

Senior Resident, Dept of Orthopaedics, SRMC, Chennai.

Dr Arjun Ganesh

Senior Resident, Dept of Orthopaedics, SRMC, Chennai.

ABSTRACT

Complex elbow fracture dislocation involving fracture of Medial condyle of humerus and radial head of the ipsilateral side is a rare pattern of injury. Very few reports have shown such a pattern of injury. We present such a case of a 33 yr old lady with Complex elbow fracture dislocation with a Distal humerus- Milch fracture dislocation of medial condyle Type 2 or Kilfoyle Type 3 and Radial head-Masons Type 4 injury, treated with open reduction and internal fixation for the distal humerus, radial head replacement as well as lateral collateral ligament reconstruction using suture anchors. Post operatively at 6 months patient has almost near normal range of movements with a good functional outcome score.

INTRODUCTION

Complex elbow fractures in adults represent a significant orthopaedics challenge due to the intricate anatomy and functional importance of the elbow joint. These injuries often involve multiple fracture lines, comminution, and disruption of the surrounding soft tissue, making management and prognosis particularly demanding. We report a rare case of a complex elbow injury with dislocation of elbow joint involving fracture of Medial condyle of distal humerus and ipsilateral radial head fracture.

CASE REPORT:

A 33-year-old lady presented to the emergency department with complaints of pain and swelling over the left elbow joint following a road traffic accident involving a motorcycle skid. The patient had a fall backward with extended shoulder and elbow; supination at forearm; and dorsiflexion at wrist. On clinical examination no external injuries; diffuse swelling and deformity was present over the elbow; tenderness over distal arm and elbow. Three point bony relationship of elbow was altered. Range of movements could not be assessed, no neurovascular deficit. Radiography and CT scan showed dislocated elbow joint with distal humerus medial condyle fracture (Milch fracture dislocation of medial condyle Type 2) and radial head fracture (Masons type 4) [Figure 1].



Figure 1: Preoperative radiograph and 3D reconstruction CT image showing the fracture

Elbow was reduced and plaster slab was applied. 2 days later definitive surgical fixation was done.

Through posterior midline approach, Ulnar nerve was identified and tagged, olecranon osteotomy was done and triceps reflected along with olecranon [Figure 2]



Figure 2: Posterior midline approach with olecranon osteotomy

Medial condylar fracture was visualised and reduced anatomically, held temporarily with K wires [Figure 3]



Figure 3: Medial condyle of humerus reduced and fixed with K wires

fixed with an intercondylar cannulated cancellous screw and a distal humerus medial condyle precontoured plate. Medial collateral ligament and capsular attachments were found to be intact. Laterally radial head was found completely displaced with torn annular ligament and lateral collateral ligament. Fractured radial head was delivered and measured to be of size 2.5, radial neck was prepared, broached and appropriate radial head replacement prosthesis was inserted [Figure 4].



Figure 4: Radial head replaced with appropriate sizes implant and fit checked in flexion

Annular ligament was repaired with sutures. Lateral collateral ligament was reconstructed using a sutures anchor to the lateral epicondyle [Figure 5].



Figure 5: Lateral collateral ligament reconstructed with suture anchors

olecranon osteotomy was fixed with K-wires and tension band wiring. [Figure 6]



Figure 6: Olecranon osteotomy fixed with Kwires and tension band wiring.

Post operative radiography revealed satisfactory reduction and articular alignment. [Figure 7]

Patient was kept on an above elbow plaster slab for 1 week following which gradual elbow movements were started. The patient has been under follow up for 6 months and has

attained near normal joint movements with only partial restriction of pronation without any complications or signs of instability. [Figure 8]



Figure 7: Post Operative Radiograph



Figure 8: Post operative Range of movements

DISCUSSION:

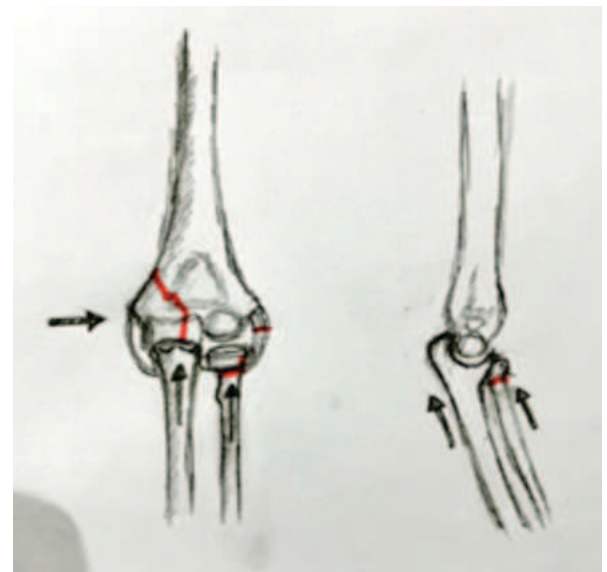


Figure 9: Diagrammatic representation of probable biomechanics of the injury

Complex elbow injuries, such as the one presented in this case, are challenging to manage due to the intricate anatomy and biomechanical demands of the elbow joint. The combination of a medial condyle fracture of the distal humerus (Milch fracture dislocation of medial condyle Type 2 or Kilfoyle Type 3), a radial head fracture (Mason type 4), and an elbow dislocation adds to the complexity, as it involves both bony and soft tissue structures crucial for joint stability and function.¹⁻² Medial condyle fractures of the distal humerus are relatively uncommon in adults and are most often the result of high-energy trauma, as in this case involving a motorcycle accident. Milch fracture dislocation of medial

condyle Type 2 involve the lateral part of the trochlea. Milch's paper on distal humerus fractures has beautifully described the mechanism of injury and biomechanics for most of these fracture. Probable biomechanics for our case has been showcased in Figure 9.

Proper reduction is essential to restore elbow joint congruity and prevent long-term complications such as malunion, instability, and post-traumatic arthritis. Open reduction and internal fixation (ORIF) is the gold standard of care for these fractures, as supported by the literature³⁻⁴. In this case, an anatomical reduction was achieved using an intercondylar cannulated screw and a precontoured medial condyle plate, providing stable fixation and promoting early mobilization, which is critical for optimal functional outcomes⁵. Radial head fractures are often associated with elbow dislocations, and the Mason classification provides a guide to management. In Mason type 4 fractures, which involve a fracture with associated dislocation, treatment is dependent on the degree of comminution and displacement⁶. In this case, the radial head was completely displaced and irreparable, necessitating radial head replacement. Radial head replacement is indicated when fractures are not reconstructable, and it plays an essential role in restoring elbow stability, particularly in valgus loading and axial resistance⁷⁻⁸. Several studies have shown that radial head replacement provides excellent outcomes in terms of restoring elbow stability and function, especially when associated with ligamentous injuries, as seen in this patient⁹⁻¹⁰. Elbow dislocations, particularly those associated with complex fractures, often involve disruption of the surrounding ligamentous structures. The lateral collateral ligament (LCL) complex, including the annular ligament, is essential for stabilizing the elbow during flexion, extension, and forearm rotation. The literature consistently emphasizes the importance of reconstructing these ligaments during surgical management of complex elbow injuries to prevent chronic instability. In this case, the torn annular ligament was repaired, and the LCL was reconstructed using a suture anchor, ensuring restoration of both lateral and rotational stability¹¹. Failure to address ligamentous injuries during the initial surgery can result in long-term instability, recurrent dislocations, and functional deficits¹². The posterior midline approach, combined with an olecranon osteotomy, is widely used for complex distal humerus fractures, as it allows optimal visualization of both the medial and lateral aspects of the elbow joint. This approach also facilitates proper reduction and fixation of the fracture components¹³. The use of tension band wiring for olecranon osteotomy fixation provides stable fixation, allowing early initiation of range-of-motion exercises postoperatively¹⁴. Early mobilization is key to preventing elbow stiffness, a common complication following elbow trauma and surgery. Studies have shown that prolonged immobilization can lead to poor functional outcomes due to joint contractures, while early range-of-motion exercises, when combined with stable fixation, promote better recovery. In this case, gradual mobilization began one week post surgery, and by six months, the patient had regained near-normal joint function without any signs of instability or complications.

CONCLUSIONS

This case underscores the importance of a multifaceted approach in managing complex elbow injuries. Thorough preoperative planning, appropriate hardware backups and a flexible approach towards exposure and fixation are of paramount importance. Successful outcomes are dependent on achieving anatomical reduction of fractures, ensuring stable fixation, and addressing any associated soft tissue injuries. The combination of ORIF for the medial condyle, radial head replacement, ligament repair, and early mobilization contributed to the patient's excellent functional recovery. This case highlights the role of early intervention and comprehensive surgical management in preventing

long-term complications such as instability, stiffness, and arthritis. Long-term follow-up remains essential to monitor for potential complications such as post-traumatic arthritis or recurrent instability

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