

Neglected terrible triad associated dislocation and heterotopic ossification of elbow- a bone setter complicated elbow injury as a rare case report

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I. Introduction

Elbow dislocation associated with both radial head and coronoid fractures, termed the “terrible triad injury” (TTI) by Hotchkiss (1), was notoriously challenging for decades because of the difficulties inherent in treatment and the consistently poor prognosis (2-4). TTI was recorded as a severe injury with a lot of complications including recurrent instability, stiffness, arthritis, multiple reoperations, pain and functional limitations (4-6). The aim of TTI treatment is to recover the stability of the elbow so as to allow early rehabilitation and reduce the risk of long-term joint stiffness or disability (7, 8). This is also termed as “Complex dislocation”.

Elbow dislocation constitute 10-25% of all elbow injuries, and second only to shoulder dislocation. Posterior type is more common than the Anterior type. The direction of dislocation is determined by relation of radius and ulna with the humerus. Neurovascular complications occur in 5–13% of elbow dislocations and include injury to the ulnar, median and, less frequently, radial nerves and the brachial artery, in most cases in open dislocations or penetrating injuries. Unfortunately in developing country, most of patient prefer to seek for a bone setter who resort to massage and manipulations etc to resolve the problem, which is true of India even in today’s era. As a result neglected cases are common. Inaccessibility to health care compounds the issue further. We can just imagine the issue, when it gets further complicated by fractures around elbow and heterotopic ossification. Neglected elbow dislocations often result in contractures and functional impairment. Surgical treatment is challenging because of the accompanying triceps retraction. It is huge challenge for the orthopaedic surgeon to obtain functional range of motion over and above reduction after the surgery. We are sharing a case which we have not found being reported in literature which had the features as described.

Keywords: Posteromedial dislocation, Coronoid fracture, Radial head fracture, Terrible triad, Neglected Posteromedial elbow Dislocation

II. Case Report

A 33 years old male came to orthopaedic outpatient of our hospital who complained of inability to flex his right elbow i.e elbow was stiff in almost full extension. He had history of fall 3 months back. The patient did not take medical treatment at that time, but went to bone setter, who resorted to massage and manipulations without any success.

During physical examination of the right elbow region, there was muscular atrophy of the forearm muscles. There was no localised tenderness on the effected region & sensory examination was normal. However, there was some weakness of thumb extension indicating posterior interosseous nerve involvement. There was no distal vascular deficit & CRT (capillary refilling time) less than 2 seconds. Active & passive range of movement (ROM) right elbow was absent.

Anteroposterior and lateral of elbow radiograph showed displacement of ulnar and proximal radial bone superomedially (Fig.1). CT was done for detailed evaluation of the injury which showed fracture of coronoid, radial head and capitellum along with heterotopic ossification along humerus (Fig.2 & 3). It may also show osteochondral fragments, intraarticular loose bodies and damage to the articular surfaces.

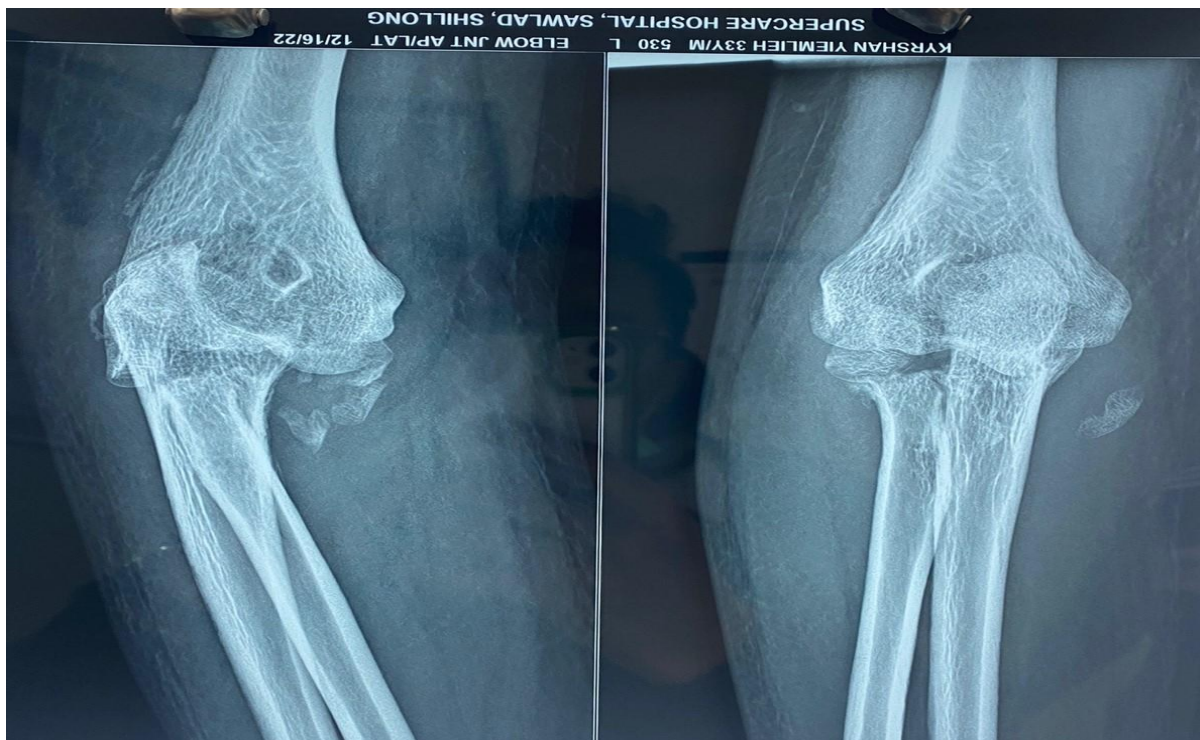


Fig.1- Radiographs showing posteromedial dislocation with fracture radial head, capitellum, coronoid process and distal trochlea. There is heterotopic ossification along humerus



Fig.2- 3D CT scan images showing fractures involving radial head, coronoid process, capitellum, trochlea with posteromedial dislocation of elbow

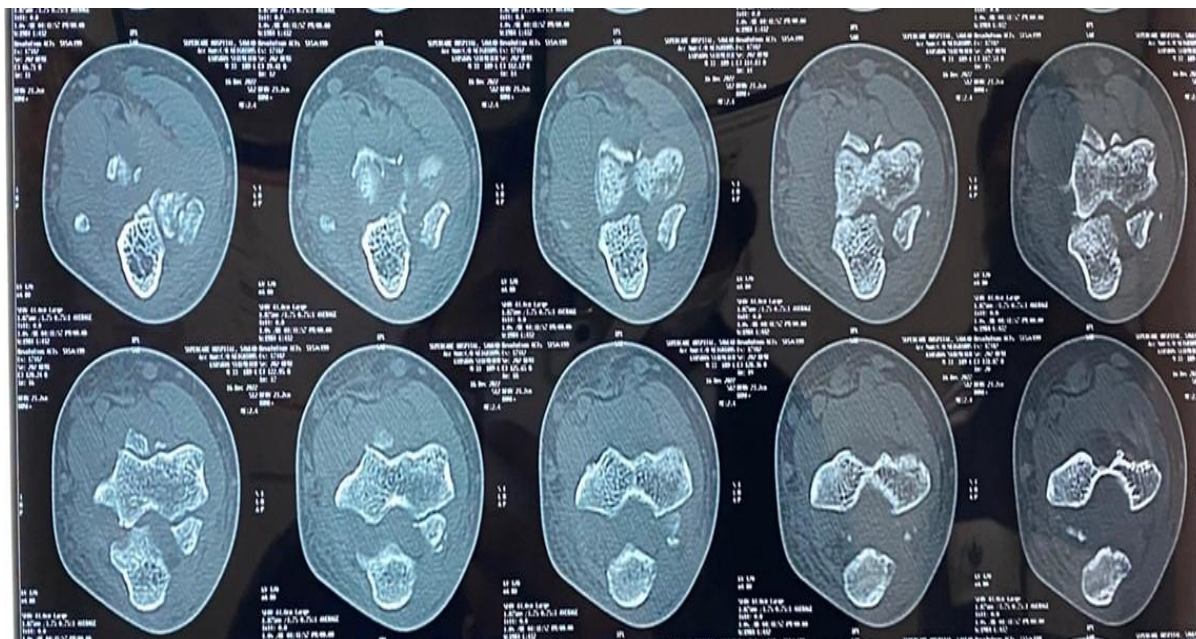


Fig.3- 3D CT scan images showing fractures involving radial head, coronoid process, capitellum, trochlea with posteromedial dislocation of elbow

Patient was planned for surgery for open reduction, soft tissue release (capsular contractures, shortening of the triceps muscle, contractures of the medial and lateral collateral ligaments, fibrotic coverage of the coronoid and olecranon fossa and compression of the ulnar nerve (9), MCL and LCL reconstruction if required, triceps muscle lengthening and excision of the displaced comminuted radial head fracture and anterior transposition of ulnar nerve. Also, with an aim to obtain functional elbow for most activities of daily life.

Morrey et al showed that most activities of daily living can be performed in the 30° to 130° range and a functional arc of motion of 100° for both flexion-extension and pronation-supination is sufficient to perform most activities in daily life (10, 11).

Patient was placed in left lateral position with affected right upper limb supported on the bolster /arm support at elbow so that full flexion and extension can be carried out. A posterior midline incision was made extending upto 8 cm proximal to olecranon skirting along the lateral aspect of the elbow and distally along the posterior ulnar aspect for 5 cm distal to the olecranon tip. Skin and subcutaneous tissue was incised and triceps exposed from its musculotendinous/aponeurotic junction to its attachment to olecranon process. Identification and preservation of ulnar nerve were first and important step (Fig. 4) followed by extensive release of fibrosis around the joint. Triceps was split using Z-plast to aid in lengthening if required. Olecranon fossa, coronoid fossa, olecranon, trochlear articular surfaces were cleared of the fibrous tissue. Precaution was taken to preserve articular cartilage, and nibbling of soft tissue around the articular cartilage was avoided. Radial head was found fractured and rotated 90 degrees with its articular surface directed laterally, Radial head was excised. Elbow was manipulated to achieve flexion with gradual release of ligaments medially and laterally as much as required for achieving reduction to maintain varus/valgus stability. Reduction was achieved after clearing heterotopic ossification involving distal humerus and was stabilized by transarticular cross k-wires of 2 mm size across ulnohumeral joint with elbow in 90 degree flexion (Fig.5 & 6). The ulnar nerve was found under tension, so decision to transpose the ulnar nerve anteriorly. Reduction and proper placement of K-wires was confirmed by visualization under image intensifier. The Z plasty of triceps was repaired, wound was washed and the incision was closed in layers followed by dressing. Patient was subsequently given above elbow plaster of paris posterior slab.



Fig.4- Peroperative clinical photograph showing ulnar nerve exposed and retracted (White arrow) with Z-plasty of triceps and olecranon fossa cleared of fibrous tissue (Green arrow)

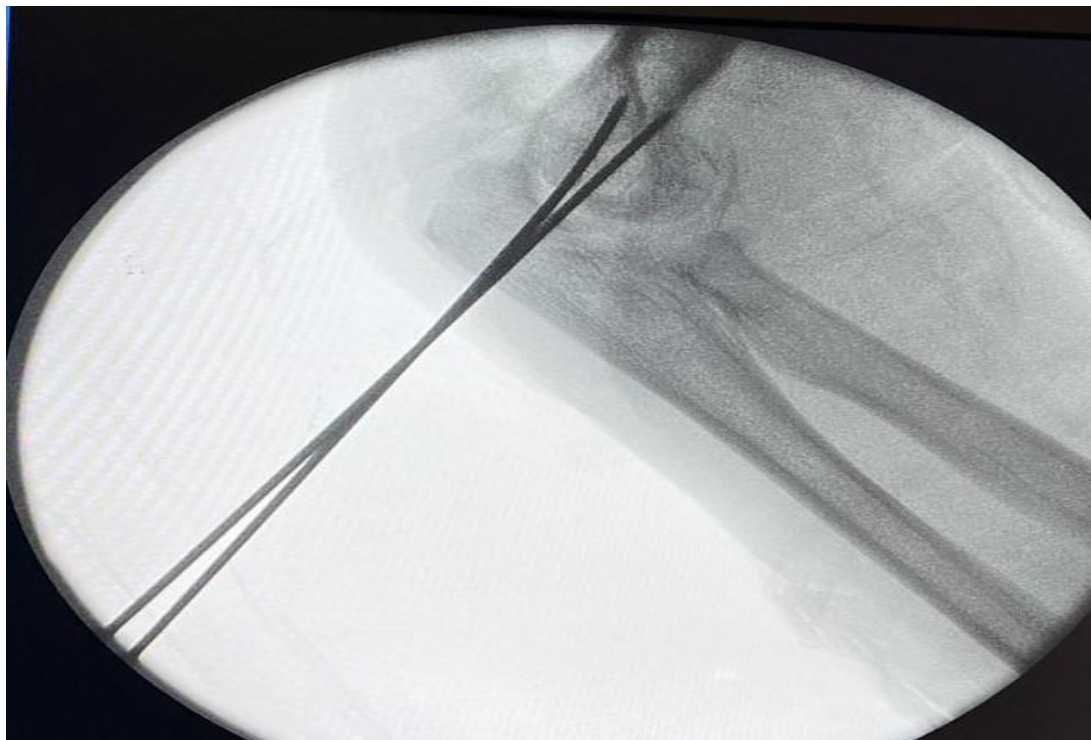


Fig.5- Image taken preoperatively showing divergent 2 mm K-wires stabilized the reduced ulnohumeral articulation with excised radial head

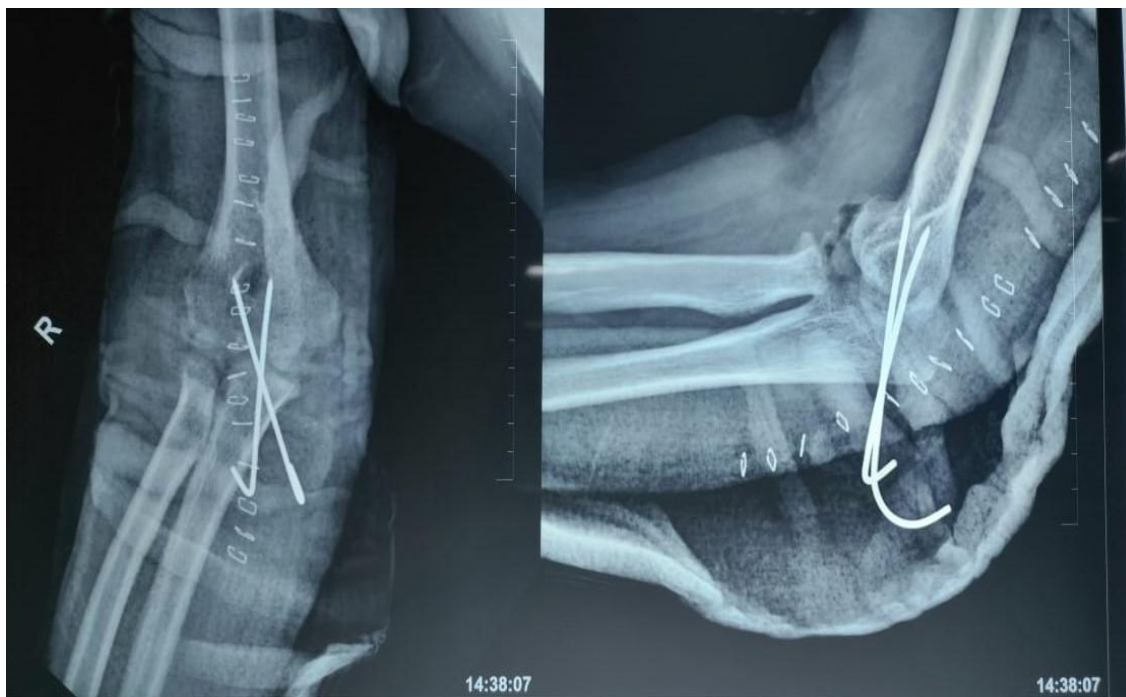


Fig.6- Post operative radiographs (AP & Oblique views) showing divergent 2 mm K-wires stabilized the reduced ulnohumeral articulation with excised radial head

III. Discussion-

Posterior type of dislocation of the elbow joint is common than anterior type (12). Neglected elbow dislocations are common in developing countries like our India. Neglected posterior dislocation of elbow is defined as an untreated posterior dislocation of the elbow joint for 3 weeks or more.

Dislocations without concomitant fractures are termed as “simple dislocations” (13). Dislocations associated with fractures of the coronoid process, radial head or neck, distal humerus, or olecranon are termed as “complex dislocations”. In neglected elbow dislocation, elbows are fixed in either extension or flexion with only a few degrees of flexion, supination, and pronation, and have a non-functional range of movement for activities of daily living.

The main reason for delayed diagnosis is due to inaccessibility to health care and consequent inadequate treatment initially. This leads to retraction of triceps muscles and collateral ligaments. The resulting nonfunctional unreduced elbow joint makes the surgical procedure quite challenging (14, 15). In these cases require surgical treatment, the surgeon has many options to consider the surgical approach, need for triceps lengthening, and stabilization of elbow after reduction and repair of collateral ligaments.

Treatment is quite challenging due to the significant soft tissue contractures, ligamentous insufficiencies and fibrosis, with possible associated nerve injuries, myositis ossificans, compliant patients and the need for long-term postoperative physiotherapy. Goal of surgical treatment is to achieve a painless, stable and mobile elbow with a congruent joint space.

Various treatment methods have been described such as closed reduction, open reduction and internal fixation with k-wire, open reduction with triceps lengthening and medial and lateral collateral ligament release, creation of an intra-articular “cruciate” ligament to stabilize the joint, hinged external fixator, excisional arthroplasty, arthrodesis, total elbow arthroplasty. Most authorities advise open reduction for elbow dislocation up to 3 months; total elbow arthroplasty; excisional arthroplasty, or arthrodesis is advised thereafter (16, 17, 18)

Most authors recommend open reduction for late presenting cases upto 3 months after injury (19, 20, 21). Functional outcome of open reduction is inversely proportional to time since injury (21)

Arthrodesis is reserved for heavy workers and arthroplasty for good ROM. Open reduction is not advised after 3 months of dislocation for fear of cartilage damage (20, 21)

Mahaisavariya et al recommended open reduction without triceps lengthening in dislocations from 1 to 3 months old (22). On the other hand in other study recommended lengthening in elbows dislocated for 60 months (23). Speed V-Y plasty (24) or Z-plasty (25) can be used for lengthening.

IV. Conclusion-

In treating chronic unreduced elbow dislocation that too with terrible triad and heterotopic ossification, the goals of restoring elbow stability and regaining a satisfactory arc of motion pose a significant challenge even for an experienced trauma surgeon.

This case report also highlights lack of knowledge on health issues as the patients frequently resort to the services provided by so called “bone setters” and with poor availability of medical facilities in developing countries like India which increase the morbidity among patients and also give tougher challenges to surgeons dealing with them later.

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