A RARE CASE OF ANTERIOR DISLOCATION OF ELBOW WITH NEUROVASCULAR INJURY- A CASE REPORT

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ABSTRACT

BACKGROUND

Elbow is a highly stable synovial hinge joint between humerus of arm and radius and ulna of forearm. It relies more on bony anatomy for stability rather than ligament. Anterior dislocation is very rare when compared to posterolateral dislocation. Anterior dislocation is more commonly associated with neurovascular injury and hence early diagnosis and proper reduction is very important for good functional outcome of the elbow. In this case report, we report a rare case of anterior dislocation with neurovascular injury.

KEYWORDS

Elbow Joint, Anterior Dislocation, Brachial Artery.

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BACKGROUND

Disruptions of the articular surfaces of the elbow represent a spectrum of injuries involving three separate articulations: the radiocapitellar, the ulnotrochlear, and the proximal radioulnar joints. Elbow dislocations are described by the relative position of the proximal radioulnar joint to the distal humerus: posterior, anterior, medial, or lateral. Posterior dislocations are further subdivided into posterolateral and posteromedial displacement. If radius and ulna dislocate posterior to humerus it is known as posterior type, and if anterior to humerus known as anterior type dislocation of elbow joint. Anterior elbow dislocations are rare with an incidence of slightly over 1% and the incidence of neurovascular injury is around 0.47% to 0.5%. The injury as mentioned by Hippocrates as the most painful of all dislocations and as fatal in a few days.^[1] They are associated with an increased incidence of complications, such as brachial artery disruption and associated fractures, compared with posterior dislocations.

Surgical and Applied Anatomy

Elbow dislocation is prevented by static and dynamic stabilisers. Dynamic elbow stabilisers consist of elbow musculature, which determines elbow position in space at the time of injury. Flexion and supination is a position of stability, while extension and pronation is a position of relative instability. Static constraints can be further divided into osseous or ligamentous. The bone geometry of the elbow creates a relatively constrained hinge. The coronoid and

olecranon form a semicircle of approximately 180° into which the trochlea of the humerus securely articulates. The concave surface of the radial head matches the convex capitellum and provides stability to the lateral aspect of the elbow joint.

Ligamentous constraints include the annular ligament and radial (lateral) collateral ligaments which provide stability to the proximal radiocapitellar and proximal radioulnar joints and to resist varus stress. The ulnar (medial) collateral ligament resists opening of the medial aspect of the elbow with valgus stress.⁽²⁾

Mechanism of Injury

Anterior elbow dislocations usually are caused by a direct blow to the posterior aspect of the flexed elbow. Hyperextension of the elbow also has been implicated in one study. Twisting of the forearm on the elbow commonly occurs.⁽³⁾

History

A 30-year-old adult male, manual labourer by occupation, admitted with the history of accidental fall while walking followed by injury to his left elbow. Patient had severe pain, swelling and deformity over his left elbow and inability to use the left upper limb since injury.

Clinical Findings

Elbow was found to be in 20° flexion, forearm was in supination, hollow depression present on posterior aspect of forearm, a fullness in the antecubital fossa, and olecranon prominence was lost. Left forearm and arm were tense with multiple blisters. Three-point bony relationship of elbow altered, forearm was found to be shortened, stretch pain was present. Radial pulse not palpable and absent on Doppler. Capillary refilling sluggish. Patient had finger drop on the involved limb. There was no wrist drop.

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X-ray

Anteroposterior and lateral X-ray showed anterior dislocation of Lt. elbow without fracture.

Treatment

Closed Reduction under GA

Patient was taken to the OT and closed reduction was done under GA using the following manoeuvre.

- With the elbow semi-flexed, a longitudinal force is applied along the long axis of the humerus (arrow 1). Pulling distally on the forearm may be necessary to initially dislodge the olecranon.
- Once the olecranon is distal to the humerus, the distal humerus is pushed anteriorly (arrow 2) while a proximally directed force is applied along the long axis of the forearm (arrow 3).
- Finally, the elbow is immobilised in some extension (arrow 4).^[2]

Care was taken not to hyperextend the elbow. Elbow was found to be stable post-reduction.

Post-op Evaluation

Post-reduction X-ray shows dislocation reduced and articular congruity maintained. Post-reduction CT scan of elbow shows maintenance of articular congruity and no other bony injury.

After reduction, radial pulse was absent but capillary refilling was present. Elbow and forearm was tense and tender, stretch pain was present. Vascular opinion revealed - radial pulse sluggish in hand Doppler and anticoagulant Inj. Heparin was started.

Brachial artery primary repair and anastomosis with Long Saphenous Vein graft done, and fasciotomy of forearm was performed.

Intraoperative Findings

Intraoperative Photograph shows Complete Tear of Brachial Artery

Cut ends of Brachial Artery are Shown

Long Saphenous Vein Graft harvested from Opposite Leg

Placement of Graft and Anastomosis was done over Ends

Procedure completed with Fasciotomy of Forearm

**After Wound Closure, Fasciotomy wound was left Open
Post Followup**

Limb was immobilised with above elbow slab and elbow in 90° flexion and forearm in midprone position. SSG was done for fasciotomy wound and limb was immobilised for three weeks. Active mobilisation was started after removing slab. On followup, left elbow full extension and flexion up to 100° was achieved and finger drop recovered completely.

Followup at the end of one year

DISCUSSION

Anterior elbow dislocations are rarest when compared to posterolateral elbow dislocations. Anterior dislocation of the elbow joint occurs when high energy direct blow is applied to the dorsal aspect of forearm with the elbow in mid flexed position. The stabilising structures of the elbow can be thought of as a ring. The trochlear notch surrounds almost 180° of the trochlea, accounting for a large part of the stability of the elbow joint. The ulnohumeral articulation has been shown to be the most important stabiliser of the elbow joint. The posterior column, the disruption of which would be a prerequisite for anterior dislocation, is formed by the olecranon, the triceps, and the posterior aspect of the capsule. This would explain the rarity of this injury. This is a case of anterior dislocation of elbow joint with neurovascular injury. Very few reports present anterior dislocation of elbow. Most authors recommend accelerated functional treatment of elbow dislocation, as long period of immobilisation has not been found to be of any benefit.^[4]

CONCLUSION

Anterior dislocation of elbow is very rare and often associated with neurovascular injury. It is an orthopaedic emergency. Early diagnosis with anticipation of neurovascular injury and congruent reduction is mandatory for a favourable outcome and to prevent any deformity.

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