CASE REPORT

Open postero-medial dislocation of the elbow in a 11-year old
A case report

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Background

Closed posterior dislocation of the elbow is a common injury. Open dislocations are rare, but associated with neurovascular injury due to the nature of the proximity of the structures and is extremely well documented as early as 1952. We present a case of a 11-year-old boy who sustained an open postero-medial dislocation of the elbow with no associated neurovascular injury. There have been no similar paediatric cases reported in the literature.

Case presentation

A 11-year-old boy was bicycling along a 6 ft high wall and fell on an extended, adducted and externally rotated left arm. He walked home and presented to the casualty department 1 h later. He had an open contaminated dislocation of his left elbow joint (Fig. 1). There was difficulty assessing subjectively due to anxiety, objectively he had no obvious neurovascular compromise. Radiographs revealed a postero-medial elbow dislocation (Figs. 2 and 3).

He was emergently transferred to the operating theatre. Surgical debridement and reduction of the joint was performed. Intra-operative findings showed that the distal humerus had penetrated through the anterior cubital fossa. In doing so the crucial lateral and medial collateral ligamentous complexes which play an important role in stability were destroyed.

The median nerve was noted to be draped over the anterior aspect of the humerus but intact. Brachial artery was in continuity and protected throughout the procedure. The common flexor origin on the medial aspect had been displaced anteriorly.

Despite almost complete disruption of the MCL and the muscular attachments, reduction was difficult. The open wound was surgically extended. Reduction was achieved but there was inherent instability and K wiring of the medial epicondyle was performed (Figs. 4 and 5).

The joint was irrigated with normal saline thoroughly and the wounds were closed. An above elbow back slab was applied and the patient concluded 1 week of antibiotic treatment with cefuroxime intravenously.

Following the procedure, examination of the child revealed paraesthesiae in the distribution of
the anterior interosseous nerve. The elbow was maintained in an above elbow cast for 6 weeks. Serial radiographs were taken to monitor alignment (Fig. 6). Physiotherapy was instigated and at 6 months had excellent functional recovery. His range of motion was 5–130° and there was no neurovascular injury remaining.

Discussion

There are several reports documenting neurovascular injury particularly brachial artery injury with closed elbow dislocations. Open dislocations and brachial artery injury is rare. Closed elbow dislocations in adults are often simply treated in casualty after sedation and these usually reduce easily.

There is significant instability and ligamentous injury following dislocation of the elbow. In most cases ligamentous ruptures are combined with rupture or avulsion of the muscular origins at the epicondyles. In a study by Josefsson et al., surgical exposure and ligament suture were performed on a
series of fracture dislocations of the elbow. All the ligaments were completely ruptured or avulsed in the epicondyle attachments and the degree of muscular damage was correlated with the tendency to redislocate under anesthesia. Recent studies have improved our understanding of the role of the lateral soft-tissue structures of the elbow with respect to elbow instability. Dislocations alone have a greater degree of lateral soft-tissue disruption than those with fracture dislocations. Firstly, for the elbow to dislocate, the separation of the origin and insertion of the LCL must be greater if the radial head and coronoid are intact than when the radial head and/or coronoid are fractured. Secondly, energy dissipation through fracturing may spare some soft-tissue damage.

The primary stabilizer of the elbow on the lateral side is the lateral collateral ligament (LCL) but the posterolateral joint capsule, common extensor origin (CEO), and capsular insertion to the annular ligament play important roles as secondary restraints. This may be likened to the posterolateral ligamentous injuries to the knee.

Ring and Jupiter’s review paper describe how the structure of the elbow reflects a balance between the functional requirements for spatial positioning of the hand and the need for sufficient stability to allow for the manipulation of heavy objects, throwing, and bearing weight. The osseous and articular components are important factors. The stabilizing structures of the elbow can be thought of as a ring.

Most of the elbows inherent stability is because the trochlear notch surrounds almost 180° of the trochlea. The forward tilt of the distal humerus articulation is beneficial in two ways. First, it increases the prominence of the coronoid process so that it helps to resist posterior subluxation of the elbow in both flexion and extension. Second, it increases the range of flexion of the elbow by ensuring clearance of the coronoid as it approaches the humeral shaft and by providing space for the flexor muscles of the arm and forearm. The spool shape and contour of the ulnohumeral articulation further enhance stability and adds stability to the articulation. The ulnohumeral articulation contributes not only to anterior–posterior stability but also to varus, valgus, and rotary stability.

This patient had bilateral collateral ligament injury and the medial epicondyle was fractured, requiring a K wire for fixation. As described earlier this can indicate less tissue injury of the ligamentous complex. This was highlighted by the difficulty in reducing the humerus because the common flexors were so taught. Although there was no permanent neurovascular injury, the boy did have an anterior interosseous nerve palsy which was self limited. Treatment in an above elbow cast for 6 weeks was necessary due to the instability of this unique injury. Most authors recommend early mobilization for functional treatment as long periods of immobilization can be detrimental.

This case highlights how minor injury from a simple fall may not always lead to a simple dislocation. The inherent stability of the elbow usually prevents such massive injuries. Major soft-tissue damage can occur and functional outcome is ultimately the main goal.
References


