Fracture Dislocation Of Elbow With Intra-Articular Displacement Of Medial Epicondyle: A Report Of Two Cases

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Citation

Abstract
Intra-articular entrapment of the medial epicondyle of the humerus concomitant with a dislocation of the elbow is a rare event in children and is considered a true indication for surgery. We favor a single attempt at gentle manipulative reduction under image intensifier control for acutely entrapped fragments as it avoids further surgical trauma. Surgery should be performed only in cases of failure of manipulation.

BACKGROUND
Fractures of the medial epicondyle usually occur between 7 and 15 years of age. They account for approximately 10 percent of all children's elbow fractures. Intra-articular displacement of medial epicondyle with dislocation of elbow has been considered a true indication for surgical intervention. Present study reports two cases managed by two different treatment methods.

CASE REPORTS
CASE NO. 1
An 11 year female child injured her right elbow following a fall on olecranon in 90 degrees flexed elbow. Physical examination revealed marked swelling and tenderness over the medial aspect of elbow. There was no distal neurovascular deficit. Radiographs showed a posterolateral fracture dislocation of elbow with intra-articular displacement of medial epicondyle (Fig. 1). A gentle manipulation was attempted under general anaesthesia under image intensifier control to achieve closed reduction but failed to reduce the entrapped fragment. Open reduction was performed through a medial longitudinal incision. The ulnar nerve was identified, dissected free, and retracted posteriorly. The fractured medial epicondyle was identified and was anatomically repositioned with a towel clip and internal fixation with two Kirschner wires was performed (Fig. 2).
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Medial collateral ligament was found intact. The elbow was immobilized in flexion for 2 weeks, after which gentle active range-of-motion exercises were begun. Patient did not develop any postoperative complication. At final review (at one year), the patient's fracture had proceeded to union (Fig. 3).

Figure 2
Figure 2: Immediate post-operative radiograph showing open reduction and internal fixation with Kirschner wires

Figure 3
Figure 3: Radiographs at one year follow up show sound union at fracture site

Figure 4
Figure 4: Clinical photograph of patient showing mild restriction of elbow flexion
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Figure 5
Figure 5: clinical photograph showing full extension of elbow without any deformity of elbow

Patient developed mild restriction of elbow flexion (terminal 10 degrees) (Fig. 4). Patient did not develop any valgus instability, ulnar nerve symptom, or deformity of elbow till last follow up (Fig. 5).

CASE NO. 2
A 14 year male injured his right elbow following a fall on to his outstretched hand. Clinical examination showed a deformity of elbow and a restriction of all movements. There were no signs of neurovascular deficit. Radiographs showed a posterolateral fracture dislocation of elbow with intra-articular displacement of medial epicondyle (Fig. 6).

Figure 6
Figure 6: Radiographs showing fracture dislocation of elbow with intra-articular entrapment of medial epicondyle

Close reduction was attempted in slight valgus, supinated position of elbow under general anaesthesia under image intensifier control. A satisfactory reduction of elbow joint and medial epicondyle was achieved (Fig. 7).

Figure 7
Figure 7: Radiographs showing satisfactory close reduction of medial epicondyle and elbow joint

The elbow joint was then immobilized in a POP slab in 90 degree flexion and supine position for three weeks. At 3 weeks gentle elbow mobilization was commenced. Patient regained full movements of elbow at four months. At final review (at one year), the patient's fracture had proceeded to union and there were no signs of valgus instability, ulnar nerve involvement, or deformity of elbow.

DISCUSSION
Fifty percent of medial epicondyle fractures are associated with elbow dislocations and in up to 15 percent cases the fragment becomes incarcerated in the elbow joint.\textsuperscript{1,3} Fracture of medial condyle may be missed initially in patients with dislocations, for which appropriate radiographic studies should be undertaken. The mechanism of injury is a valgus stress producing traction on the medial epicondyle through the flexor muscles.\textsuperscript{1} If associated with an elbow dislocation, the fragment may become incarcerated in the joint at the time of dislocation. There has been a general disagreement as to the best method of treatment for displaced medial epicondyle fractures with intra-articular entrapment. Earlier studies have advocated closed techniques to extricate the entrapped medial epicondyle fragment\textsuperscript{3,5,6} whereas open reduction and internal fixation has been strongly advocated in several recent studies.\textsuperscript{2,7,8,9} Pimpalnerkar et al considered type four fracture of medial epicondyle a true indication for surgical intervention\textsuperscript{8}. Closed extraction is accomplished by opening the joint with
A valgus stress and then supinating the forearm and dorsiflexing the wrist and fingers to stretch the flexors and extract the medial epicondylar apophysis from the joint. Electrical stimulation of the flexor mass or joint distension with saline or air may facilitate extraction. Sinha et al described nerve stimulation technique to achieve closed reduction of the medial epicondyle fracture with displacement into the elbow joint. Closed reduction in valgus position may injure ulnar nerve. Hence, Fowles et al recommended open reduction and internal fixation with two K-wires as the safest management. Ip and Tsang recommended surgery for fractures of medial epicondyle displaced more than 5 mm in young patients. Pimpalnerkar et al recommended open reduction and internal fixation of fractures of medial epicondyle of the humerus with dislocation of the elbow joint because such fractures usually demonstrate intra-operative instability and are associated with intra-articular entrapment of ulnar nerve. Bulut et al recommended surgery in patients with entrapment of the medial epicondylar fragment in the joint and with a displacement of more than 5 mm. Complications from elbow dislocations and medial epicondyle fractures include stiffness, ulnar neuritis, missed incarceration, myositis ossificans, recurrent dislocations and symptomatic nonunion. In the present study patient undergoing operative treatment had mild terminal restriction of elbow flexion. Stiffness is to some extent a function of the soft tissue damage at the time of injury. Stiffness is more likely following prolonged immobilization and early aggressive passive range-of-motion exercises. A brief period of immobilization (no more than 3 weeks) followed by early, gentle active range-of-motion exercises is recommended.

Aggressive physical or occupational therapy should be avoided in the early (initial 6 weeks) phase. A delay in the initial reduction and vigorous passive stretching exercises following cast removal have been reported to lead to myositis ossificans. Patients in the present case reports did not develop any other complication as we had followed this exercise program. Dias et al reviewed 20 patients with severely displaced medial epicondyle fractures with elbow dislocation who were managed nonoperatively. Only one patient had slight impairment of elbow function and none had late-onset ulnar neuritis. Wilson et al in their study compared the results of operative vs nonoperative treatment and found that the final outcome was the same in both groups. They concluded that the only indication for surgery was failure of manipulation. We believe that a single, gentle manipulation should be attempted under image intensifier control to avoid excessive valgus which prevents ulnar nerve injury during closed reduction. Closed reduction avoids further surgical trauma to the elbow and postoperative complications. Open reduction and internal fixation can be performed in same sitting in cases of failure of closed reduction.

References
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