

## Symptomatic medial humeral epicondylar fracture non-union- rare presentation of a relatively common injury

Vidisha S. Kulkarni<sup>a</sup>, Nitish Arora<sup>a,\*</sup>, Harshit Gehlot<sup>a</sup>, Sagar Saxena<sup>a</sup>, Sunil G. Kulkarni<sup>a</sup>, Supreet Bajwa<sup>a</sup>

<sup>a</sup> Department of Orthopaedics, Post Graduate Institute of Swasthiyog Pratishthan, Miraj, Maharashtra 416410, India

### KEYWORDS

Elbow  
Humerus  
Medial epicondyle  
Non-union  
Incarceration of medial epicondyle  
Fracture dislocation  
Ulnar nerve injury

### ABSTRACT

**Background:** Symptomatic non-union of medial humeral epicondylar fractures is a limited entity. Some studies recommend surgical excision of the fragment, but the results are controversial. The purpose of this study is to evaluate the outcome of open reduction and internal fixation of a medial epicondyle non-union fragment.

**Materials and methods:** A retrospective study was conducted in all the patients, who were operated in our hospital between the year 2010 and 2015 for symptomatic medial humeral epicondyle non-union. Inclusion criteria were open reduction and internal fixation of symptomatic medial epicondyle non-union and minimum one year of follow-up from time of surgery. Exclusion criteria included other associated musculoskeletal disorders of the affected limb. Open reduction and internal fixation of the fragment was done in all patients and the ulnar nerve was decompressed and anteriorly transposed in cases where symptomatology was present. Outcome was assessed with radiograph, range/arc of motion, Visual analogue pain scoring and two functional outcome tools.

**Results:** Study sample consisted of 14 patients, with mean age at presentation of 14.9 years (range 6 to 50 years) with mean time since injury of 7.7 months (range 3 to 24 months). Patients presented with medial elbow pain and prominence, limited range of motion, valgus instability, and ulnar nerve compression. After open reduction and internal fixation, at a mean of three years after surgery (range 1.5 to 5 years), patients reported an improvement in visual analogue pain score from a mean of  $7.29 \pm 1.3$  to  $0.21 \pm 0.4$ , and the difference was statistically significant ( $p=0.001$ ). Mean postoperative Quick DASH (Disability of Arm, Shoulder, and Hand) score was  $5.21 \pm 7.2$ . Mean Mayo Elbow Performance Score was  $96.7 \pm 6.1$ . Improvement in arc of motion was statistically significant ( $p=0.001$ ). Radiographic union was achieved in all patients except one who had fibrous union. Functional elbow range of motion was achieved in 13 out of 14 cases (92.8%) and ulnar nerve recovered in five patients and one patient required tendon transfer.

**Conclusion:** Open reduction and internal fixation of symptomatic medial humeral epicondyle non-union gives excellent clinical and functional outcome in the majority of cases.

© 2017 Elsevier Ltd. All rights reserved.

### Introduction

Fractures of the medial humeral epicondyle are relatively common in children [1]. With conservative treatment non-union rates of displaced medial humeral epicondyle fractures are reported as high as 90%, however most of them remain asymptomatic without any functional deficit [1–4]. Symptomatic non-union of medial humeral epicondylar fracture is a relatively rare entity and complications can sometimes be devastating. The medial epicondyle of the humerus does not usually begin to ossify before the age of four or five years and, hence is not seen on radiograph of young children. In cases where apophysis is not ossified, a diagnosis of these fractures is difficult to make and often missed [5,6] as is the case of a TRASH lesion [7]. Although rare, these fractures can

sometimes be disabling for patients with a painful unstable medial collateral ligament (MCL) deficient elbow [3]. Moreover missed incarceration of the medial epicondyle with ulnar nerve entrapment in the joint can lead to chronic painful stiff elbow with ulnar nerve neuropathy [8]. Satisfactory results were obtained with surgical excision of the epicondylar fragment and suture attachment of the tendons and MCL [3,4], however excision is not a solution for instability [3]. Surgical excision of the medial epicondylar fragment should be avoided and not recommended in many studies [1,9,10].

The aim of this study is to evaluate the clinical and functional outcome of open reduction and internal fixation of symptomatic un-unioned epicondylar fragments.

### Material and methods

A retrospective cohort study was conducted after obtaining approval from our institutional ethics committee. Informed consent was obtained from all the patients.

\* Corresponding author.

E-mail address: [narora8756@gmail.com](mailto:narora8756@gmail.com) (N. Arora).

Inclusion criteria: (1) diagnosis of medial epicondyle non-union; (2) open reduction and internal fixation of symptomatic medial epicondyle non-union; and (3) minimum 1 year of follow-up from the time of surgery. Exclusion criteria: other associated musculoskeletal disorders of the affected limb, multiple medical comorbidities, that would prevent operative intervention.

Data was collected for all the patients who had symptomatic medial epicondyle non-union, operated in our institute between the year 2010 and 2015. There were 14 patients, nine males and five females with a mean age of  $14.9 \pm 10.6$  years (range 6 to 50 years). The mean time since injury was 7.96 months (range 3 to 24 months). Six patients had preoperative ulnar nerve injury, five had incarceration of the epicondylar fragment, three had elbow dislocation, two had elbow joint contracture and one had heterotopic ossification.

All patients had some amount of valgus instability, determined by examination under anaesthesia. All patients were operated with open reduction and internal fixation using a posteromedial approach [11]. A single incision was made anterior to the medial epicondyle. This incision allows exposure to the fracture site as well as the ulnar nerve. The fracture site was visualized and the medial epicondylar fragment located, this was usually displaced anteriorly and distally [11]. If there was an incarceration of the epicondyle into the elbow joint then through gentle extension of the elbow, wrist and fingers with the forearm fully supinated, whilst at the same time abducting the forearm at the elbow, will bring the fragment out [12,13]. The base of the fractured humerus was exposed, and soft-tissue obstructions were carefully dissected away from the fracture bed to allow for an anatomic reduction. The base of the fracture bed was curetted carefully for growth plate remnants to expose cancellous bone. The reciprocal surface on the medial epicondylar fragment was carefully exposed, as well, and any soft tissue that blocked the reduction, was removed [11].

Once the fracture was reduced anatomically by supinating the forearm and flexing the elbow, internal fixation is achieved with the help of either a 4.0 mm cancellous screw for a larger fragment, or by two k wires and a tension band wiring construct, or two k wires and 1'0 vicryl construct, or a 1'0 vicryl alone for a smaller fragment (Figure 1). Augmentation of the flexor origin was done by drilling into humerus and suturing with 1'0 vicryl. The ulnar nerve was decompressed and anteriorly transposed in six patients with preoperative ulnar nerve injury. Medial collateral ligament reconstruction was done in all patients. Securing attachment of the medial complex including anterior band of medial collateral ligament allowing early mobilization and improved outcome. Two of them required Palmaris longus tendon graft as it was difficult to oppose the two ends of MCL. Triceps lengthening was required in seven patients. One patients required capsular release and flexor pronator musculotendinous lengthening. In one patient heterotopic mass excision was done for joint contracture. Intraoperatively before closure the elbow was examined for stability and range of motion.

Post operatively the elbow was immobilized in a posterior above elbow splint for two weeks, then gradual mobilization was started with hinged elbow brace in consultation with a physiotherapist.

Patients were followed up regularly every week in the first month, then monthly for next three month, progressively increasing the range of motion at every visit, then every three monthly for the next one year. Protection of the elbow with avoidance of weight lifting was advised for first three months and strengthening exercise were started thereafter.

Outcome was assessed radiologically by post-operative radiograph, clinically by range of motion, arc of motion and 10-point visual analogue pain scale (VAS). Functionally patients were evaluated with two outcome tools at minimum one year follow up or the latest follow up, one was the patient completed Quick-DASH (Disability of Arm, Shoulder, and Hand) score [14,15] (Q-DASH), and the other was the clinician completed Mayo Elbow Performance

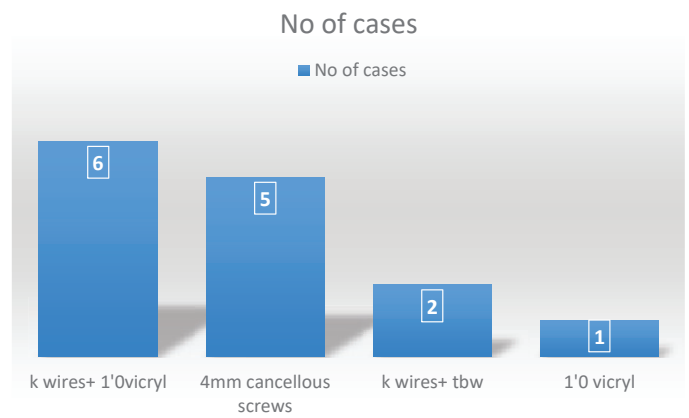


Fig. 1. Different modes of internal fixation used in the procedure with number of patients in each group shown in the box.

Score (MEPS) [14]. Quick-DASH scores range from 0 to 100 with higher scores representing greater disability. The Mayo Elbow Performance Score is an upper extremity functional assessment in which an overall score of 0 to 100 is calculated, with 90 to 100 points graded as excellent, 75 to 89 as good, 60 to 74 as fair, and less than 60 as poor [10].

#### Statistical analysis

Statistical analysis was performed using paired t test to compare the difference between pre-operative and post-operative values of all variables considered.

#### Results

Patients presented with medial elbow pain, prominence, fixed flexion deformity, limited range/arc of motion, stiffness, valgus instability, ulnar nerve compression, joint contracture, elbow dislocation, incarceration of the fragment and heterotopic ossification. At a mean follow up of three years after the surgery (range 1.5 to 5 years), patients reported an improvement in visual analogue pain score from a mean of  $7.29 \pm 1.3$ , preoperatively to  $0.21 \pm 0.4$ , post-operatively, and the difference was statistically significant ( $p < 0.001$ ).

The mean preoperative fixed flexion deformity was  $46.78 \pm 23$  degrees (range 10–90 degrees) which improved to mean of  $11.4 \pm 8.6$  (range 0–20 degrees) postoperatively and the difference was statistically significant ( $p < 0.001$ ). Post operatively, four out of 14 patients did not have any fixed flexion deformity. Maximum fixed flexion deformity was 20 degrees and maximum flexion achieved was 140 degrees post operatively. Only one patient had flexion less than 130 degrees (120 degrees). The mean preoperative arc of motion was  $41 \pm 20$  degrees which improved to a mean of  $120.7 \pm 19.38$  degrees and the difference in the result was statistically significant ( $p < 0.001$ ).

Radiographic union was achieved in all but one patient who had fibrous union; this patient was followed up for a year and had mild pain, mild weakness on lifting heavy weights and medial prominence. This patient did not have any complaints on performing his activities of daily living. On examination moderate amount of instability was present. Three other patients had slight enlargement or irregularity of the medial epicondyle. Visual analogue pain score was zero in rest of the cases. One patient had superficial infection, it was debrided, antibiotic beads were inserted and the infection subsided.

Ulnar nerve recovery was achieved in five patients and one patient required second stage tendon transfer. None of the other patients had any other post-operative complications. All patients

Download English Version:

<https://daneshyari.com/en/article/5652857>

Download Persian Version:

<https://daneshyari.com/article/5652857>

[Daneshyari.com](https://daneshyari.com)