

Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.elsevier.com/locate/apme

Review Article

Internal fixation of fractures of the capitellum and trochlea – Retrospective analysis of 26 cases



Yatinder Kharbanda^a, Mrinal Sharma^{b,*}, Anand Vadhera^c,
Vivek Srivastava^d

^a Senior Consultant Orthopaedics, Indraprastha Apollo Hospital, New Delhi, India

^b Consultant Orthopaedic Surgeon, Indraprastha Apollo Hospital, New Delhi, India

^c Clinical Associate, Indraprastha Apollo Hospital, New Delhi, India

^d DNB Orthopaedics Student, Indraprastha Apollo Hospital, New Delhi, India

ARTICLE INFO

Article history:

Received 1 October 2012

Accepted 17 May 2013

Available online 14 June 2013

Keywords:

Internal fixation

Capitellum

Trochlea

Herbert screw

ABSTRACT

Introduction: Fractures of capitellum and trochlea account for 0.5–1% of elbow fractures and 6% of distal humerus fractures. These usually occur due to axial loading of the distal humerus by forces transmitted across the joint producing a coronal shear fracture of the capitellum or the trochlea. Internal fixation is the best modality to restore articular congruity in these fractures.

Material and methods: Twenty-six cases of fresh trauma operated for capitellum ($n = 22$), trochlea ($n = 2$) or capitello-trochlear ($n = 2$) fractures using Herbert screws between 2005 and 2011 were evaluated retrospectively. Patients between age group of 19 and 58 years were followed up for mean 3.6 years (1.8–7 years). Fractures were classified according to the classification of Bryan and Morrey. Patients were evaluated using the Mayo elbow performance score.

Results: The mean time to union was 5 weeks (4–7 weeks). Patients were followed for mean 3.7 years (1.8–7 years). No patient was lost to follow-up. Mean extension was 50 (range 00–150) and mean flexion was 132 degree (range 1200–1400). Excellent results were seen in 18, good in 6, satisfactory in 1 and poor in 1 case. None of the patients showed evidence of avascular necrosis.

Discussion: Anatomic reduction, stable internal fixation and early post-operative mobilisation leads to best results. Headless compression screws with differential pitch afford rigid stability and compression at the fracture site. It can be sunk into the bone and does not need removal later.

Copyright © 2013, Indraprastha Medical Corporation Ltd. All rights reserved.

1. Introduction

Coronal shear fractures of the articular surface of distal humerus namely the capitellum and the trochlea are a challenge to the orthopaedic surgeon as restoration of articulate congruity is the primary aim of internal fixation. Intra-articular fractures of

distal humerus have a well deserved reputation of being difficult to manage with a poor prognosis.¹ These fractures account for 0.5–1% of elbow fractures and 6% of distal humerus fractures. Internal fixation is the best modality to restore articular congruity in these fractures.^{2,3} These usually occur due to axial loading of the distal humerus by forces transmitted across the

* Corresponding author.

E-mail address: dr.mrinalsharma@gmail.com (M. Sharma).

0976-0016/\$ – see front matter Copyright © 2013, Indraprastha Medical Corporation Ltd. All rights reserved.

<http://dx.doi.org/10.1016/j.apme.2013.05.015>

joint producing a coronal shear fracture of the capitellum or the trochlea.⁴ Herbert screw fixation provides stable fixation and compression at the fracture site, least damage to the cartilage and there is no need for implant removal.^{5,6}

We retrospectively analysed 22 cases of capitellum, trochlea (2) and capitulo-trochlear fractures (2) treated by open reduction and internal fixation using Herbert screws and K-wires in the past 7 years.

2. Material and methods

Twenty-six cases of fresh trauma operated for capitellum ($n = 22$), trochlea ($n = 2$) or capitulo-trochlear ($n = 2$) fractures using Herbert screws between 2005 and 2011 were evaluated retrospectively. Patients between age group of 19 and 58 years were followed up for mean 3.6 years (1.8–7 years). Fourteen of them were males and 12 were females. Sixteen of them had a fall on the outstretched hand. Others could not recollect the mechanism of injury. All the injuries were closed and there was no associated injury in other bones except for one case with ipsilateral olecranon fracture. Antero–posterior (AP) and lateral views of the elbow were taken and fractures were classified according to the classification of Bryan and Morrey.⁷ Computed tomography (CT) was done in cases where the fracture pattern was not clearly defined on radiographs.

All cases were operated under single tourniquet time. The mean time of surgery was 42 min (36–55 min). The fracture was exposed using Kaplan's approach (between extensor carpi radialis longus and brevis) to the elbow for capitellar and capitulo-trochlear fractures. Fracture fragments were defined and reduced. Provisional fixation was done using K-wires. Drilling was done over the guide wires and Herbert screws of measured sizes were placed to achieve inter-fragmentary compression. Mini-fragment screws and K-wires were used to stabilise small fragments in complex patterns. Trochlear fractures were exposed from the medial side and fixed with headless compression screws directed from posterior to anterior (preferred) or anterior to posterior. We preferred to pass two Herbert screws in each fragment to provide rigid rotational stability. Ligamentous avulsion of the epicondyles were stabilised using K-wires. Wound closure was done in layers.

Post-operatively elbow was immobilised in a slab at 90° of elbow flexion for 7 days. Passive range of motion exercises was started after one week when pain and swelling settled. Active assisted exercises were started at 3 weeks. Patients were recalled for clinical evaluation and X-rays at 2 weeks, 1 month, 3 month and 6 monthly thereafter. Patients were evaluated for pain, range of motion, stability and activities of daily living using the Mayo elbow performance score. Radiographs were evaluated for union, heterotrophic ossification, avascular necrosis and osteoarthritis.

3. Results

Fractures were classified as Bryan and Morrey type 1 ($n = 22$), type 2 ($n = 2$) and type 4 ($n = 4$). All fractures showed union. There was no intra-operative or immediate post-operative complications. The mean time to union was 5 weeks

(4–7 weeks). Even fragments devoid of soft tissues united. Patients were followed for mean 3.7 years (1.8–7 years). No patient was lost to follow-up. Patients were evaluated using Mayo elbow performance score (90 points).⁸ Mean extension was 5° (range 0°–15°) and mean flexion was 132° (range 120°–140°). Excellent results were seen in 18, good in 6, satisfactory in 1 and poor in 1 case. None of the patients showed evidence of avascular necrosis. One patient had elbow stiffness and poor result for which an arthrolysis was performed. None of the patients had an intra-articular screw. K-wire migration and soft tissue irritation was seen in two patients. This was managed with K-wire removal. Heterotrophic ossification was seen in one case with resultant restriction of motion. Excision of new bone was performed after complete maturation at one year. Arthrosis and elbow instability was not seen in any of our cases.

3.1. Illustrative case reports

3.1.1. Case 1

A 28-year male injured his left elbow after a slip on the floor. His CT scan 3d reconstructed images showed a fracture of the capitulo-trochlear fragment (Fig. 1a–c). Fixation was done using a headless compression screw from the lateral side and a K-wire from the medial side. Post-operative radiographs at 2.5-year follow-up (Fig. 1d,e). Full supination and pronation achieved with 15° extension lag at the elbow (Fig. 1f–h).

3.1.2. Case 2

A 32-year male injured his right elbow and sustained a fracture of capitellum, lateral epicondyle and part of trochlea (Fig. 2a,b). Intraoperative picture showing the capitellum fracture and provisional fixation with K-wires (Fig. 2c). Post-operative follow-up radiographs at 2-year follow-up showing complete union (Fig. 2d,e).

4. Discussion

Coronal shear fractures of distal humerus are sometimes missed on routine radiographs. Radiographs of type IV fractures may show a double arc sign (case 1) which is pathognomonic of a trochlea and capitellum fracture.⁴ But this sign may not be visible in all cases due to rotation of the fragments.⁶ CT scans with 3D reconstructions clearly defines the fracture pattern.⁹ Neglected or untreated fractures lead to adhesions, limitation of motion and early arthrosis.^{10,11} Closed reduction of these fractures results in stiffness and resultant loss of motion.^{11,12} Excision of fragments leads to adhesions on the raw area and elbow instability, valgus deformity at the elbow and ulnar neuritis at a later date.^{5,6,10}

Anatomic reduction, stable internal fixation and early post-operative mobilisation lead to best results.^{5,13–15} Fixation with K-wires although provides stability but does not provide compression at the fracture site. K-wires also need removal at a later date. AO compression screw head irritates the cartilage of the radial head leading to radio-humeral arthrosis.⁵ Headless compression screws with differential pitch afford rigid stability and compression at the fracture site. It is sunk into the bone, does not need removal and can be used

Download English Version:

<https://daneshyari.com/en/article/3234992>

Download Persian Version:

<https://daneshyari.com/article/3234992>

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