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RESEARCH ARTICLE

EVALUATION OF FUNCTIONAL OUTCOME AFTER DUAL PLATING IN DISTAL HUMERUS FRACTURE WITH INTERCONDYLAR EXTENSION

Deepak Aher, *Yash Agarwal, Rahul Verma and Sanjiv Gaur

Gandhi Medical College, Bhopal, India

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ABSTRACT

Aim: This study was conducted to evaluate the functional outcome of dual plating in distal humerus fracture with intercondylar extension.
Material and Methods: 20 patients of age between 30 to 70 years with fracture of distal humerus with intraarticular extension were enrolled for the study of dual plating using olecranon osteotomy approach in out tertiary center from January 2016 to January 2018 of which 18 were males and 2 females.
Results: The mean union time was 10 weeks. The arc of flexion was 110 degrees. Average Mayo elbow performance score (MEPS) was 84. There were 2 cases of infection.
Conclusion: In distal humerus fractures with intercondylar extension, with dual plating, a good reduction can be achieved which leads to good union, which helps in early mobilization and restoring elbow functions with early intensive physiotherapy.

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INTRODUCTION

The fractures of Distal Humerus are relatively uncommon and comprise approximately 2-6 % of all the fractures (Sanjeev Kumar *et al.,* 2015; Joshua Abzug and Phani Dantuluri). They are one of the most difficult of all fractures to manage since the original description by Desault in 1811 (Watson, 1993). In fractures of distal humerus, the goal of the treatment is to re-establish the articular congruity and alignment and begin active motion as soon as possible. In most cases, open reduction with rigid internal fixation is preferred. In fractures with intra-articular comminution anatomical restoration of the articular surface becomes difficult with just simple reduction and require more stable fixation (Brown). For the Complex fractures of the distal humerus, single column plating system is not preferred, which are proven to be less stable to loads compared to double column plating methods. fixation with double plating is currently recommended, based on clinical and biomechanical studies. The purpose of this study was to study the functional outcome after ORIF of distal humerus fractures using bicolumnar plating. Our hypothesis was that multiple points and planes of fixation into the short distal segments will optimally maintain alignment to facilitate union and aggressive rehabilitation.

Corresponding author: **Yash Agarwal,**
Gandhi Medical College, Bhopal, India.
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MATERIAL AND METHODS

This prospective study consisted of 20 patients with 18 males and 2 females, in our tertiary centre from January 2016 to January 2018. Most cases were due to road traffic accidents. All the patients were initially evaluated for the injuries and then all were operated with dual plating in distal humerus with transolecranon approach (Fig. 1, 2)

Inclusion Criteria

- Closed distal humerus fractures
- Age group of 30-70 yrs

Exclusion Criteria

- Compound fractures
- Age of patients below 20 yrs and above 70 yrs are excluded
- Other gross co-morbidities deferring surgery

The patients were followed up at 1 month, 2 months, 6 months and 1 year duration. Functional assessment was done by Mayo Elbow Performance Score at the final follow up. The Overall clinical outcome was graded as follows.

Excellent : >90
Good (satisfactory) : 75-89
Fair : 60-74
Poor : <60

RESULTS

Out of the 20 patients, 18 were males and 2 females. The age group was from 30 years to 70 years with mean age of 45 years. Most patients were in the age group of 40 to 50 years. There was a male predominance in the subjects of study with 90% being males and compared to females which were 10 % of the sample size. Most patients who presented had fractured their left humerus, with the left to right ratio being 2:1. Road traffic accidents were the major mode of injury sustained by our patients (80 %) with respect to fall and assault. Fracture union was assessed radiologically. Radiological union was assessed with callus formation on 3 cortices in two views. Most upper limb fracture repair completely in 8 to 12 weeks. The mean union time for was 10 weeks. There were no cases of non union. In orthogonal plating group one patient had flexion upto 0-40°, one had 0-90°, three had 0-110° and rest were more than 0-110°. The mean range of motion after dual plating was 110 degrees (Fig 3,4). According to Mayo Elbow Performance Score, the functional outcome was excellent in 10 cases, good in 6 cases, fair in 2 and poor in 2 cases.

Figure 1. Preoperative X-Ray

Figure 2. Postoperative X-Ray

Figure 3 and 4. 6. Months postoperative range of motion

DISCUSSION

Though the transolecranon approach creates an additional intra-articular fracture, this approach also facilitates identification of and protection of the ulnar nerve. There are two ways of dual plating in distal humerus fractures, one by parallel and other by orthogonal plating. Schemitsch et al found that parallel plating with medial recon plate and a lateral J plate had the greatest construct rigidity compared to orthogonal plating (Schemitsch *et al.,* 1992). Self et al in their study found that parallel plating trended towards having greater rigidity and load to failure than orthogonal plating (Self *et al.,* 1995). Sanchez-Sotelo reported that parallel plating had increased structural stability compared to orthogonal plating (Sanchez-Sotelo *et al.,* 2007). Our study also had similar results with no instability and good functional outcome. Excellent results were found in 12 cases (60%); Good results in 4 cases (20%), and sum of excellent to good results of 16 cases (80%). Results achieved in our study were superior than those by G. K. Aitken and Rora Beck (Aitken Rora Beck, 1986) and slightly inferior than Jupiter and Peter Holzackseries (Jupiter *et al.,* 1985). G. K. Aitken and Rora Beck treated 29 adult patients of which 17 cases were treated by open reduction and internal fixation. In our study, There was only one case of infection out of total 20 patients. In study done by Sanchez-Sotelo, 2007 there were two cases of infection in a series of 34 patients (Sanchez-Sotelo *et al.,* 2007). In their study of 23 patients, Gofton *et al* in 2003 reported two cases of infection

(Gofton *et al.,* 2003). In our study the mean union time was 10 weeks. In their study, Kulkarni *et al*. reported the mean union time of 3.25 months (Vidisha *et al.,* 2016). Functional outcome was excellent in 12 cases, good in 4 cases, fair in 2 and poor in 2 cases. The average Mayo Elbow Performance Score was 84 which was good to excellent. According to Gofton *et al*., the average mayo elbow performance score was 93 in the group of patients (n= 23) treated with orthogonal plating technique (Gofton *et al,* 2003).

Conclusion

Anatomical reduction of the articular surface, rigid and stable internal fixation of the distal humerus medial and lateral pillars and accurate reconstruction of the trochlea and capitellum are of prime importance in achieving an excellent functional outcome in distal humerus fractures. ORIF surgery with dual plating is the method of choice for treatment of distal humeral fractures with intercondylar extension .functional outcome is greatly affected by Physiotherapy .Since the sample sizein this study is small, our results have to be confirmed with large clinical trials.

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