INTERNATIONAL JOURNAL OF CURRENT ADVANCED RESEARCH
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 11; Issue 10(A); October 2022; Page No. 1571-1573
DOI: http://dx.doi.org/10.24327/ijcar.2022.1573.0350

Research Article

A PROSPECTIVE STUDY OF FUNCTIONAL OUTCOME OF INTRA-ARTICULAR FRACTURES OF DISTAL HUMERUS TREATED WITH LOCKING COMPRESSION PLATE

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A R T I C L E I N F O

Article History:

Received 10th September, 2022
Received in revised form 25th September, 2022
Accepted 15th October, 2022
Published online 28th October, 2022

Key words:

Mayo Elbow Performance Score (MEPS); Locking Compression Plates (LCP); Distal Humerus Fractures.

A B S T R A C T

BACKGROUND: Distal humerus fractures constitutes approx 30% of all the elbow fractures and are the most challenging fractures for orthopaedicians to manage. These fractures are distributed in a bi-modal fashion with the first peak being seen in the young population resulting from high-energy trauma and the second peak being seen in the elderly osteoporotic population. The purpose of this study is to evaluate the functional outcome of intra-articular fractures of distal humerus treated with locking compression plate. **METHODS:** This prospective study included 30 patients who underwent open reduction internal fixation for intra-articular fracture of distal humerus using locking compression plate and have given written, informed consent. Sample size was calculated using post-hoc analysis and patients were enrolled with 80% power and 95% significance. Functional outcome assessment was done using Mayo Elbow Performance Score. **RESULTS:** In our study mean Mayo Elbow Performance Score was 79 ($p<0.05$). Out of total patients 30% patients showed excellent results and 46.7% patients showed good results. **CONCLUSIONS:** No case of implant failure or non-union was reported in our study. We conclude that distal humerus locking compression plate is a versatile implant providing strong fixation,thus providing early rehabilitation.

INTRODUCTION

Distal humerus fractures constitutes approx 2% of all fractures in the adult population. A distal humerus fracture is a break in the continuity of lower end of the upper arm bone (humerus), one of the three bones that come together to form the elbow joint. Majority of the distal humerus fractures (96%) have a complex pattern involving both the columns and the articular surface AO type B and C injuries (McCarty L.P. *et al*, 2005). Commonly these fractures occur in osteoporotic bones, are multifragmented and have complex anatomy with confined options for internal fixation. Historically distal humerus fractures had gained a reputation for universally poor outcomes regardless of any treatment modality. Indeed it took many years to reach a consensus as to whether these injuries warranted surgery in favour of the non-surgical conservative "bag of bones" technique (Eastwood WJ, 1937). Many papers have been looking at the prerequisites for successful fixation of these fractures.

Despite advance in implants and operative techniques these fractures continues to present challenges as joint function is often compromised because of pain, stiffness and weakness.

The purpose of this study is to evaluate the functional outcome of intra-articular fractures of distal humerus treated with locking compression plates with Olecranon osteotomy approach using Mayo elbow performance score.

MATERIALS AND METHODS

STUDY TYPE

Our study was a prospective, observational study done in the Department of Orthopaedics and Traumatology at K. B. Bhabha Municipal General Hospital, Bandra(Mumbai) during the period of June 2019 to May 2020, with follow up at 3rd, 6th, 12th week and at 6 month.

INCLUSION CRITERIA

- Patients who have been diagnosed as having AO type 13 C1, 13 C2, 13 C3 fracture.
- Patients of age group >18 years of age.
- Patients who are medically fit for surgery.
- Fractures of distal humerus less than 1 month old.

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- Patients willing to participate in study and available for follow-up.

EXCLUSION CRITERIA

- Patients who have been diagnosed as having AO type 13 A, 13 B fractures.
- Patients who are ≤ 18 years of age.
- Patients who are unfit or not given written consent for surgery.

METHODOLOGY

Data collected was transferred in master chart which was subjected to statistical analysis. All the patients were enrolled with 80% power and 95% significance. Sample size was calculated using post-hoc analysis. Study included consecutive consented 30 patients in12months. Final assessment was done on the basis of Mayo Elbow Performance Score rating.

LCP Distal Humerus Plates have the following features (Greiner S *et al*, 2008)**:**

- 50° of longitudinal screw angulation
- 14° of transverse screw angulation
- Uniform hole spacing
- Load (compression) and neutral screw positions

The LCP has combination locking and compression holes (Combi holes). The Combi holes allow placement of standard cortex and cancellous bone screws on one side or threaded conical locking screws on the opposite side of each hole.

a) Threaded hole section for locking screws,
b) Dynamic Compression unit hole section for standard screws,
c) Locking screws in threaded side of plate holes,
d) Cortex screw in compression side of plate holes.

PREOPERATIVE PREPARATION

Eligible patients underwent all mandatory check-ups & pre-anesthetic fitness. Radiological examination was done properly with X ray elbow anteroposterior & lateral view, if required 3D- CT Scan of elbow also done for pre-operative planning.

SURGICAL INTERVENTION

- Brachial block and/or general anaesthesia was used.
- In lateral decubitus position with arm supported and forearm hanging freely. Pneumatic tourniquet used and time noted down.
- Olecranon osteotomy approach to elbow joint was utilized.

OLECRANON OSTEOTOMY APPROACH

It provides excellent exposure of distal humerus articular surface and is ideal for type C fractures (Jupiter JB *et al*, 1985). A mid-line straight incision is taken over elbow joint beginning 5 cm. Distal and 8 cm. Proximal to the tip of olecranon. After superficial dissection, ulnar nerve identified and protected. A V- shaped apex distal chevron osteotomy is performed through the bare area (area 2 cm. distal from the tip of olecranon lying between olecranon articular facet and coronoid articular facet) using bone saw. Osteotomized olecranon along with attached triceps is then reflected proximally giving nice exposure to the articular surface (Coles CP *et al*, 2006 and Jupiter JB *et al*, 1985).

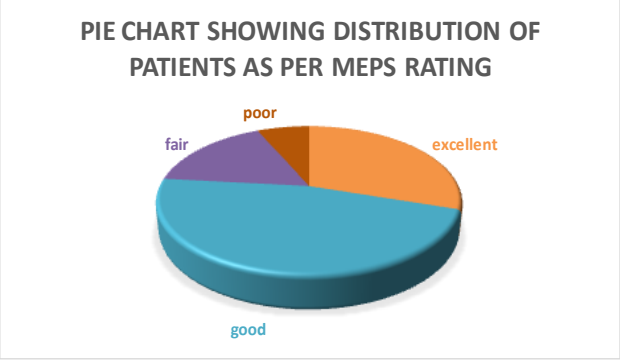
Objective assessment was done using **Mayo Elbow Performance Score (MEPS)** with following criterion (Morrey BF *et al*, 2000) -

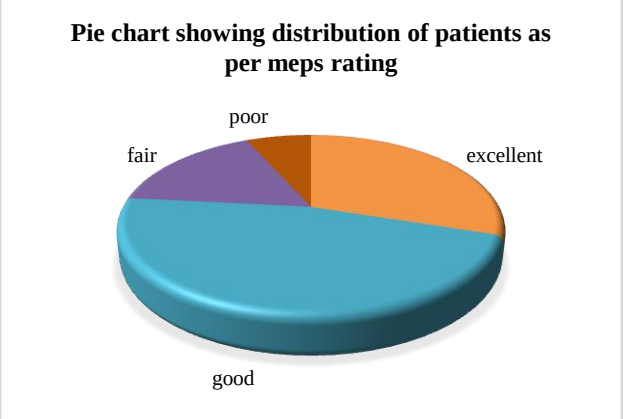
- Excellent: 90 points or more
- Good: 75-89 points
- Fair: 60-74 points
- Poor: <60 points

RESULTS AND DISCUSSION

Mean age of patients in our study was 43.4 years (range 21 to 65years), lower mean age in our study was as many elderly patients were not fit for surgery due to the presence of co-morbidities. We found Male: Female ratio of 3:2 which depicts a male predominance in our study. This can be attributed to the fact that in Indian subcontinent, male population more exposed to high velocity trauma & motor vehicle accidents and they also indulge in sports activities more as compared to female population. In our study the average time to fracture union was 12.7 weeks (10-18 weeks).

Chart: Showing Distribution of Patients as Per Meps Rating





Mean outcome MEPS in our study was 79 (statistical significance of $p<0.05$). Out of total, 9 (30%) patients showed excellent result, 14 (46.7%)showed good results, while 5(16.7%) patients showed fair and 2 (6.7%) patients showed poor outcome. The average MEPS decreases as the age of the patient increases. Also the

average MEPS tend to fall as the complexity and degree of comminution in a fracture increases. Greiner *et al*, 2008 evaluated 14 patients of distal humerus fractures and reported mean MEPS of 91±11.7 points. In a prospective study of 40 consecutive patients, who underwent fixation of intra-articular fractures of distal humerus using distal humerus locking plates, Gupta RK *et al*, 2013 reported mean MEPS of 82.5. 'Good' and 'Excellent' results were observed in 33 patients.

There was no case of screw cut out, implant migration or non-union in this study which reflects that locking plates provide strong fixation and also it has no adverse effect on triceps muscle strength (extensor mechanism) thus permitting early initiation of elbow motion.

CONCLUSION

In our study it was found that an anatomically pre-contoured LCP stand out as 'best approach' to deal with distal humerus fractures as it allows greater stability and strong fixation that results in early mobilisation.

CONFLICTS OF INTEREST – None

References

1. Coles CP, Barei DP, Sean E, Nork SE, Taitsman LA, Hanel DP. The Olecranon Osteotomy: A six year experience in the treatment of intraarticular fractures of the distal humerus. *J Orthop Trauma*, 2006; 20:164-71.
2. Eastwood WJ. The T shaped fracture of the lower end of humerus. *J Bone Joint Surg Am* 1937; 19:364-369.
3. Greiner S, Haas N P, Bail H J. Outcome after open reduction and angular stable internal fixation for supra-intercondylar fractures of the distal humerus: preliminary results with the LCP distal humerus system. Aechives of Orthopaedic and Trauma Surgery. 2008; 128(7):723-729.
4. Gupta RK, Gupta V, Marak DR. Locking plates in distal humerus fractures: study of 43 patients. Chinese Journal of Traumatology 2013;16(4):207-211
5. Jupiter JB, Neff U, Holzach P, Allgower M. Intercondylar fractures of the humerus. An operative approach. *J Bone Joint Surg* 1985; 67:226-239.
6. Nadim Aslam, Keith Willet. Functional outcome following internal fixation of intraarticular fractures of the distal humerus (AO type C), Acta Orthop. Belg 2004; 70:118-122.
7. McCarty L.P., Ring D., Jupiter J.B. Management of distal humerus fractures. *Am J Orthop*. 2005; 34:430-438.
8. Morrey BF, AN KN, Chao EY. Functional evaluation of elbow. In: Lampert R, ED. The elbow and its disorders. 3rd ed. Philadelphia: WB Saunders, 2000:74-83
9. Robinson CM, Hill RM, Jacobs N, *et al*. Adult distal humeral metaphyseal fractures: epidemiology and results of treatment. *J Orthop Trauma* 2003; 17(1):38-47.

How to cite this article:

Ankit Jain *et al* (2022)' A Prospective Study of Functional Outcome of Intra-Articular Fractures of Distal Humerus Treated With Locking Compression Plate ', International Journal of Current Advanced Research, 11(10), pp. 1571-1573. DOI: http://dx.doi.org/10.24327/ijcar.2022.1573.0350