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Original research article

A study on functional outcome of surgical management of fractures of distal end of humerus in adults by plate osteosynthesis

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Abstract

Aim: To study the result of surgical management of distal humerus fractures using distal humerus plates.

Methodology: This is a prospective study done in the Department of Orthopaedics, Guntur Medical college, Guntur for a period of 2 years i.e., from May 2018 to April 2020. Sample of study was12 patients.

Results: In the present study, mean age was 37 years. Majority of the patients (33) belonged to the age group of 17-33 years. 50% of the patients were above 44 years of age. Equal number of male and female patients. 5 patients have Rt side and 7 patients had Lf side involvement. e) 8 patients had RTA and 4 patients had self-fall. Fracture union seen in 10 (83%) patients by 12 weeks, 2 patients (17%) had nonunion due to complications. 1 patient (8.3%) reported elbow stiffness and 1 patient (8.3%) reported infection after 24 weeks of ORIF. The infection was superficial.

Conclusion: We conclude as per AO principles that early operative intervention with distal humerus bicolumnar plating for distal humerus fracture results in good functional outcome.

Keywords: Distal humerus, surgical management, RTA, ORIF

Introduction

Fractures of distal end of humerus are uncommon in adults. They account for about 2%-6% of all fractures and for about 30% of all elbow fractures [1].

Stable fracture fixation and anatomical restoration of joint are the prerequisites for early mobility. This is often difficult to achieve because of complex joint anatomy, significant forces across the elbow, diminished mineral quality of the bone. As a result, complication rates around 35% and poor results in around 15% patients are seen. Non-operative treatment usually results in poor functional outcome of the elbow joint including poor range of movements. Over the past two decades, Open reduction and internal fixation has become popular to achieve maximum anatomical restoration of the articular surfaces and facilitate early mobilization of the joints [3-6].

An ideal implant should be able to maintain stability under physiological loads and it's interface with bone should be able to bear stress, application should be simple and possible to contour or mould the device according to the anatomical variations of the distal humerus.

Double-plate osteosynthesis is the treatment of choice of many surgeons. Until recently, two main plate localizations have normally been used, applying the radial plate dorsally and the ulnar plate medially. These positions have proved to be clinically feasible and biomechanically adequate for fixation [8-9].

Hence, this research work was done with the aim to bridge the treatment gap of this rare fracture. An attempt is made in this study to evaluate the results of surgical management of fractures of distal end of humerus using distal humoral locking plates by parallel plating technique.

Aims and Objectives

Aim

To study the result of surgical management of distal humerus fractures using distal humerus plates.

Objectives

1. To evaluate fracture reduction and stable fixation using distal humerus locking plates.
2. To assess the post-operative maintenance of reduction.
3. To monitor the range of movements of elbow joint.

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Materials and Methods

Study design

This is a prospective study done in the Department of Orthopaedics, Guntur Medical college, Guntur for a period of 2 years i.e., from May 2018 to April 2020. Sample of study was 12 patients.

Criteria for selection

Inclusion criteria

1. Patients with age 18-65 years.
2. All patients giving consent for surgery.
3. Those having closed fracture of distal humerus.
4. Open fractures with Gustilo Anderson classification type 1 and 2.

Exclusion criteria

1. Comorbid-Unfit for surgery.
2. Open fractures with Gustilo Anderson classification type 3.

Method: Patient was in Lateral position, in Posterior approach, Olecronon Osteotomy, reduction of Fracture and internal fixation with pre-contoured parallel plates was done in our study. They were followed up post operatively for 12 weeks, the outcome was evaluated with the mayo elbow performance score and the dash score.

Observation and Results

Table 1: Results of the Study

Results	Frequency	Percent
Excellent	7	58.3
Fair	1	8.3
Good	3	25.0
Poor	1	8.3
Total	12	100.0

Table 2: Stability of the elbow

Stability	Frequency	Percent
Stable	10	83.3
Unstable	2	16.7
Total	12	100.0

Table 3: Pain score

	Minimum	Maximum	Mean	Std. Deviation
DASH score - 0 weeks	76	98	85.00	6.796
DASH score - 24 weeks	14	65	24.50	15.900

Table 4: Range of motion of elbow

ROM	Frequency	Percent
<50	1	8.3
50-100	2	16.7
>100	9	75.0
Total	12	100.0

Table 5: Fracture union

Fracture union	Frequency	Percent
Absent	2	16.7
Present	10	83.3
Total	12	100.0

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Table 6: Complications

Complications	Frequency	Percent
Elbow stiffness	1	8.3
Infection	1	8.3
Nil	10	83.3
Total	12	100.0

Results & Discussion

The fractures of distal humerus are complex. They affect the functional movement of the elbow. Functional elbow is essential for an individual's social and economic well-being.

Early surgical intervention to obtain anatomical reduction and stable fixation is the treatment of choice. Physiotherapy has to be initiated once the pain reduces.

In the present study,

a) Mean age was 37 years.
b) Majority of the patients (33) belonged to the age group of 17-33 years.
c) 50% of the patients were above 44 years of age.
d) Equal number of male and female patients.
e) 5 patients have Rt side and 7 patients had Lf side involvement.
f) 8 patients had RTA and 4patients had self-fall.
g) Fracture union seen in 10 (83%) patients by 12 weeks, 2 patients (17%) had non-union due to complications.
h) 1 patient (8.3%) reported elbow stiffness and 1 patient (8.3%) reported infection after 24 weeks of ORIF. The infection was superficial.

Functional evaluation

The results were graded excellent in 7 (58%), good in 3(25%), fair in 1(8%) and poor in 1(8%) patients. Fracture union occurred in 83% patients by the end of 12 weeks. A few patients showed nonunion (17%). After a follow up period of 12 weeks, only 1 patient had ROM less than 50 degrees. Rest of the patients had greater than 50 degrees movement range with 75% patients having range of movement more than 100 degrees. 83% patients had stable elbow joint after 24 weeks. After 2 weeks of surgery, 9 patients (75%) had mild pain, 16% had moderate pain and 8% patients had severe pain. The mean MEPS score of the sample was 83.67. The mean DASH score at presentation was 85 with a standard deviation of 6.8. After 12 weeks of ORIF with LCP, the mean DASH score was found to be 24.5 with a standard deviation of 15.9 in our study. On comparing MEPS score with DASH score, it was found that the two were inversely related and the result was statistically significant. Hence, the performance of elbow improves and disability reduces after ORIF [9-18].

Conclusion

Distal humerus fractures are complex fractures representing 2% of all fractures.

These fractures require good preoperative evaluation and planning for good functional outcome.

Early surgical intervention with bicolumnar pre-countoured distal humerus plates provides anatomical reduction and stable fixation in these fractures.

It facilitates early mobilization and prevents complications.

In our study, we treated 12 patients of distal humerus fracture with open reduction and internal fixation with pre-contoured distal humerus plates and functional outcome was good to excellent in majority of the patients.

We conclude as per AO principles that early operative intervention with distal humerus bicolumnar plating for distal humerus fracture results in good functional outcome.

Limitations: The study was carried out for a short duration with a small sample size.

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