



Orthopaedics

A STUDY ON EVALUATION OF RESULTS OF SURGICAL MANAGEMENT OF FRACTURES OF DISTAL END HUMERUS USING DISTAL HUMERUS PLATES IN A TERTIARY CARE HOSPITAL, HYDERABAD, INDIA.

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ABSTRACT

Background & objectives: The management of distal humerus is complicated by the complex 3-dimensional anatomy of the elbow, the limited bone stock for internal fixation and often comminuted and osteopenic nature of the articular segment. Distal humerus locking plates provides higher stability by permitting multiple screws in distal fragment there by addressing some of the limitation of conventional plates. Objectives of the studies are to assess and score functional outcome based on Mayo elbow performance score for functional outcome and to study functional outcome of treatment in terms of achieving radiological union and elbow range of movement of distal humerus fracture managed by distal humerus plating. **Methods:** A prospective study on 30 cases of distal humerus fractures in the age group of 18 to 65 years from November 2020 to November 2022 managed with distal humerus plates. Results were evaluated based on time of fracture union, range of movement and functional outcome by Mayo elbow performance score. **Interpretation and Conclusion:** Out of 30 patients, 28 patients had fracture union by 24 weeks. Functional outcomes were excellent in 18 patients (60%), good in 7 patients (23.33%), fair in 3(10%) and poor in 2 cases. As per AO principles that early operative intervention with distal humerus bicolunar plating for these fracture will result in good functional outcome.

KEYWORDS : Distal humerus fracture, Distal humerus plate**Introduction:**

Adult distal humerus fractures are comparatively rare. They account for 2 to 6 % of all fractures and 30 percent of elbow fractures^[1]. 61% of these fractures involve articular surface. The injuries present in a bimodal distribution: an early peak in young males associated with high energy trauma and a late peak in elderly women with osteoporotic bone^[2,3,4]

Numerous research on fractures of the metaphyseal area, with or without joint involvement, demonstrate that the best outcomes come from early physical treatment. Articular fragment reduction ,re-establishment of the joint axis and early motion are key tenets to restore the function. Many different surgical approaches have been described, including olecranon osteotomy, triceps reflecting anconeus flap, Bryan Morrey(Mayo), paratricipital, triceps splitting and triceps flexor carpi ulnaris.^[5,6,7]

Traditional non-operative treatment has a poor functional outcome and severely restricts elbow motion^[8]. However, during the past 20 years, surgical reduction and internal fixation has gained popularity as a way to restore the articular surface to its natural state and promote early mobilization. The specifications for the perfect implant are clear. Under physiological pressures, it should offer sufficient stability, and the bone-implant interface shouldn't change under cyclic stress.

Up until now, the radial plate has typically been applied dorsally, and the ulnar plate has typically been applied medially. These placements have been considered a clinically viable and biomechanically suitable fixing approach. Future stability is required in metaphyseal comminution situations, nevertheless, to avoid further issues. Additionally, the alternatives for screw placement are quite restricted in "low fractures" and osteoporotic bone, making solid anchorage of each screw essential.

In this study, an effort has been made to assess the outcomes of surgically treating distal end humerus fractures with distal humerus plates. Patients between the ages of 18 and 65 with distal humerus fractures who were hospitalized to and treated in Osmania general hospital, Hyderabad were chosen for this procedure.

Materials and methods:

This was a prospective study conducted in Osmania General Hospital, Hyderabad from November 2020 to November 2022 among 30 patients.

Inclusion criteria:

- Age 18-65 years.
- Closed distal humerus fractures.

- Open fractures with Gustilo Anderson classification type 1 and 2

Exclusion criteria:

- Open fractures with Gustilo Anderson classification type 3
- Distal humerus fracture with other injuries around the elbow including fracture of ulna ,radius and elbow dislocation

After pre-anaesthetic check-up and valid written informed consent, patients included were managed at the earliest with open reduction and internal fixation (ORIF) with distal humerus plates. A standard posterior lateral para-midline incision is made avoiding the tip of the olecranon. Full-thickness skin flaps are elevated. The ulnar nerve is identified, mobilized, and protected throughout the case. The triceps flap is distally based and measures approximately 10 cm in length and 2-3 cm wide. The flap is then elevated off the underlying muscle. The underlying triceps muscle is split longitudinally in the midline with electrocautery and retracted to both sides revealing the distal humeral shaft. Continued elevation of the triceps muscle and intermuscular septum will adequately expose the lateral and medial column^[9,10]. Threaded Kirschner wires are used as joysticks for manipulating the medial and lateral condyles. Plates are placed over the medial and lateral column and reduced the condyles to the shaft^[11]. Postoperatively patients were followed up for 6 months and the outcome was assessed by Mayo elbow performance score.^[12]

Results:

Of the 30 cases, 18 were males (60%) and majority cases sustained left-sided injury (53.33%, n=16). Mean age was 36.8 years. 13 patients sustained injury from fall and 17 were involved in RTA. Patients were followed up for 24 weeks. 28 patients out of 30 had fracture union by 24 weeks. 23 patients had range of motion (ROM) above 100 degree, 4 patients with ROM between 50 to 100 degree and 3 patients had less than 30 degree ROM. We had excellent functional results in 18 patients (60%) [Figure-1& 2], good in 7 patients (23.33%) ,fair in 3 patients (3%) and 2 had poor result (6.67%) [Table-2].

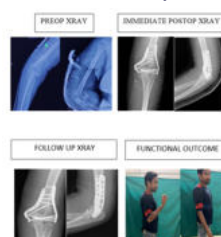
Figure-1: Functional outcome in 21 year old male

Figure-2: Functional outcome in 25 year old male**Table-1: MAYO ELBOW PERFORMANCE SCORE**

Function points (N = 100 points)	
Pain (maximum 45 points)	
None	45
Mild	30
Moderate	15
Severe	0
Range of motion (maximum 20 points)	
Arc > 100°	20
Arc 50–100°	15
Arc < 50°	5
Stability (maximum 10 points)	
Stable	10
Moderately unstable	5
Grossly unstable	0
Function (maximum 25 points)	
Able to comb hair	5
Able to feed oneself	5
Able to perform personal hygiene tasks	5
Able to put on shirt	5
Able to put on shoes	5

GRADE	SCORE
Excellent	>90
Good	75-89
Fair	60-74
Poor	<59

Table -2: Our analysis of functional outcome by Mayo elbow performance score

GRADE	SCORE
Excellent	18
Good	7
Fair	3
Poor	2

Discussions:

In this study, 60% participants were males, 53.33% sustained injury to the left side with road traffic accident being the most common mode of injury. In our study fracture union taken place in 28 patients by 24 weeks. We encountered nonunion in 2 patients. Muzaffar N et al^[13] (2014) in their study found that fracture united in 25 patients by 10-16 weeks. Singh V et al^[14] (2016) in their study found that fracture united in 10-14 weeks. In our study 1(3.33%) patient had superficial infections which were subsided with broad spectrum iv antibiotics and regular dressings. Elbow stiffness encountered in 2 (6.66%) patients who improved on physiotherapy. Nonunion in 1(3.33%) patient. We did not encounter any other complications in our study. In our study we performed open reduction and internal fixation with plating for all 30 patients with follow up period of 6 months and results were evaluated by mayo elbow performance score.

In our study results graded as excellent in 18 (60%), good in 7(23.33%), fair in 3(10%), poor in 2(6.67%). Singh V et al in their study results were graded as excellent in 4(14.81%) patients, good in 13(48.14%), fair in 7(25.92%), poor in 3(11.11%) Abishekh Mishra et al^[15] in their study results were graded as excellent in 15(75%), good in 3(15%), fair in 1(5%) and poor in 1(5%). Sung-Weon Jung, MD et al^[16] in their study results were graded as excellent 12(31.57%), good in 19(50%), fair in 5(13.15%), poor in 2(5.26%).

Conclusion:

Early operative intervention with bicolumnar precountoured distal humerus plates provides anatomical reduction and stable fixation in these fractures facilitates early mobilization and prevents elbow stiffness. In our series we treated 30 patients of distal humerus fracture with open reduction and internal fixation with distal humerus plates and functional outcome is good to excellent in 83.34% patients. We conclude as per AO principles that early operative intervention with distal humerus bicolumnar plating for these fracture will result in good functional outcome

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