

Outcome Analysis of Precontoured Locking Plate Fixation in Distal Humerus Fractures: An Institutional Based Study

Shashank Jindal¹, Shyam Mohan^{2*}

¹Lecturer, ^{2*}Assistant Professor,

Department of Orthopaedic Surgery, LLRM Medical College, Meerut, Uttar Pradesh, India.

ABSTRACT

Background: Fractures of the distal humerus continue to present a significant dilemma in management despite recent advances in surgical technique. The resulting functional deficits can be profound, and the limited soft tissue envelope surrounding the elbow also means these injuries are often open. Hence; the present study was conducted for assessing the outcome of Precontoured locking plate fixation in patients with distal humerus fractures.

Materials & Methods: A total of 20 patients with distal humerus fractures were enrolled in the present study. Under general anaesthesia/ brachial block /regional anaesthesia, under all aseptic conditions proper painting and draping was done. After completing the Precontoured locking plate fixation wound was closed in layers over negative suction drain. Movements of elbow were checked. The drain was removed after 48 hrs. All patients were examined clinically and radiologically postoperatively. Results were assessed according to Mayo elbow performance index.

Results: Excellent results were obtained in 70 percent of the patients while good results were obtained in 20 percent of the patients. Mean time for complete union was found to be 13.11

weeks. Superficial infection and skin necrosis were found to be present in 1 patient each.

Conclusion: Precontoured locking plate fixation is an excellent method of treating distal humerus fracture cases, thereby yielding excellent results.

Key words: Distal Humerus, Fracture, Precontoured.

*Correspondence to:

Dr. Shyam Mohan,
Assistant Professor,
Department of Orthopaedic Surgery,
LLRM Medical College,
Meerut, Uttar Pradesh, India.

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INTRODUCTION

Fractures of the distal humerus continue to present a significant dilemma in management despite recent advances in surgical technique. The resulting functional deficits can be profound, and the limited soft tissue envelope surrounding the elbow also means these injuries are often open.¹⁻³

Anatomically, the distal humerus has a triangular shape which is built of two columns and a "tie arch". The medial column holds at its distal end the nonarticular medial epicondyle with the insertion of the flexor muscles and the medial part of the humeral trochlea. The lateral column holds at its distal end the capitellum and more proximally the lateral epicondyle with the insertion of the extensor muscles (mobile wad).⁴

Distal humeral fractures in osteoporotic bone are particularly problematic due to the propensity for intraarticular comminution, poor bone stock for solid fixation as well as limited space for fixation devices. Results of internal fixation, although improved, are not without complications. Indeed total elbow arthroplasty as primary treatment is gaining popularity in selected patients.⁵⁻⁷

Hence; the present study was conducted for assessing the outcome of Precontoured locking plate fixation in patients with distal humerus fractures.

MATERIALS & METHODS

The present study was conducted in the Department of Orthopaedic Surgery, LLRM Medical College, Meerut, Uttar Pradesh (India) and it included assessment of outcome of Precontoured locking plate fixation in distal humerus fractures. A total of 20 patients with distal humerus fractures were enrolled in the present study. Ethical approval as obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. The first aid management was given to the patients in the form of back splintage, analgesics, antibiotics, antiseptic dressing; and stitching of wound was done. Immunization with Tetanus toxoid was given to the patients having external soft tissue injury and any associated injury was taken care of.

Detailed history of patients including the mode of injury was taken. Under general anaesthesia/ brachial block /regional anaesthesia, under all aseptic conditions proper painting and draping was done. After completing the Precontoured locking plate fixation wound was closed in layers over negative suction drain. Movements of elbow were checked. The drain was removed after 48 hrs. All patients were examined clinically and radiologically postoperatively. Results were assessed according to Mayo elbow performance index.⁸ All the results were summarized in Microsoft excel sheet and were analysed by SPSS software. Chi- square test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

Table 1: Age wise distribution of patients

Age group (years)	Precontoured plating	
	n	%
18 to 30	2	10
31 to 40	2	10
41 to 50	6	30
51 to 60	10	50
Total	20	100
Mean age (years)	47.2	

Table 2: Gender wise distribution

Gender	Precontoured plating	
	N	%
Males	16	80
Females	4	20
Total	20	100

Table 3: Classification of fractures

Gustilo Anderson classification	Precontoured plating	
	N	%
Closed	16	80
Compound Grade I	4	20
Total	20	100

Table 4: Outcome

Mayo elbow performance score grading	Precontoured plating	
	N	%
Excellent	14	70
Good	4	20
Fair	2	10
Poor	0	0
Total	20	100

Table 5: Mean Time for complete union

Time for complete union (weeks)	Precontoured plating	
	N	%
Less than 6 weeks	0	0
7 to 12 weeks	10	50
13 to 18 weeks	8	40
More than 18 weeks	2	10
Total	20	100
Mean time for complete union (weeks)	13.11 ± 3.15	

Table 6: Complications

Postoperative complications	Precontoured plating	
	N	%
Superficial infection	2	10
Skin necrosis	2	10

RESULTS

In the present study, a total of 20 patients with distal femur fractures were enrolled. Mean age of the patients was found to be 47.2 years. 50 percent of the patients belonged to the age group of 51 to 60 years. 30 percent of the patients belonged to the age group of 41 to 50 years. 80 percent of the patients were males while the remaining were females. According to Gustilo Anderson classification, 80 percent of the fractures were of closed type while the remaining 20 percent were of compound grade I type. In the present study, excellent results were obtained in 70 percent of the patients while good results were obtained in 20 percent of the patients. Mean time for complete union was found to be 13.11 weeks. Superficial infection and skin necrosis were found to be present in 2 patients each.

DISCUSSION

Fractures of the distal third of the humerus are challenging injuries due to their peri-articular location, small size of the distal bone fragments, and the osteopenic quality of the bone in older adults. Methods of management of distal humerus fractures include conservative management using plaster cast immobilization or functional bracing, plate osteosynthesis and intra-medullary nailing.⁶⁻⁸

In the present study, a total of 20 patients with distal femur fractures were enrolled. Mean age of the patients was found to be 47.2 years. 50 percent of the patients belonged to the age group of 51 to 60 years. 30 percent of the patients belonged to the age group of 41 to 50 years. 80 percent of the patients were males while the remaining were females. According to Gustilo Anderson classification, 80 percent of the fractures were of closed type while the remaining 20 percent were of compound grade I type. In a study it was found that the treatment of supra-intercondylar fractures of distal humerus is challenging. Anatomically preshaped angular stable implants facilitate operative reduction and stabilization of the fracture and may allow early postoperative rehabilitation. Clinical and radiological results are promising, with good range of motion and flexion and extension force.⁹ In a study it was found that by using the precontoured and angular stable LCP distal humerus plates system a stable osteosynthesis allowing early physiotherapy is achieved in majority of patients. Due to early initiation of physical therapy the functional results might be improved. Despite using the LCP system complications at the distal humerus fracture side were frequently, emphasizing the challenging surgical procedure and demonstrating the need for further implant and surgical procedure improvement.¹⁰

In the present study, excellent results were obtained in 70 percent of the patients while good results were obtained in 20 percent of the patients. Mean time for complete union was found to be 13.11 weeks. Superficial infection and skin necrosis were found to be present in 2 patients each. In a study of 27 patients it was found that the injury was caused by a fall in 24 patients (88.9 %), sustained in a car accident in two (7.4%) and as the result of a gunshot in one patient (3.7%). Multiple injuries to the musculoskeletal system were diagnosed in five patients (18.5 %). One patient with polytrauma after a fall from 6 metres suffered an ipsilateral fracture of the distal femur (3.7 %). The two patients involved in car accidents (7.4 %) had injury to the contralateral acetabulum. Two patients (7.4 %) sustained distal radial fractures on the other side. Surgery was carried out within 10.5 hours (4 to

47) of injury on the average. The average hospital stay was 6.4 days (2 to 12). All 27 fractures were classified as AO type C fractures, of these seven were open fractures. Complete bony union was achieved at an average of 4 months, with a range of 3 to 9 months (in two patients 7.4 %) after surgery. The early post-operative complications included wound dehiscence due to superficial infection in two patients. In two patients early removal of the implants was indicated, and this was for ulnar nerve irritation and motion range restriction in one and deep infection in the other. No migration or failure of the implants was recorded.¹¹ Kumar MN et al assessed the effectiveness of osteosynthesis of extra-articular diaphyseal fractures of the distal third of the humerus using a single 4.5-mm locking compression plate (LCP) with two-screw purchase in the distal fragment. They performed internal fixation of distal third extra-articular humeral fractures in 22 adult patients using 2–3 lag screws neutralized with a single 4.5-mm locking compression plate with only two screws in the distal fragment. The mean follow-up period was approximately 1.6 years. Fractures united in all 22 patients with minimal complications. The mean time to union of fracture was 13 weeks. The Mayo elbow score and the DASH scores were in the excellent and good category in all patients at final follow-up. Their study showed that it is possible to obtain excellent outcomes in distal third fractures using only a single 4.5-mm LCP with two-screw (4-cortices) purchase in the distal fragment.¹²

CONCLUSION

From the above results, the authors conclude that Precontoured locking plate fixation is an excellent method of treating distal humerus fracture cases, thereby yielding excellent results.

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