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ORIGINAL ARTICLE

Assessment of efficacy of Precontoured locking plates in patients with distal humerus fractures

Subeg Singh¹, Sandeep Singh², Amit Sharma² Mandeep Mittal¹

¹Senior Resident, ²Junior Resident, Department of Orthopaedics, GGS Medical College, Faridkot, Punjab

ABSTRACT:

Background: The comminuted fracture of distal humerus has remained one of the most difficult fractures to manage. Hence; the present study was conducting for assessing the efficacy of Precontoured locking plates in patients with distal humerus fractures. **Materials & methods:** A total of 10 patients with distal end humerus fractures were enrolled in the present study. Complete demographic details of all the patients were obtained. The first aid treatment was given to the patients in the Emergency Ward in the form of back splintage, analgesics, antibiotics, antiseptic dressing and stitching of wound was done. Under general anaesthesia/ brachial block /regional anaesthesia, under all aseptic conditions proper painting and draping was done. Precontoured plating was done in all the patients. All patients were examined clinically and radiologically for assessing the outcome. **Results:** Road traffic accident was the main mode of injury found to be present in 80 percent of the patients. Mean duration of surgery was found to be 118.5 minutes. Mean time to complete radiographic union was found to be 13.2 weeks. **Conclusion:** Precontoured plating has significant clinical success which indicates that the technique is promising and warrants further investigation.

Key words: Locking plates, Precontoured

Corresponding author: Dr Subeg Singh, Senior Resident, Department Of Orthopaedics, GGS Medical College, Faridkot, Punjab.

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INTRODUCTION

The comminuted fracture of distal humerus has remained one of the most difficult fractures to manage.¹ When significant bone loss precludes an anatomic reduction, a nonanatomic reconstruction that is stable and achieves all the four above cited objectives will be the preferred choice. It is a well-known fact that fractures are capable of uniting without human assistance. In terms of union the results can be good but from the point of view of functional recovery, the results are suboptimal because of incongruity, joint stiffness and malalignment.²⁻⁴

Surgical management of distal humerus fractures was initially unpredictable, with poor outcomes. With subsequent advances in hardware and techniques, nonsurgical management of distal humerus fractures is mainly reserved for medically unstable older patients, those with limited arm function (e.g., paralysis), and some nondisplaced fractures. Results of all methods except open reduction and internal fixation, have been disappointing. All the surgical methods have some limitations to achieve perfect anatomical reduction due to the complex anatomy of the lower

end of humerus. The Precontoured locking plates are designed as per the anatomy of the distal humerus and their use will be helpful to achieve the perfect anatomical reduction.⁵⁻⁷ Hence; the present study was conducting for assessing the efficacy of Precontoured locking plates in patients with distal humerus fractures.

MATERIALS & METHODS

The present study was conducted in the department of orthopaedics of medical institute and it included assessment of efficacy of Precontoured locking plates in patients with distal humerus fractures. A total of 10 patients with distal end humerus fractures were enrolled in the present study. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. Complete demographic details of all the patients were obtained. The first aid treatment was given to the patients in the Emergency Ward in the form of back splintage, analgesics, antibiotics, antiseptic dressing and stitching of wound was done. Under general anaesthesia/ brachial block /regional anaesthesia, under all aseptic conditions proper painting and

draping was done. Precontoured plating was done in all the patients. All patients were examined clinically and radiologically for assessing the outcome. 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.

RESULTS

In the present study, a total of 10 patients were analysed. Mean age of the patients was found to be 47.8 years. 60 percent of the patients belonged to the age group of 51 to 60 years. 80 percent of the patients of the present study were males while the remaining were females. Road traffic accident was the main mode of injury found to be present in 80 percent of the patients.

In the present study, mean duration of surgery was found to be 118.5 minutes. Mean time to complete radiographic union was found to be 13.2 weeks.

Table 1: Age-wise distribution of patients

Age group (years)	Precontoured plating	
	Number of patients	Percentage
18 to 30	1	10
31 to 40	1	10
41 to 50	2	20
51 to 60	6	60
Mean age (years)	47.8	

Table 2: Gender-wise distribution of patients

Gender	Precontoured plating	
	Number of patients	Percentage
Males	8	80
Females	2	20
Total	10	100

Table 3: Distribution of patients according to mode of injury

Mode of injury	Precontoured plating	
	Number of patients	Percentage
FFH	2	20
RTA	8	80
Total	10	100

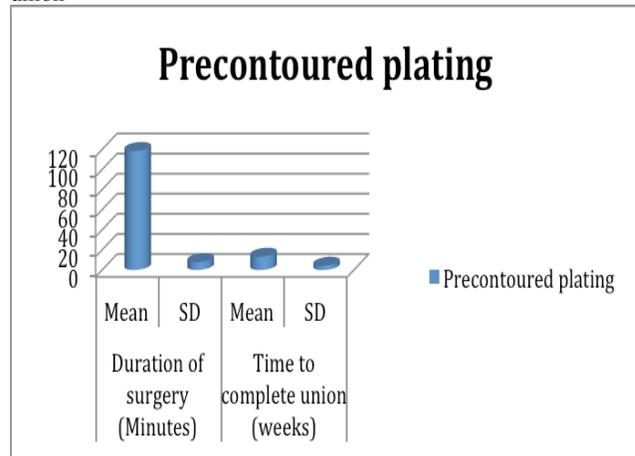
Table 4: Duration of surgery and time to complete radiographic union

Parameter	Precontoured plating	
Duration of surgery (Minutes)	Mean	118.5
	SD	7.82
Time to complete union (weeks)	Mean	13.2
	SD	4.2

DISCUSSION

The frequent multi-fragmentary nature of these fractures with comminution of the articular surface and metaphysis makes accurate reduction and fixation very difficult. Conventional implants and techniques have not been able to completely address the problem of implant failure and substantial stability in small distal osteoporotic fragments. The high failure rate is due to insufficient area for insertion of ample number of screws in a small sized distal fragment, resulting in poor stability at bone-plate interface.⁸

Graph 4: Duration of surgery and time to complete radiographic union



In the present study, a total of 10 patients were analysed. Mean age of the patients was found to be 47.8 years. 60 percent of the patients belonged to the age group of 51 to 60 years. 80 percent of the patients of the present study were males while the remaining were females. Road traffic accident was the main mode of injury found to be present in 80 percent of the patients. Kumar J et al assessed the morbidity and clinico-radiological outcome of the dual plating osteosynthesis technique used for fixation of inter-condylar distal humerus fractures (DHF) via trans-olecranon approach. A total of 21 adult patients with comminuted inter-condylar fracture of the distal humerus operated with dual plating osteosynthesis technique via trans-olecranon approach were evaluated clinically and radiologically for functional outcome based on Jupiter criteria including alignment and fracture union after a mean follow-up of 8 months. Post surgical complications were noted. Fractures were classified according to Muller et al (AO). Patients with polytrauma, pathological fracture, open fracture and a fracture more than 2 week old were excluded from the study. Out of the 21 patients, 38% were female and 62% were male. 52.3% had left elbow while 47.6% had right elbow involvement. The mean age was 31 years (range 20 - 50 years). Mean time between injury and internal fixation was 4.8 days. The mean follow-up period was 8 months. As per AO classification, 10 cases were C1, 7 cases C2 while 4 cases were in C3. The most common cause of fracture was road traffic accident in 13 cases. All fractures achieved anatomical restoration of articular surface and were united in average 14.6 weeks. The clinical results were evaluated for functional outcome based on Jupiter criteria. According to that criterion, satisfactory results were obtained in all patients. They had no instance of postoperative deep infection and neurological complications, only Backing of olecranon K-wires were noted in 5 patients (23.8%). They concluded that dual plate osteosynthesis technique is an effective procedure for fixation of inter-condylar distal humerus fracture, achieves rigid fixation and hence, early mobilization. Additionally use of olecranon osteotomy offers best fracture exposure of distal humerus. Complications were minimal and healing satisfactory.⁹ In the present study, mean duration of surgery was found to be 118.5 minutes. Mean time to complete radiographic union was found to be 13.2 weeks. Ali N et al determined the time to radiological union and final functional outcome of fixation of extra-articular distal humeral fractures with extra-articular distal

humerus locking plate. All the fractures were approached using lateral para-triceptal approach of Gervin, and stabilized with extra-articular distal humerus locking plate with or without lag screws. Time to radiological union was assessed in the follow up and at the final follow up functional outcome was evaluated using Mayo Performance Elbow Score (MEPS). Complications and need for any additional procedures was also recorded. A total of 20 patients with mean age of 36.5 years and an average follow up of 17 months were included. The mean time to radiological union was 17.4 weeks (12 to 36 weeks) which included one delayed union that required bone grafting. The mean flexion at elbow was 127° with only one patient having flexion extension arc movement of less than 100° at the final follow up. The average MEPS at final follow up was 94.7±8 with 19 patients having excellent and good results. It was concluded that use of extra-articular distal humeral locking plate using lateral para-triceptal approach in extra-articular distal humeral fractures allows stable fixation of the fracture to allow early return to function with minimal soft tissue dissection and excellent final functional results and minimum complications.¹⁰

CONCLUSION

Precontoured plating has significant clinical success which indicates that the technique is promising and warrants further investigation.

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