

Original Research Article

Functional outcome of proximal humerus fracture treated with proximal humerus interlocking system plating

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Received: 19 March 2019

Revised: 03 June 2019

Accepted: 04 June 2019

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ABSTRACT

Background: Proximal humerus fractures account for 4-5% of all fractures. They are the commonest fractures in elderly population, which ranks the third, after hip and distal radius fractures respectively. Displaced fractures treated by pinning, cancellous screws, intra-medullary nails, proximal humeral plates and hemiarthroplasty. The proximal humerus interlocking system (PHILOS) plate is anatomically contoured and the threaded screw heads are locked into the threaded plate holes which allow early rehabilitation. The aim of this study is to evaluate results and complication of PHILOS.

Methods: This a prospective study, conducted at JLN Medical College, Ajmer from 1st January 2017 to 31st July 2018. 36 patients of displaced proximal humerus fractures were included and operated at hospital with PHILOS plating. We evaluate Intra-operative events, post-operative radiological evaluations and bony union by NEER'S score and complications.

Results: Functional results according to NEER'S score were found that out of 36 patients, 11 patients (30.5%) had excellent outcome, 19 patients (52.7%) have satisfactory outcome, 3 patients (8.33%) had unsatisfactory outcome and 3 patients (8.33%) had poor outcome.

Conclusions: Internal fixation of proximal humerus fractures with use of PHILOS yields reliable results when utilized correctly. To achieve gold standard results, early physiotherapy is must which can only be done by stable fixation, ORIF with PHILOS provides more stable construct with anatomical reduction.

Keywords: Proximal humerus fracture, Proximal humerus interlocking system, Neer's score

INTRODUCTION

Proximal humerus fractures account for 4-5% of all fractures with a prevalence of 70 per 100,000, raising to 405 per 100,000 in population aged over 70 years.¹ They are the commonest fractures in elderly population, which ranks the third, the first and second being, hip and distal radius fractures respectively.²

There are two important causes for these alarming high incidences are improved life expectancy with sedentary

life style leading to senile osteoporosis which is the major cause of these fractures and increasing number of high velocity motor vehicle accidents these days.³

The extent of displacement is an essential factor with regard to the choice of treatment. Non displaced or minimally displaced fractures can be treated conservatively. Displaced fractures of the humerus are preferably treated by means of surgical intervention like percutaneous or minimally invasive techniques such as pinning, osteosynthesis using cancellous screws, intra-

medullary nails, open reduction and internal fixation with proximal humeral plates and hemiarthroplasty.^{4,5}

Open reduction and internal fixation with PHILOS is another method to achieve anatomical, stable and secure reduction with immediate mobilization with excellent long term results, unless until the excellent pre-operative planning with proper selection of cases.

The proximal humerus locking compression plate is anatomically contoured and the threaded screw heads are locked into the threaded plate holes to prevent screw toggle, slide and pull out. Because of the greater angular stability and better screw anchorage stability these devices offer, early mobilization can be achieved without the risk of screws becoming loose and/or secondary loss of reduction as seen with non-locking plates.⁶

METHODS

Source of data

The present study included 36 cases of fracture of proximal humerus admitted in Department of Orthopedics, Jawahar Lal Nehru Medical College and Associated Group of Hospitals, Ajmer, Rajasthan. Patients were operated with PHILOS (Proximal Humerus Internal Locking System) plating a prospective series of displaced proximal humerus fractures. All of these 36 patients were followed from 1st January 2017 to 31st July 2018 for mean duration of 11 months.

Inclusion criteria

Patients with displaced closed proximal humerus fracture, on basis of Neer's classification two/three/four part fracture.

Exclusion criteria

Patients with pathological fractures, children between the age 0-14 yrs, open fractures and medically unfit for surgery.

Fractures were classified according to the Neer's classification.⁷ Surgery was performed through the Deltpectoral (anterior) approach.^{8,9} Average follow up duration was 11 months and evaluation was done by Neer's score.

Statistical analysis was done using SPSS Software (IBM Version-20).

RESULTS

Average age of the patient was 51.77 years, SD 14.58 with youngest patient of 26 years and the oldest one of 78 years. The injury was most prevalent in IV and V decade of life. Out of 36 patients 24 are female and 12 are male showing female were more predominant. Out of them 23

were right sided and 13 were left sided thus right side commonly involved. In our study 36 patients equal number of patients of all the three types of fracture pattern was present. No significant difference with regard to fracture pattern was found. In our study 10 (27.77%) of patients were injured due to road traffic accidents. 66.66% of patients (24) were injured due to fall on ground. Most of these patients were around 50 years of age. This shows the role of osteoporosis in causing these fractures with minor trauma. Among them 2 patients are fall from height. All the fractures united with an average of 10.34 weeks. No case of delayed union or nonunion was found.

Out of 36 patients, 11 patients (30.5%) had excellent outcome, 19 patients (52.7%) have satisfactory outcome, 3 patients (8.33%) had unsatisfactory outcome and 3 patients (8.33%) had poor outcome. Thus 30 patients (83.33%) had favourable and 6 patients (16.67%) had unfavourable results (Table 1).

Table 1: Results of operative procedure (n=36).

Results		No. of patients	%
Excellent	Favourable	11	30.5
Satisfactory		19	52.7
Unsatisfactory	Unfavourable	3	8.3
Poor		3	8.3

Table 2: Complications in patients.

Complications	No. of cases
Sub acromial impingement	1
Screw perforation	1
Infection	1
Varus malreduction	3
Restricted ROM (Stiff shoulder)	5
Pain in shoulder	6

Table 3: Mean Neer's score

	Proximal humerus interlocking system (PHILOS)	
	Mean	SD
Neer's score	85.88	8.60
Neer's ROM score	20.94	2.05

DISCUSSION

Most of the proximal humerus fractures which are undisplaced can be treated conservatively.¹⁰ However, displaced fractures require surgical treatment for better outcomes.¹¹ The treatment goal is to achieve a painless shoulder with full range of motion.

In the present study 36 patients were taken, which were followed for mean duration of 11 months. Patients were

managed with ORIF with PHILOS. Our study revealed the average age of patients with such injuries to be 51.77 years (26-78). Our study is consistent with Fazal et al patient aged 22-85 mean age is 56, Agarwal et al patient aged 23-81 mean age 58.1 years.^{12,13}

In our study, simple fall (trivial trauma) was the most common mode of injury (66.66%) followed by RTA (27.77%) and fall from height (5.5%). The results are consistent with study of Fazal et al has high energy trauma 22.2% and low energy 77.8%.¹² In our study, 12 (33.33%) were Neer's two fracture, 12 (33.33%) were three part fracture, and 12 (33.33%) were Neer's four part fracture. Consistent with Aggarwal et al have 11 patient 2 part, 22 were 3 and 14 were 4 part fracture.¹³ The average time for union (in weeks) was found to be 10.34 (7-18 weeks). Results of our study are comparable with the study of Ong et al found average union in 12 weeks.¹⁴ In our study 11 (30.50%) patients had excellent outcome, 19 (52.7%) patients had satisfactory outcome, 3 (8.33%) patients had unsatisfactory outcome, 3 (8.33%) patient had poor outcome results were consistent with other study of Fazal et al, Umapathi et al, Sayed et al, had 14 excellent results (23.8%), 27 good results (45.7%), 15 fair results (25.5%), and only 3 patients had poor results (5%).^{12,15,16} Thus, 41 patients (69.5%) showed favourable results at the final follow-up visit.

CONCLUSION

In patients of 2 part and 3 part and 4 part displaced proximal humerus fractures results are good using ORIF with PHILOS. Due to early initiation of physiotherapy more ROM of shoulder is achieved in less time. Because of rigid and secured fixation provided by PHILOS early active physiotherapy can also be initiated without the fear of loss of reduction. Complications related to PHILOS like subacromial impingement, screw perforation and malreduction can be prevented by proper placement of plate, small size of screw with subchondral purchase and prevention of varus malalignment of humerus shaft at the time of plate application (Table 2 and 3). In order to achieve gold standard results, early and continuous physiotherapy is must which can only be done by stable fixation, ORIF with PHILOS provides more stable construct with anatomical reduction of tuberosity.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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Cite this article as: Harshwardhan H, Verma BP. Functional outcome of proximal humerus fracture treated with proximal humerus interlocking system plating. *Int J Res Orthop* 2019;5:936-8.