

Original Research Article

ROLE OF PHILOS PLATE IN THE MANAGEMENT OF PROXIMAL HUMERUS FRACTURES IN ADULTS AT TERTIARY HEALTH CARE CENTER

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ABSTRACT

Background: The increased incidence of osteoporosis and advanced age predispose to an increase in Proximal Humerus fractures. It accounts for about 4-5% of all fractures and is the third most common fracture in patients above 60 yrs of age. PHILOS (Proximal Humerus Internal Locking System) plates are biomechanically better suited for fixation of proximal humerus fracture and provide angular stability and locking screw anchorage in weak osteoporotic bones. The present study was done to evaluate the role of PHILOS plate in management of proximal humerus fracture in adults at tertiary health care center.

Materials and Methods: In present study patients with fractures of proximal humerus were treated surgically with PHILOS plate. Pendular exercises and assisted and passive active movements were started from the third postoperative day. Assessment of shoulder function was done using Constant and Murley scoring system at three months.

Results: Total 30 patients were included in present study. Mean age of the patients was 50.30 ± 9.23 years. Male patients (73 %) were common than female patients (27 %). Road traffic accident (53 %) was most common mode of injury. According to Neer's classification, 3 part fractures (53 %) was most common, followed by 2 part fractures (33%). Assessment of shoulder function was done using Constant and Murley scoring system. Good function was noted in 53% patients, followed by fair function in 23% patients. excellent and poor function was noted in 17% and 7% patients respectively. 2 patients had stiffness and 1 had impingement. No malunion, avascular necrosis, infection or postoperative loose implant noted in patients.

Conclusion: Proximal humerus internal locking system (PHILOS) plate is an advantageous implant in fixing proximal fractures of the humerus as it provides stable anatomical fracture fixation, early mobilization and better patient satisfaction.

Keywords: Proximal humerus fracture, PHILOS plate.

INTRODUCTION

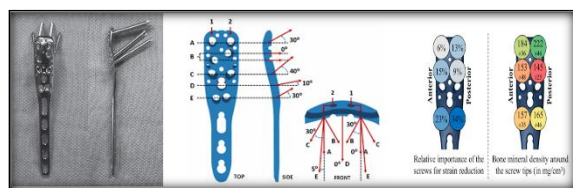
Proximal humerus fractures have a dual age distribution occurring either in young people following high energy trauma or in those older than 60 years with low velocity injuries like simple fall. More than 70% of patients with these fractures are older than sixty years of age, and 75% of them are women. The surgical modalities used are closed reduction and percutaneous fixation, transosseous

suture fixation, open reduction and internal fixation with conventional plates, locking plate fixation and hemiarthroplasty which have shown to have mixed results. Conservative treatment is usually associated with nonunion, malunion and avascular necrosis resulting in a painful shoulder.^[1-3]

The goals of surgery are to obtain anatomic fracture reduction and stable primary fixation to ensure rapid fracture healing and immediate post-operative functional therapy without prolonged

immobilization. The introduction of PHILOS systems has redefined the treatment of proximal humerus with the advantage of increased skeletal anchorage and higher resistance to failure by increasing the axial and angular stability.^[4]

The PHILOS plate is part of the latest generation of locking compression plates.^[4,5] The screws in the humeral head are locked into the plate and cannot back out or toggle, which is a particular advantage in osteoporotic bone.^[4] The screws alternately diverge and converge, improving the purchase in the humeral head. The plate has a low profile, which minimizes the risk of impingement syndrome. These plates do not compromise periosteal blood supply as the biomechanics does not depend on friction or compression between the plate and bone to stabilize the fracture.



MATERIALS AND METHODS

In present study patients with fractures of proximal humerus were treated surgically with Proximal Humerus Internal Locking System (PHILOS) plate at Dept. of Orthopaedics, Dr. Hedgewar Hospital, Chh Sambhajinagar, (Aurangabad), India. Single Orthopaedic Surgeon operated all cases. Study was prospective, observational type conducted between Jan 2017 to December 2019.

Institutional ethical committee approval was taken.

Inclusion criteria

- Patients above 18 years of age with acute, closed proximal humerus fractures, fit for surgery.

Exclusion criteria

- Patients with open proximal humerus fractures, associated neurovascular injury, acute infection, pathological fractures, and old fractures.
- Nonunion and delayed union.
- Not willing to participate or follow up, lost to follow up.

A written informed consent was taken from patients. Detailed history, clinical examination, routine investigation, preanaesthetic checkup was done. X-ray of proximal humerus, both anteroposterior view and axillary views were taken and fractures were classified according to Neer's classification.^[6] 3D CT Scan was done in indicated patients for better understanding of fracture geometry and surgical planning.

In all the patients, surgery was performed under General anaesthesia. All patients were placed in the beach-chair position, and operated by a standard delto-pectoral approach.^[13] Fracture reduction was performed in a logical sequence. If the humeral head is dislocated it was reduced first under direct

visualization. The surgeon then choose to either reduce the tuberosities to the head anatomically or reduce the head to the proximal shaft depending upon fracture geometry. The plate position was also selected to avoid subacromial impingement. For posteromedial calcar comminution locking plate with screws were inserted along the calcar in a low position within the head to buttress the area of comminution, had been shown to be helpful in restoring stability of fractures with calcar comminution.

Post operative radiographs were taken to assess the reduction of fracture and stability of the fixation. Drain removal and dressing change was done on 2nd post-operative day. All patients were discharged from hospital on 3rd or 4th post-operative day. Patients were rehabilitated under supervision of physiotherapist. Patients were followed at 3 weeks, 6 weeks, 3months and 6months. During this period, in each visit clinical evaluation of wound healing, pain, shoulder function and range of movements were assessed and recorded. Functional Assessment was done using Constant-Murley score based on pain, Activities of daily living, ROM and power for each case at third month follow up visit and recorded.^[7]



CLINICAL PHOTO



RESULTS

Table 1: Distribution of patients according to Age-group

Age-group	No. of patients	Percentage
<40	04	13.3
40-50	11	36.7
50-60	11	36.7
>60	04	13.3
Total	30	100%
Mean±SD	50.30±9.23 years	

Table 2: Distribution of patients according to Gender

Gender	No. of patients	Percentage
Male	22	73.3
Female	08	26.7
Total	30	100%

Table 3: Distribution of patients according to Mode of Injury

Mode of Injury	No. of patients	Percentage
RTA	16	53.3
Fall	14	46.7
Total	30	100%

Table 4: Distribution of patients according to Diagnosis

Diagnosis	No. of patients	Percentage
2 PART	10	33.3
3 PART	16	53.3
4 PART	4	13.3
Total	30	100%

Table 5: Distribution of patients according to Complications of PHILOS

Complications	No. of patients	Percentage
Impingement	1	3.3
Stiffness	2	6.7

Table 6: Distribution of patients according to Functional outcome of proximal humeral fractures fixation using PHILOS (CONSTANT-MURLEY SCORE)

Outcome	No. of patients	Percentage
Excellent (>85)	05	16.7
Good (71-85)	16	53.3
Fair (55-70)	07	23.3
Poor (<55)	02	6.7
Total	30	100%
Mean±SD	73.79±11.04	

DISCUSSION

Operative treatment of comminuted and displaced proximal humerus fractures, especially in osteoporotic bone, has been a complex and challenging problem. Different techniques have been

described for fixation of comminuted and displaced proximal humeral fractures. All these techniques have been associated with a varying rate of complications such as cut-out or back-out of the screws and plates, nonunion, avascular necrosis, and fractures distal to the plate.^[8,9] Functional outcome

not only depends on the quality of bone stock, but also on the stability provided by the implant. Anatomical reduction and rehabilitation is most important part of fracture management and strong predictor for good functional outcome.

In study of 27 patients by MA Fazal and FS Haddad,^[16] treated with locking plate for displaced proximal humerus fractures, 11 patients had good outcome (40.7%), 13 patients had moderate outcome (48%) and 3 patients had poor outcome (11%)

In a retrospective study, Björkenheim et al,^[17] reviewed 72 patients treated with the PHILOS plate. At final controls, 36 patients had a good or excellent functional outcome according to the Constant-Murley score, 31 patients had a moderate score, and five patients had a poor outcome. The authors advocated the use of the PHILOS plate, especially in osteoporotic bone.

Dhruv Pandya studied 41 patients treated with PHILOS plating, 22 patients had excellent scores, 10 had satisfactory scores, 5 had unsatisfactory scores and 4 had poor outcome scores.^[1]

In the present study, we assessed shoulder function using Constant and Murley scoring system, good function was noted in 53% patients, followed by fair function in 23% patients. excellent and poor function was noted in 17% and 7% patients respectively.

The limitations in our study were small sample size, a single method of fracture fixation. The small sample size in our study can overestimate the results. Large sample studies [comparing](#) various fixation methods in proximal humerus fractures are needed. Although the locking plate technology has revolutionized the surgical fixation of proximal humerus fractures in recent years, typical failure patterns occur with locking plates whenever basic concepts and technical principles are not respected.

CONCLUSION

The present study was conducted to assess the role of PHILOS plate in management of proximal humerus fractures. It was concluded that this technique helped in better fixation of the fracture and early mobilization. The chances of complications are minimal and the functional outcome is good in most of the cases.

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