



A STUDY ON, TREATMENT OF PROXIMAL HUMERUS FRACTURES USING PHILOS PLATE IN A TERTIARY CARE HOSPITAL.

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ABSTRACT

Fractures of proximal humerus is still unsolved fractures in many ways. A wide variety of treatment modalities have been used for these fractures. The Proximal humeral internal locking system (PHILOS) plate fixation provides greater angular stability than do conventional implants. The aim of the study is to assess the functional outcome of proximal humerus fractures treated with PHILOS plating. To recognize any associated complications. This was a prospective study conducted from August 2020 to February 2021 in our hospital with 5-6 month follow up. We include skeletally matured patients with proximal humerus fractures with displacement >1cm and varus angulation of >45°. The outcome was assessed using Neer's scoring system and recorded before treatment and on follow up at 1st month, 2nd month, 4th month and 6th month. Fracture healing assessed by consecutive radiographs. As per Neer's classification system, there were (11.32%) 1 part, (35.85%) 2 part, (32.08%) 3 part and (20.75%) 4 part fractures. Average surgical duration was 90+/- 15min. Radiological union was seen at 12+/- 4 weeks. Among all the cases 13.2% cases had excellent results, 69.8% had satisfactory results and 11.3% had unsatisfactory results. PHILOS plating has a good functional outcome for proximal humerus fractures in skeletally matured patients.

KEYWORDS : PHILOS, Proximal Humerus Fracture, Neer's

INTRODUCTION

Fractures of proximal humerus is still unsolved fractures in many ways. Fixation techniques are myriad and none is ideal for all cases. (1) 15% of these fractures are displaced unstable and may have disruption of the blood supply. The treatment of these fractures is therapeutic challenge. (2) The majority of patients with this fracture are elderly, which increases the risk for their bones to be osteoporotic or brittle. A wide variety of treatment modalities have been used in the past. These include transosseous suture fixation, tension band wiring, percutaneous wire, screw fixation, standard plate and screw fixation and hemireplacement arthroplasty.

Precontoured locking plates work on the principle of angular stability, less disruption of vascularity and less chances of plate failure. Improved fixation by locking plates are attributed to the angular stability of the screws locking in the plate and their three-dimensional distribution in the humeral head. (3)

The Proximal humeral internal locking system (PHILOS) plate fixation provides greater angular stability than do conventional implants. It works as a locked internal fixator and provides better anchorage of screws in osteoporotic bone (4,5) with good functional outcomes (6,7) In proximal humerus fractures, PHILOS plate offers a good functional outcome in context to the early joint mobilisation and rigid fixation of the fracture. (8) Considering these advantages and the scarcity of data on the efficacy and the functional outcome following internal fixation with PHILOS plate for displaced proximal humerus fractures, the present study was planned.

METHODOLOGY

This was a retrospective study conducted at department of orthopedics, Mandya Institute of Medical Sciences. The patients who attended the orthopaedic department of Mandya Institute of Medical Sciences with proximal humerus fracture and with their complete data during August 2020 to June 2021 were included in this study. Personal data and pattern of injuries who underwent the Proximal humerus PHILOS operative procedure were extracted from the case

records and OT register. Data extraction was manually done by reviewing each case file. Data collected was analyzed using simple statistical method of percentages and functional outcome was rated using Neer's rating score.

RESULTS:

This study included 30 patients out of which 16 (53.33%) were males and 14 (46.67%) were females. The most common age group involved in the fractures was 31-35 years followed by the age group 21-25 years with mean age 22.3 +/- 2.4

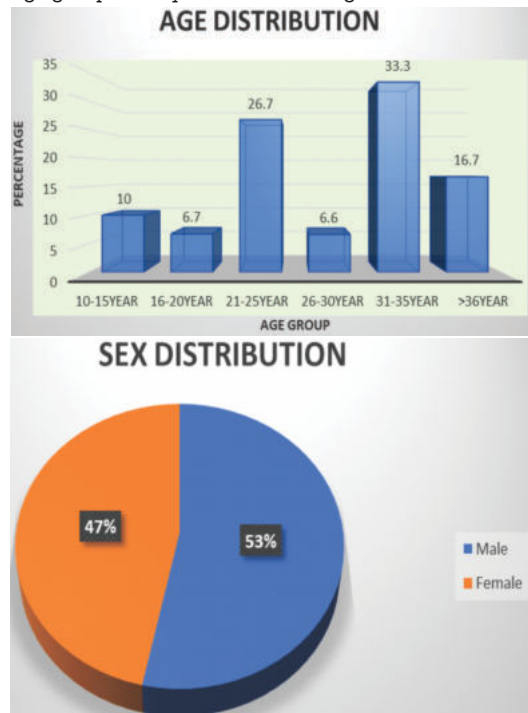


Figure 1. Demographic Distribution Of Patients

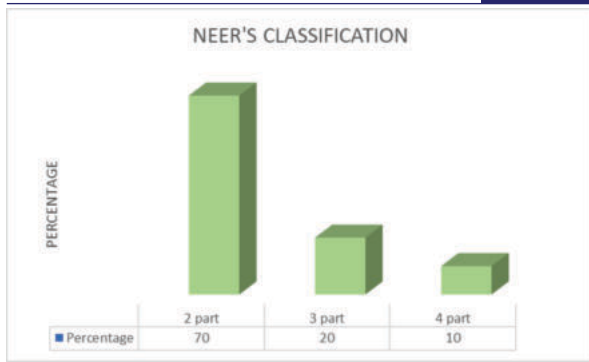


Figure 2 : Neer's Classification

In our study majority of patient 22 (73.33%) of patients sustained an injury due to RTA, followed by falls on outstretched hand 7 cases (23.33%) and one case of assault(10%) . Most of the patients (25) were seen in the Emergency on the day of the injury and 4 were seen on the second-day injury and one case was seen on the fourth day of the injury. The Neer's classification of fractures of proximal humerus was followed in this study. Most of the patients n=21 (70%) were having Neer's Two-part fractures and three-part fractures were found in n=6 (20%) and four part in n=3 (10%) of the patients.

All of the cases in the study were operated. The Mean follows up period was 10 months. Clinically and radiologically fractures were assessed. Patients were functionally evaluated based on the constant scoring system. The final outcome of the procedure was graded excellent scores 86-100, good scores 71-85, moderate scores 56-70, and poor scores 0-55, respectively. The Constant–Murley score was assessed by two surgeons, with mean points for statistical analysis. The average Constant–Murley score was 85.8 (range, 67–100) points.

Table 1 : Range Of Movements After 6months Of Philos Plating

	Median	Mean	Standard Deviation
Flexion	142	89.3	15.2
Abduction	140	98.3	15.3
External rotation	60	38	8.8
Internal rotation	45	42	12.1

Function

In terms of movement, median range was 142° flexion (range, 90–180°); 45° extension (range, 30–50°); 45° internal rotation (range, 30– 70°); 60° external rotation (range, 45–85°); 140° abduction (range, 110–180°) at the end of six months.



Figure 3: X-RAY Of Proximal Humerus Fracture Treated With Philos Plating

DISCUSSION

Open reduction and internal fixation (ORIF) provides the features of anatomical fracture reduction, rigid fixation and the possibility of bone grafting. In proximal humerus fractures, PHILOS plate offers good functional outcome with context to the early joint mobilisation and rigid fixation of the fracture. The present study was undertaken to assess the efficacy and the functional outcome following internal fixation with PHILOS (proximal humeral internal locking system) plate for displaced proximal humerus fractures. A total of 30 patients who sustained proximal humerus fracture were enrolled. Patients underwent open reduction and internal fixation using PHILOS plate through deltopectoral approach. In this study, patients with only 2-part, 3-part & 4-part fracture of proximal humerus were included based on Neer's classification. Accordingly, the 2-part fractures were noted in most of the cases (70%) followed by 3-part (20%) and 4-part (10%). Kristiansen and Christensen⁽⁶⁾ have reported a high incidence of fixation failure following use of T-buttress plates in fixation of proximal humerus fractures. Wijnman *et al.*⁽¹⁰⁾ have reported good intermediate and long-term results in 87% of patients who had three-and four-part fractures fixed with T-buttress plate. Recently newer implants such as the Plan Tan humerus fixator plate, Polaris nail and the PHILOS plate have been used for fixation of proximal humerus fractures. The plate is pre-shaped and contoured for the proximal humerus. The benefits of this implant are that it gives enhanced purchase in osteopenic bone, there is no loss of reduction or varus/valgus angulations, the locking screws into the plate provide angular and axial stability of the construct. With regard to functional outcome following use of locking plates (PHILOS) early benefits can be gained. The other demanding aspect is to avoid placing the plate too proximally on the humerus with resulting impingement of the top of the plate on the acromion. This can be avoided by using a K wire inserted through a hole at the top of the plate, which should line up with the tip of the greater tuberosity. This is done during initial positioning of the plate. Positioning the plate too high can also lead to incorrect placement of the divergent screws in the humeral head. Care should be taken to avoid penetration of the head and subsequent chondrolysis with proximal interlocking screws.⁽¹¹⁾

In the present study open reduction and internal fixation through deltopectoral approach with PHILOS plate was carried out and nearly half of the study population had good outcome (47%). Among the others, fair and poor outcomes were noted in 26% and 7% while excellent outcome was noted in 20% of the patients. The range of motion at first, second and third follow ups showed gradual increase in mean flexion, abduction, external rotation and internal rotation during subsequent follow ups. These findings suggest that internal fixation with PHILOS (proximal humeral internal locking system) plate for displaced proximal humerus fractures results in overall good results that is nearly 67% of the patients had excellent and good results. Esser⁽¹²⁾ reported excellent results in 22 out of his 26 patients of three part and four part fractures of proximal humerus treated with a modified clover leaf plate. Paavolainen *et al.*⁽¹³⁾ reported satisfactory results in 74.2% of their 41 patients with severe proximal humerus fractures treated with plate and screw devices. However all these authors found poor results in 4 part fractures and recommended a prosthetic replacement in such patients. In a study Koukakis A *et al.*⁽⁶⁾ prospectively evaluated 20 patients with fractures of the proximal humerus. According to their experience, the plate design provides stable fixation with a good functional outcome and eliminates most hardware problems such as failure and impingement syndrome. In 2009 MA Fazal *et al.*⁽¹⁴⁾ retrospectively reviewed 27 patients who underwent locking compression plate fixation. The Constant shoulder Score was > 75 in 11 patients, 13 were scored between 50 to 75, and 3 below 50. They concluded PHILOS plate fixation provided stable fixation, minimal metal work

problem and enabled early range of motion exercises to achieve acceptable functional results. Egol KA *et al*⁽¹⁵⁾ in his retrospective analysis studied early complications in proximal humerus fractures treated with locked plates in 51 consecutive patients. Radiographically, 92% of the cases united at 3 months after surgery, and 2 fractures had signs of osteonecrosis at latest follow-up. The major complication reported in this study was screw penetration, suggesting that exceptional vigilance must be taken in estimating the appropriate number and length of screws used to prevent articular penetration. In 2009 Brunner F *et al*⁽¹⁶⁾ in his multicenter study from 8 trauma units enrolled 157 patients and treated with open reduction and internal fixation with a Philos plate. The incidence of experiencing any implant-related complication was 9% and 35% for non implant related complications. Primary screw perforation was the most frequent problem (14%) followed by secondary screw perforation (8%) and avascular necrosis (8%). They concluded that fixation with Philos plates preserves achieved reduction, and a good functional outcome can be expected.

CONCLUSION

Philos plate has threads in its holes, which locks with the threads of its screw heads. This provides a high degree of angular and axial stability eliminating screw loosening and backout. The divergent and convergent orientation of the screws engaging in the humeral head prevent pull out and failure of fixation. Early physiotherapy and good rehabilitation programme is vital to get a good functional outcome. In conclusion, the PHILOS plate is an ideal construct and a stable implant to use for fractures of the proximal humerus in Neer's 2-part, 3-part, and 4-part and osteoporotic fractures of the proximal humerus in elderly patients hence allowing early mobilisation of the shoulder.

CONFLICT OF INTEREST

None declared

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