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A study of prospective analysis of outcome of proximal humerus fracture with philos plate fixation

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Abstract

Introduction: Proximal humerus fractures constitute 5% of all fractures. These fractures are common in elderly patients presenting as a challenging problem in the management because of the low-quality of cancellous bone.

Aim: The study aims to evaluate the outcome of proximal humerus fractures managed with PHILOS.

Methods: This prospective study to determine the outcome of proximal humerus fractures treated with PHILOS. 40 patients were taken for this study. Preoperative workup was done to exclude open fractures. Majority of fracture fixation was done through a deltopectoral approach. Fracture fixation was done with the PHILOS plate under 'C' arm control. All patients were reviewed clinically and radiologically at regular interval.

Results: Type of fractures according to Neer's classification 22 were two parts, 8 three parts and 10 four parts. Excellent results were in 26 cases, good results in 9 cases, fair results in 5 patients and there were no poor results. Fair results were in four parts fractures with intraarticular extensions.

Conclusion: PHILOS fixation gives excellent results in proximal humerus fractures, and it provides rigid fixation in early mobilization. However, we are aware that this is a short term study and would require further evaluation and more input.

Keywords: Proximal humerus fracture, PHILOS, osteoporotic fractures

Introduction

Proximal humerus fractures are one of the most common osteoporotic fractures. It accounts for 5% of all fractures, following the distal radius and vertebra, it is the third most common osteoporotic fractures.

The shoulder joint consists of a glenoid cavity of scapula and the head of the humerus. This glenohumeral joint is stabilized by the articular cartilage, labrum, ligaments, rotator cuff and deltoid. The head is slightly offset medially and posteriorly in relation to the posterior shaft^[1]. Tendons produce a reliable deforming force on bony fragments. The supraspinatus and teres major insert on the greater tuberosity and produce a posterolateral deformity. The subscapularis inserts on the lesser tuberosity and has a medial deformity. The pectoralis major inserts into medial humeral shaft deform medially, while the deltoid inserts into the lateral humerus and deforms laterally^[2]. The proximal humeral blood supply is from the anterior and posterior humeral circumflex branches of the axillary artery. The arcuate artery is the terminal ascending branch of the anterior humeral circumflex artery and enters the humeral head near the anatomical neck^[2, 3]. The fracture with short calcar fragment (<8mm), a disrupted medial hinge and anatomical neck involvement are more prone to ischaemia^[4]. In proximal humerus fractures, axillary artery injury is exceedingly rare. The axillary nerve is about 4.5 to 7cm from the proximal humerus and 1 to 4cm from surgical neck travelling through the quadrilateral space with posterior humeral circumflex artery. The common nerve injury in proximal humerus fracture is the axillary nerve. During surgery, care should be taken with incision greater than 5 cm length distal to the acromion process.

Management of this common injury is often challenging and controversial. Diagnosis of proximal humerus fractures can be made after careful clinical assessment and radiological examination. Fractures of proximal humerus are common, debilitating injuries and an increasing problem in the elderly. The most stable fractures which often occurs in frail, elderly

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patients are best treated conservatively. Still, some form of fixation is usually indicated in unstable fractures, intraarticular fractures, open fractures and comminuted fractures. Various implants ranging from 'K' wire, non-locking and locking plate, nail, prostheses and external fixators are used to treat these fractures. We prepare proximal humerus internal locking system (PHILOS) plating because it provides rigid fixation and better anchorage of screws in osteoporotic bone. It also offers early mobilization of joints and good functional outcome.

AIM

This study aims to evaluate the outcome of proximal humerus fracture managed with PHILOS.

Material and Methods

This prospective study was conducted in Government medical college, Pudukkottai and Team speciality hospital, Pudukkottai from 2015 to 2018. 40 patients with fracture of the proximal humerus were selected for this study. We exclude open fractures in this study. The preoperative evaluation was done with complete haemogram, serological investigations for HIV, HBsAg, radiology and CT scan. In all cases, surgery was done within 72 hours under general anaesthesia. We prepare the deltopectoral approach in most of the cases. The incision of 10-12 cm starting from the coracoid process was taken along the line of deltopectoral groove, the plane between the deltoid and pectoralis major was identified. The fracture fragments were reached, and saline wash was given.

Tag sutures with absorbable material were taken through rotator cuff muscles for later repair. The fracture was reduced and stabilized with 'K' wires initially under 'C' arm control. PHILOS plate was applied 5mm distal to the greater tuberosity, 2-4mm lateral to the bicipital groove. The plate was fixed with locking screws, and 'K' wires were removed, and the final reduction was checked with 'C' arm. The previously tagged sutures of the rotator cuff were passed through the peripheral holes in the plate and anchored. The wound was closed in layers. Mobilization was started after 48 hours with arm pouch. All patients are reviewed regularly in 4, 8 and 12 weeks and regular check X-ray was taken to assess the bone union.

Results

Out of 40 cases, 16 were males, and 24 were females.

Table 1: Gender distribution

Gender	No. of. Cases
Male	16
Female	24

Based on the mode of injury, 28 had a road traffic accident, and 12 had fallen.

Table 2: Mode of injury

Mode of Injury	No. of. Cases
RTA	28
Fall	12

22 cases had 2 parts fractures, 8 cases had 3 parts fractures, 10 patients had 4 parts fractures based on Neer's classification.

Table 3: Neer's classification

Neers Classification	No. of. Cases
2 Parts	22
3 PARTS	8
4 PARTS	10

26 cases had excellent outcomes, 9 cases had good outcomes, and 5 patients had fair outcomes.

Table 4: Distribution of outcomes

Outcomes	No. Of. Cases
Excellent	26
Good	9
Fair	5

Based on the surgical approach, 32 patients had a deltopectoral approach, 8 patients had deltoid splitting.

Table 5: Surgical approach.

Surgical Approach	No. of. Cases
Deltopectoral	32
Deltoid Splitting	8

2 patients had a superficial infection, 3 cases had malunion, 2 patients had screw penetration, 1 had axillary nerve palsy.

Table 6: Complication.

Complication	No. Of. Cases
Infection	2
Malunion	3
Screw Penetration	2
Axillary Nerve Palsy	1
Avascular Necrosis	0
Acromial Impingement	0
Screw Breakage	0

Discussion

Fractures of proximal humerus are common and debilitating injuries and are an increasing problem in the elderly. Incidence of proximal humerus fractures is 4 to 5 percent of all fractures^[5]. Mechanism of injuries in a young adult is high energy injuries mainly from road traffic accidents, sports injury or fall from height. Fracture in elderly patients is more common than young adults which are low energy osteoporotic injuries like domestic fall. Females are more affected than males. 85% of proximal humeral fractures are stable, minimally displaced and can be treated conservatively^[6]. The patients usually have fracture-dislocation^[7]. Secure fixation of displaced three and four-part fractures of proximal humerus remains a problem^[8]. Fractures with intraarticular extension and severe comminution need surgical management.

Various methods of treatment for proximal humerus fractures available are Kirschner wire fixation, tension band wiring, external fixation, intramedullary nailing, plate fixation^[9, 10] and prosthesis replacement. 'K' wire fixation does not ensure stable reduction and hinders early mobilization and fracture healing. Tension band wiring gives the same functional outcome of conservative management^[8, 11] in avulsion fractures. AO plate fixation gives poor results with osteoporotic patients, screw loosening and subacromial impingement are frequent^[10, 12]. Intramedullary nailing gives

satisfactory results in two-part fractures [13]. Shoulder hemiarthroplasty provides pain relief, but functional and range of movements are less predictable [14]. Plate fixation aims to provide secure fixation of the humeral head to the shaft, thereby preventing secondary torsional displacement of the shaft from the head and to provide additional fixation of reduced tuberosity fragments [15].

The proximal humerus interlocking system (PHILOS) plate is pre-contoured for proximal humerus gives stable fixation to osteoporotic bone, and it minimizes soft tissue damage. The pre-contoured PHILOS plates are more versatile with a high rate of union, especially in osteoporotic bone [16, 17]. PHILOS preserves the blood supply to the bone, ensures axial and angular stability and maintains the reduction. PHILOS design aims at improving purchase and prevents pull-out screws in osteoporotic bone by using the convergent and divergent orientation of screws engaging the head of the humerus. It can bridge multifragmentary fractures of the surgical neck, and the rotator cuff can be attached to the plate through suture holes [18].

Conclusion

The PHILOS plate fixation gives excellent results as compared to other fixation methods, particularly in osteoporotic and comminuted fractures. It provides rigid fixation and allows early mobilization. The PHILOS plate is near ideal technique with a high union rate in the treatment of proximal humerus fractures. However, we are aware this is a short term study and would require further evaluation and more input.

References

1. Boileau P, Walch G. The three-dimensional geometry of the proximal humerus. *J Bone Joint Surg Br* 1997;79-B(5):857-865.
2. McLaurin TM. Proximal humerus fractures in the elderly are we operating today? *Bull Hosp Jt Dis N Y N*. 2004;62(1, 2):24-32
3. Rockwood CA, ed. *The Shoulder*. 4th ed Philadelphia, PA: Saunders/Elsevier 2009.
4. Hertel R, Hempfing A, Stiehler M, Leuing M. Predictors of humeral head ischaemia after intracapsular fracture of the proximal humerus. *J Shoulder Elbow Surg*. 2004;13(4):427-433.
5. Habermeyer P, Schweiberer L. Fractures of proximal humerus. *Orthopade* 1989; 18:200-7 (in German).
6. Young TB, Wallace WA. Conservative treatment of fractures and fracture-dislocation of the upper end of humerus. *J Bone Joint Surg [Br]* 1985;67-B:373-7.
7. Flatow EL. Fractures of the proximal Humerus Rock Wood and Greens fracture in adults 2001;1:997-1035.
8. Zyto K, Ahrengart L, Sperber A, Torn Kvist H. Treatment of displaced proximal humerus fractures in elderly patients. *J Bone Joint Surg [Br]* 1997;79-B:412-17.
9. Kristiansen B, Kofoed H. External fixation of displaced fractures of proximal humerus: technique and preliminary results. *J Bone Joint Surg [Br]* 1987;69-B:643-6.
10. Kristiansen B, Christiansen SW. Plate fixation of proximal humeral fractures. *Acta Orthop Scand* 1986;57:320-3.
11. Ilchmann T, Ochsner PE, Wingstrand H, Jonsson K. Non-operative treatment versus tension-band osteosynthesis in three- and four-part proximal humeral fractures: a retrospective study of 34 fractures from two

- different trauma centers. *Int Orthop* 1998;22:316-20.
12. Rees J, Hicks J, Ribbans W. Assessment and management of three- and four-part proximal humeral fractures. *Clin Orthop* 1998;353:18-29.
13. Rajasekhar C, Ray PS, Bhamra MS. Fixation of proximal humerus fractures with the Polarus nail. *J Shoulder Elbow Surg* 2001;10:7-10.
14. Moeckel BH, Dines DM, Warrem RF, Altchek DW. Modular hemiarthroplasty for fractures of the proximal part of humerus. *J Bone Joint Surg [Am]* 1992;74-A:884-9
15. Rockwood and Greens Fractures in adults. 7th edition 1,1074.
16. Gavaskar AS, Karthik BB, Tummala NC, Srinivasan P, Gopalan H. Second generation locked plating for complex proximal humerus fractures in very elderly patients. *Injury* 2016;47(11):2534-38.
17. Brunner F, Sommer C, Bahrs C, Heuwinkel R, Hafner C, Rillmann P *et al*. Open reduction and internal fixation of proximal humerus fractures using a proximal humeral locked plate: a prospective multicentre analysis. *J Orthop trauma* 2009;23(3):163-72.
18. AO Principle of Fracture management Second expanded edition 2,581.