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A study of functional outcome of displaced proximal humerus fracture treated with philos plating

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Abstract

Background: Fracture of proximal humerus fracture represent approx 5% of all fractures and 26% of humerus fractures. The usual method of treatment was conservative in past and result and functional outcome were not good. Three and four part fracture of Neer's classification (13-16% of proximal humerus fractures) have been challenging to achieve stable fixation. With philos plating the functional outcome are known to be improved.

Methods: A Study was conducted on 30 consecutive patients came to PGI Swasthiyog during period of May 2020 to May 2022. All fractures were fixed with proximal humerus locking plate and patient were followed up at regular intervals. All patients are evaluated using 1) Pain relief, 2) Mobility 3) Strength. Final assessment was done using Constant and Murley scoring system for functional outcome.

Results: According to constant and murley shoulder scoring system out of 30 patients there were excellent outcome in 14 patients (46.66%), good in 10 patients (33.33%), fair in 5 patients (16.66%), poor outcome in 1 patients (3.33%).

Conclusion: Fixation using proximal humerus locking plate gives better functional outcome in displaced proximal humerus fracture particularly in elderly and osteoporotic patients. The incidence of complication and subsequent resurgery is relatively low.

Keywords: Constant and murley score system, proximal humerus fracture, functional outcome

Introduction

Proximal humerus fracture consist of 5% of all fractures in all age groups [1] and they are the 3rd most common fracture overall, after hip and distal end radius fractures. Most common fractures affecting shoulder girdle [2, 3, 4]. Neer's classification distinguishes between the numbers of displaced fragments with displacement defined as greater than 45 degree of angulation or >1cm of separation [5]. Minimally displaced fractures regardless of numbers of fractures lines can be treated by closed reduction but displaced fractures requires anatomical reduction and internal fixation [6].

In young patients high energy trauma is most common cause, in elderly patients –trivial fall (due to osteoporosis) is most common cause [7]. Different techniques like closed reduction with K-wire, open reduction with fixation with bone sutures, Multi lock nail, Reverse shoulder replacement, Polaris nail have been developed [8]. Complications from above methods like cutout/backout of screws, avn, nail migration, rotator cuff impingment are present [9]. The proximal humerus fractures with poor cancellous bone quality especially in older patients, results in high risk of failure of fixation with any types plating system.

Philos plating has been developed as a device to achieve better results and minimize complications. The proximal humerus internal locking system plate is next generation implant with locking system. It is considered as fixed angle implant and is designed according to anatomy of proximal humerus [10]. Philos plate is precountered anatomical plate with improved fracture fixation in osteoporotic bones due to better anchorage of screws [11, 12]. There is less chance of screw loosening and better purchase in humeral head. With this background, we in present study tried to evaluate the functional outcome of proximal humerus fracture treated with philos plating.

Method

This study was conducted at PGI Swasthiyog Prathisthan, Miraj during period from May 2020 to May 2022. Inclusion criteria were all adults' patients with closed 2-parts, 3-parts and 4-parts fracture of proximal humerus fracture. Exclusion criteria were patients with open fractures, pathological fractures, polytrauma, pre-existing medical morbidity.

A total of 30 patients were included in study based on inclusion and exclusion criterias. All patients were evaluated and subjected to clinical and local examinations and routine preop investigations.

Plain xray of affected shoulder AP, lateral and axillary plane views were done. CT scan of shoulder was performed in all patients.

If all preoperative investigations are normal and patient is fit to undergo surgery he or she was posted for surgery. Injection antibiotics were given 1hr prior to surgery. Brachial block or GA was used in all patients according to medical conditions. Surgery was done in supine position.

Fracture site opened by standard deltopectoral approach and minimal soft tissue dissection. First sutures were taken through rotator cuff tendons and fracture fragment were identified and after the reduction of fracture fragment a temporary fixation with K-wire was performed to hold fracture reduction done under fluoroscopy. Once final reduction was acceptable a pre-contoured locking plate of appropriate size was placed over lateral surface of humerus about 8mm distal to tip of greater tuberosity, lateral to bicipital groove, screws were inserted divergent in the head fragment through the jig.

It is important to achieve valgus reduction that means the neck shaft angle should be more than 120 degree. Calcar screw should support the inferomedial head portion but if there is poor purchase because of low density or anatomical neck fracture then we use either iliac crest graft, tricalcium phosphate bone substitute, fibular graft or in some patient additional medial recon plate. Plate positioning is crucial to avoid complications.

Rotator cuff tendons were anchored and tied through plate using non-absorbable sutures and first tuberosities were tied with each other and then to plate. Final reduction was confirmed using fluoroscopy to check reduction, length of screws, plate position.

In few cases Philos plate can't catch all fragments so we put additional screws through tuberosities to augment the fixation. Wound was closed in layers and sterile dressing applied. The arm was immobilized by using shoulder sling and arm pouch. The wound was checked on 2nd post op day and sutures were removed after 14th day. Post-operatively limb elevation and active fingers movement will be advised as per pain tolerance. Post-procedure shoulder range of movement initiated from post-operative day 1 which includes wall climbing, pendulum exercises, CPM, passive movements as per tolerance. Active assisted exercises after 6 weeks and full active exercises after 10-12 weeks. Strengthening exercises after 3 months. No heavy weight lifting or vehicle driving allowed till radiological and clinical union.

Results

A total of 30 patients were included in study of proximal humerus fracture. The patient were followed for period of 12 months. Functional outcomes were assessed according to constant and murley scoring system. The most common age group involved in fracture was 21-50 yrs. At the end of the year, 14 patients (46.66%) had excellent outcome, 10 patients

(33.33%) were functionally had good outcome and 5 patients (16.66%) had moderate which scores between 56-70 which according to literature is fair result, 1 patient (3.33%) had score less than 55 points and were graded poor.

The Mean constant murley shoulder score is 82.85 there by falling in good outcome category.

Grading based on constant-murley score

Grading	Constant score	Patient no.	%
Excellent	86-100 points	14	46.66%
Good	71-85 points	10	33.33%
Moderate	56-70 points	5	16.66%
Poor	0-55 points	1	3.33%

The Neer's classification of proximal humerus was followed in study

Neer's fracture Class	Numbers of patients	Constant score
1 part fracture	0	—
2 part fracture	8	85.06
3 part fracture	15	82.78
4 part fracture	7	80.09

The average outcome after 1yr follow up as per for 2 part fracture (mean constant score 85.06) while 3 part have average outcome (mean constant score 82.78) 4 part have poor outcome (mean constant score 80.9). However the difference in outcome is minimal and not statistically significant. There were no cases of superficial or deep infection in study. In our study we observed that flexion and internal rotation were earliest movements to recover followed by external rotation and finally abduction.



Fig 1: Part proximal humerus fracture (Neer's classification)



Fig 2: Union with PHILOS plate after 8 months.**Discussion**

Proximal humerus fractures are the second most common fractures of upper extremity accounting for 4% to 5% of all fractures [13]. These fractures usually shows bimodal age distribution with high energy velocity injuries in younger population to trivial trauma in older age groups. Undisplaced fractures can be treated non-operatively with favourable outcome, fractures with intra-articular extension and severe comminution needs surgical fixation [14, 15]. Advantage of philos plate is that it gives better purchase in osteopenic bone with no loss of reduction or varus/valgus angulations, locking screw provides better angular and axial stability. Plate positioning must not be too high as it can leads to incorrect placement of the divergent screws in humeral head. Care should be taken by rotation in all directions to avoid screw penetration in head and to avoid use screw length 5mm shorter than measured. Philos plate design provides stable fixation with good functional outcome and eliminate most hardware problems such as failure and impingement syndrome [16] if applied properly. In 2009 MA Fazal *et al.* [17] concluded philos plate fixation provided stable fixation, minimal metal work problem and enabled early mobilization with exercises to achieve acceptable functional results [18]. Primary screw perforation was most frequent problem followed by secondary screw perforation and vascular necrosis. As proximal humerus fracture remains a challenge as complication rate is still high in elderly and osteoporotic patients.

Conclusion

Philos plate as per its pre contoured design provides a high degree of angular and axial stability, locking screws to plate in this system provides a high degree of angular and axial stability but philos is not a versatile design for all types of fracture of proximal humerus, failure rate is high if improperly done. Placement of calcar screw is must to prevent varus collapse, you may need a second plate to support calcar if severe osteopenia or a fibular strut graft to augment screw purchase. Restoration of rotator cuff bio-mechanics plays an important role in regaining movements of shoulder post-operatively. Early physiotherapy post-operatively and good rehabilitation programme can give good functional outcome. Philos plate is ideal and stable implant to use for fractures of proximal humerus in Neer's 2-part, 3-part, and 4-part and osteoporotic fractures with augmentation in elderly and comminuted fractures of proximal humerus.

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Author's Contribution

Not available

Conflict of Interest

Not available

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References

1. Court-Brown CM, Caesar B. Epidemiology of adult fractures: A review. *Injury*. 2006;37:691-7.
2. Palvanen M, Kannus P, Niemi S, Parkkari J. Update in epidemiology of proximal humerus fracture. *Clin Orthop Relat Res*. 2006;442:87-92.

3. Bell JE, Leung BC, Spratt KF, Koval KJ. Weinstein, Trends and variation in incidence, surgical treatment, and repeat surgery of proximal humerus fracture in elderly. *J Bone Jt Surg*.
4. Court-Brown CM, Garg A, McQueen MM. The epidemiology of proximal humeral fracture. *Acta Orthop Scand*, 2001.
5. Classification in Brief, The Neer Classification for Proximal Humerus Fractures Bradley C.Carofino MD, Seth S. Leopold MD *Clin Orthop Relat Res*. 2013;471:39-43.
6. Handoll HH, Gibson JN, Madhok R. Interventions for treating proximal humerus fractures in adults. *Cochrane Database Syst Rev*. 2003;4:434-434.
7. Lind T, Kroner K, Jensen J. The epidemiology of fractures of the proximal humerus. *Arch Orthop Trauma Surg*. 1989;108:285-7.
8. Rohra N, *et al.* *Int J Res Orthop*. 2016 Mar;2(1):25-28.
9. Kiran Kumar GN, *et al.* *Chinese Journal of Traumatology*. 2014;17(5):279-284.
10. Smith WR, Ziran BH, Anglen JO, Stahel PF. Locking plates: Tips and tricks. *J Bone Joint Surg Am*. 2007;89(10):2298-07.
11. Gautier E, Sommer C. Guidelines for the clinical application of the LCP. *Injury*. 2003;34(2):B63-76.
12. Hemley N, Hintermann B. New trends in the treatment of proximal humerus fractures. *Clin Orthop Relat Res*. 2006;442:100-8.
13. Neer CS, Rockwood CA. Fractures and Dislocations of the shoulder, in Rockwood and Green: Fractures in adults, Philadelphia, PA: Lippincott, 1984, 675-721.
14. Nho SJ, Brophy RH, Baker JU, Cornell SJ, Mac Gillivray JD. Management of proximal humerus fractures based on current literature. *J Bone Joint Surg [Am]*. 2007;89(3):44-58.
15. Friess DM, Attia A. Locking plate fixation for proximal humerus fracture: a comparison with other fixation techniques *Orthopaedics*. 2008;31(12):pii. orthosuper site.
16. Koukakis A, Apostolou CD, Taneja T, Korres DS, Amini A. Fixation of proximal humerus fractures using PHILOS plate: early experience. *Clin Orthop Relat Res*. 2006;442:115-20.
17. Fazal MA, Haddad FS. Philos plate fixation for displaced proximal humerus fractures. *J Orth Surg* 2009;17(1):15-18.
18. Brunner F, Sommer C, Bahrs C, Heuwinkel R, Hafner C, *et al.* Open Reduction and Internal Fixation of proximal humerus fracture Using a Proximal Humeral Locked Plate: A Prospective Multicenter Analysis. *J Orthop Trauma*. 2009;23(3):163-172.

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