

Comparison of Open Reduction- Internal Fixation of Proximal Hummers Interlocking System (PHILOS) Versus Closed Reduction and K-Wire Fixation in Proximal Humeral Fracture.

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Abstract: Fracture proximal humerus is the 2nd most common fracture of upper limb in adults. This fracture is treated by ORIF by PHILOS and percutaneous k wire fixation.

Objective: To compare the result of both techniques

Methods: In this study cases were included which were divided into two groups by randomized controlled trial type of study design. 30 Patients in Group A were operated with proximal humerus Interlocking System (PHILOS) and 30 patients in Group B were treated with percutaneous K wire fixation. All patients were followed up to one year.

Result: All fractures were united with an average 10 weeks. The result of both groups were compared.

Conclusion: Fixation with PHILOS plates provides an excellent stable construct even in multi fragmented osteoporotic proximal humeral fracture with accurate reduction and early mobilization. Fixation with percutaneous K wire may present an efficient treatment in 3 parts and multi fragment fractures.

Key words: PHILOS plate, proximal humerus fracture, K wire.

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I. Introduction

Fracture of the proximal humerus represents the second most common fracture after Colles' fracture in adults of upper limb due to road traffic accident and increase in incidence of osteoporosis. They constitute about 4-5% of all fractures¹. Minimally displaced fractures regardless of number of fracture lines can be treated with closed reduction but displaced fractures required anatomical reduction and internal fixation^{2,3}. The choice of treatment depends on the age, the pattern of the fracture, the quality of the bone, the patient's requirement and surgeon's familiarity with the treatment procedures. The age of patient, physical activity also largely influence the treatment options. Among various modalities the closed reduction and percutaneous K wire fixation is one of them⁴. In this procedure blood loss is less and minimal risk of neurovascular complications. However prolonged immobilization lead to stiffness of shoulder joints and anatomical reduction is not achieved especially in multi fragmental fractures.

Another modality of treatment is open reduction and internal fixation with proximal humeral interlocking osteo-synthesis plate (PHILOS plate)⁵. It is anatomically contoured with threaded screw head, locked into the threaded plate holes to prevent screw toggle to slide and pull out and give angular stability and anatomical reduction. These plates have a low profile and hence the danger of post-operative soft tissue impingement syndrome is very less.

The aim of our study was to compare the results of open reduction internal fixation (ORIF) with proximal humeral interlocking system and closed reduction and pinning with K wire in proximal humeral fracture.

Material and method

A Prospective study was conducted in MGM Medical College Hospital, Jamshedpur from May 2015 to May 2018, Out of 78 Patients with proximal humerus fracture were selected .

Inclusion criteria - Closed fracture of surgical neck humerus -2 part, 3 parts and 4 parts (Neer's classification) fractures of within 4 weeks.

Exclusion Criteria - Age < 18 years and >70 years.

- Minimally displaced fractures neck or humerus.
- Open fracture of proximal humerus.
- Pathological fractures.

Comparison of Open Reduction- Internal Fixation of Proximal Hummers Interlocking System

All the patients were divided into two groups . Group A included 30 patients (18 male and 12 females) who were treated with open reduction and internal fixation with proximal humeral interlocking osteosynthesis system (PHILOS) plate. In this group 15 patients had 2 parts fracture, 11 patients had 3 parts fracture and 4 patients had 4 parts fracture. Group B included 30 patients (19 males and 11 females) who were treated with closed reduction and percutaneous K wire fixation. In this group 18 patients had 2 parts fracture, 9 patients had 3 parts fracture and 3 patients had 4 parts fracture.

Operative technique for each group was as follows-

Group A- Patients with proximal fractures were treated with open reduction and internal fixation (ORIF) with PHILOS plate. Surgery was performed under general anesthesia, patient in supine position with a small pillow under the shoulder. The fracture was opened through a deltopectoral approach, the fracture fragments were reduced and held in position by putting the PHILOS plate and inserted the K wires. The PHILOS plate was placed lateral to the bicipital groove and 1 cm distal to the upper end of greater tubercle. The required lengths of the locking screws were determined with a direct measuring device over the K wire and this can be confirmed by image intensifier. There were at least 6 locking screws were inserted in the proximal humeral head. The lesser tubercle and other fracture fragments were fixed with separate K wires or screws. Wound was closed in layers with putting the suction drain. Passive range of motion (ROM) exercises was initiated after one week of operation. Sutures were removed after two weeks. Active shoulder mobilization exercises were started after 4 to 5 weeks post operatively. Follow up was at every month for 6 months and then after 1 year for final evaluation.

Group B- The patients of this group were placed in beach chair position then under general anaesthesia the anatomical reduction was achieved by manual traction and mobilization. Under aseptic precaution 3 to 4 threaded 2.5 mm K wires under the guidance of image intensifier were inserted. Depending on the number of fracture fragment K wires weaved. Care was taken on the orientation and pin placement to avoid injury to axillary nerve, the radial nerve and anterior circumflex humeral vessels which is lying medially. K wires left out of skin and bent at the extremity to control proximal migration. Dressing was done on alternate days. Patient was encouraged to start active mobilization of wrist and elbow on 2nd post-operative days. Passive (ROM) exercises were initiated after one week of operation. Active shoulder mobilization exercises were started at 4 to 5 weeks of operation. Follow up at one week every month for 6 months and then after one year for final evaluation.



Fig-1. A-2 parts fracture of proximal humerus,B- Treated with PHILOS Plate



Fig-2.A – 2parts fracture of proximal humerus, B-Treated with K-wires

II. Observation &Result

Mean operation time was 110 minutes (range 90 to 130 minutes) in group A and 75 minutes (range 60-90 minutes) in group B. The blood loss in group A was average 600 ml (range 400 to 1000 ml) and in group B average was 100 ml (range 80ml to 160 ml). Both groups received broad spectrum antibiotics in post operatively.

There were no any major complications noted during operation. The post-operative complications were noted in group A and group B both which are shown in Table 1

Table-1: Post-Operative complications in Gr - A &Gr- B

GROUP-A (PHILOS)	Non-Union	Infection	Mal-Union	Avascular necrosis of humeral head	Average Constant Murley Score
No. of patients	2	4	2	2	84.6
Treatment	Autogenous bone graft	Antibiotics	No treatment	Shoulder arthroplasty	
GROUP-B(K wire)				Pin loosening	
No of patients	2	6	4	6	76.4
Treatment	Autogenous bone graft	Dressing and antibiotics	No treatment	Pin removal & re-insertion	

III. Discussion

Most of the displaced proximal humeral fractures can be treated conservatively. However displaced fractures require surgical treatment for better outcomes. The treatment's goal was to achieve a painless shoulder with full ROM. Many different fixation techniques such as non-absorbable suture tension band, K wire, T plate intramedullary device and hemiarthroplasty have been used for these difficult fractures.

These fractures have been treated with wide range of options, namely non- operative percutaneous screw/pin fixation externally and open reduction and internal fixation are both common in this region. The fracture with high energy as well as fractures with simple falls in all age group. In elderly patients fragility of osteoporotic bone complicates the pattern of fracture and making the treatment challenging. Zyto and colleagues reported mean constant score of 65 points and no complications with conservative treatment compared with surgical approach resulting in mean value of 60 points and with complications like AVN and infection etc⁶. Magovern Kenner and Nho found good constant scores with surgery and relatively few complications with better functional scores than percutaneous K wire fixation⁷. Percutaneous fixation has its limitations of poor reduction of fracture fragments, pin tract infection and long period of recovery⁸. But it has the advantage of less soft tissue stripping with less blood loss and minimal invasiveness. The Open reduction and internal fixation with PHILOS plate for treatment of proximal humerus fractures has the advantage of accurate reduction, early mobilization, better fixation even in osteoporotic bones. It is also very useful in reconstruction of comminuted and irreducible fractures. The disadvantages of ORIF are excessive soft tissues dissection and blood loss, the risk of injury to the neurovascular structures hence risk of AVN of humeral head⁹. However recent studies ORIF with PHILOS plate shown good results¹⁰. The study of Fazal et al, it was seen PHILOS plate fixation provided stable fixation with minimal implant problems and enabled early range of motion exercises to achieve acceptable functional results¹¹.

IV. Conclusion

In this study it was concluded that PHILOS plate provides as excellent stable construct especially in multi fragmented osteoporotic proximal humeral fracture with advantage of accurate reduction and early mobilization. Fixation with percutaneous K wires may present an efficient treatment option for 3 and 4 part proximal humeral fractures with its advantages of minimal invasiveness and less soft tissue dissection. The better functional results were seen in patients treated with PHILOS plate.

References

- [1]. Handoll H H ,Gibson J N, Madhok R. Interventions for treating proximal humeral fractures in adults. Cochrane Database System Rev 2003;4:434.
- [2]. Clifford PC,Fractures of neck of humerus: A review of late results .Injury 1980;12:91-5.
- [3]. Stableforth PG .Four part fractures of the neck of humerus J Bone Joint Surg Br 1984;66:104-8
- [4]. EsenE ,DogramciY,Gultken S ,Deveci MA. Factors affecting results of patients .Injury 2009;40 :1336-41.
- [5]. Ring D.Current concepts in plate and screw fixation of osteoporotic proximal humerus fractures in elderly patients. Am J Orthop 2011;40:458-61.
- [6]. ZytoK,AhrengartL,SperbertA,Torknqvist H.Treatment of displaced proximal humeral fractures in elderly patients. J Bone joint Surg[Br]1997;79:572-7.
- [7]. Magovern B, Ramsay ML.Percutaneous fixation of proximal humeral fractures.OrthopClin North Am 2008;39:405-16.
- [8]. NhoSJ,Brophy RH, Baker JU ,Cornell CN ,Mac Gillivray JD.Management of proximal humerus fractures based on current literature,J Bone Joint Surg[Am] 2007;89:44-58.
- [9]. Sigel J,Dines D.Proximal humerusmalunion.OrthopClin North Am 2000;31:35-49.
- [10]. Hirschmann MT ,FalleggerB,AmslerF,RegazzoniP,GrossT.Clinical longer term results after internal fixation of proximal humerusfractures with a locking compression plate(PHILOS).J Orthop Trauma2011;25:286-93.
- [11]. Fazal.PHILOS plate fixation for displaced proximal humeral fractures. J Orthop Trauma Surg 2009; 17(1):15-8.

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