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To study functional and radiological outcome of proximal humerus fractures treated with Philos plate

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Abstract

Introduction: Fractures of proximal humerus is the third most common fracture after hip fracture and Colles fracture in elderly patients. As the technology has advanced, the elderly people no longer need to be denied effective surgical treatment.

Aim of the study: The aim of the study was to analyze the functional and radiological outcome and to assess the complications of proximal humeral fractures treated using PHILOS plates.

Materials and Methods: This study we have analyzed 16 cases of proximal humeral fractures treated surgically using PHILOS plate admitted at GMC Jammu from April 2021 to April 2022. All the patients were reviewed at two weeks interval, for first three months and later every month. During follow up, patients were clinically evaluated for pain and function. The minimum follow-up period was 3 months and maximum follow up period was 8 months. Radiological evaluation of fracture union was observed by serial x rays.

Results and Observation: Majority of injured patients were females (70%) and the highest number of patients were in their 5th decade (40%). Free fall at ground level was the most common mode of injury (70%). Early complications like superficial skin infection, screw penetration and Late complications like Osteonecrosis and joint stiffness were encountered. DASH Score was used to assess the functional outcome of our patients.

Conclusion: Finally we concluded that displaced proximal humeral fractures when treated surgically produce greater range of movements (ROM), less pain and less stiffness. Functional outcome is better with isolated fractures than with fracture dislocations. Functional outcome of 2 part fractures is better than 3 part and 4 part fractures. Radiological outcome assessed by means of quality of reduction and union of fracture in two and three part fractures is better than in four part fractures.

Keywords: Proximal humeral fractures, philos plates, Neer's classification

Introduction

Fractures of the proximal humerus comprise nearly 4% of all fractures and 26% of fractures of humerus. They are the commonest fractures in elderly population, which ranks the third and the first and second being, hip and distal radius fractures respectively. Proximal humerus involves head, greater tuberosity, lesser tuberosity and proximal one fourth of the shaft. Most common in elderly patients due to osteoporosis and less frequent in young adults due to high energy trauma. Usually high energy trauma is associated with dislocation. Most of the proximal humerus fractures in younger as well as in the elderly patients are stable & slightly or non-displaced, can be treated non operatively. These comprise nearly 80% of proximal humerus fractures. The rest of 20% require surgical fixation either because they need better shoulder mobility or because their fracture is more severe. Neer's classification distinguishes between the number of displaced fragments with displacement defined as greater than 45° of angulation or > 1cm of separation. These type of fractures require stable fixation. There are different types of fixations for proximal humerus fracture like k-wires, screw fixation, T-butress plate, conventional plate, locking plate and prosthetic replacement. Each fixation has its own complications. The proximal humerus with poor cancellous bone quality especially in older patients, results in high risk of failure of fixation with conventional plating system.

Materials and Methods

This is a prospective study, conducted at Government medical College Jammu on those who were admitted with displaced fracture of Proximal Humerus from April 2021 to April 2022. Before including them in this study, informed consent was obtained from them in the language in which they were well versed and ethical committee clearance was obtained for the same.

Inclusion criteria

1. Patients with age greater than 18 with displaced proximal humerus fracture, on the basis of Neer's classification
2. Failure of conservative treatment.
3. Associated dislocation of shoulder.

Exclusion criteria

1. Metastatic & pathological fractures
2. Un-displaced fractures
3. Those who not will for surgery

Pre op assessment

After initial resuscitation, a detailed history was taken and thorough clinical examination was done to rule out any other associated injuries. Distal neurovascular status was assessed. Routine investigations like complete hemogram, bloodsugar, renal function tests, serum electrolytes, blood grouping and typing, bleeding time, clotting time, chest x ray PA view, ECG were done. Radiographs of the affected shoulder were taken in AP, Lateral and Axillary views and fractures were classified according to Neer's classification.



Fig 1: Pre-op assessment

CT pictures were taken in selected patients with complex fracture patterns to know the articular involvement. Anaesthetic fitness was obtained for all the patients before surgery. All patients received 1 gram of cefotaxime intravenously. All patients were positioned supine on the table with a sand bag placed between the spine and medial border of the scapula in order to push the affected side forward and to open up the front of the joint. Sixteen patients were operated using standard deltopectoral approach. Four patients were operated using deltoid splitting approach. After incising the skin, subcutaneous tissue, fascia and muscle, the conjoint tendon was retracted medially. The fragments were reduced indirectly and temporarily fixed with the help of 1.5 or 1.8 mm K-wires under image intensifier control. After obtaining acceptable reduction, the PHILOS plate was placed at least 8mm distal to the upper end of the greater tuberosity. The long head of biceps tendon was identified and preserved. The plate was then placed lateral to the long head of biceps without compromising its function. The humeral head fragment as well as the metaphyseal shaft was fixed with locking head screws. Standard length wires were inserted into the humeral head through a guide and the length of screw was determined by placing a measuring device over the protruding wire. The corresponding length locking screw was then inserted using a specifically designed screw driver. Then final position of the implant was checked with image intensifier in multiple planes. The shoulder was checked for stability of fixation, range of movements and absence of impingement. None of our patients required bone grafting. Suction drain kept

in situ and closure was done. Drain was removed on the second post operative day. Post operative day X rays are taken in the immediate post-op period to document the fracture alignment, reduction and fixation.

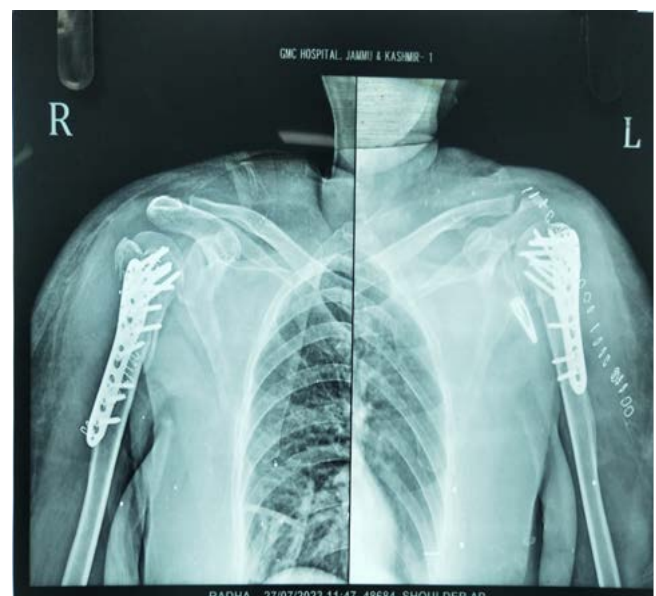


Fig 2: Post-op assessment

Thereafter X rays are repeated at every 3 to 4 weeks interval to

monitor the fracture union and to detect any implant loosening, deviation, screw penetration, screw backout, impingement and failure. In all patients the arm was placed in an arm sling, cuff and collar or shoulder immobilizer. Passive elbow flexion and extension were started by 24-48 hrs. Phase I exercises consisting of pendulum exercises were started from the first week. Gentle passive forward flexion, internal and external rotation exercises were initiated by third week. Phase II exercises consisting of active range of motion exercises and resistive exercises were started by 4-6 weeks. Phase III exercises consisting of advanced stretching and strengthening exercises were started by 3 months. Lifting of light weight objects were started after 3 months.

Results

Fractures of the proximal humerus occurred more frequently in women (70%) than men (30%) in our cohort of patients. The average age for the cohort of patients in this study was 54.4 years. Most of the patients (70%) presenting to our hospital had a simple fall as the reason for their humerus fractures. The remaining 30% developed the fractures due to road traffic accidents. Of the 16 patients with humerus fractures, 01 patient had fractures of both the humerus bones. Of these 50% had right-sided humerus fracture, while the remaining 49% had left-sided proximal humerus fracture. Most of the patients (75%) presented to our hospital on the same day of sustaining injury and were diagnosed with proximal humerus fracture. The remaining 10% patients presented 1 to 2 days (10%), 2 to 6 days (5%), and ≥ 7 days, each, after sustaining injury. Majority of the patients (70%) did not have a comorbidity, either from a fracture occurrence/treatment perspective, or from a fracture healing perspective. Twenty percent of the patients had type II diabetes mellitus (DM), while 10% had type II DM and systolic hypertension. Majority of the patients (80%) did not have an associated injury. Radiological evaluation of the fractures was done and were classified according to Neer's four-part classification system. 20% had 2-part fractures 55% had 3-part fractures and 25% had 4-part fractures Majority of the patients underwent surgical treatment for the proximal humerus fracture within 2 weeks of occurrence of injury. 1 patient underwent surgery after 2 weeks of injury. All 16 patients were started on physiotherapy with passive mobilization on day 3 post-surgery. The patients underwent a DASH scoring evaluation the final patient outcomes were assessed as follows: Of the 16 patients, 6 (40%) patients had good final outcome based on the DASH score, 8 (50%) had a satisfactory outcome, while the remaining 2 (10%) had a poor outcome from the fracture surgery. The overall DASH scores were better in the younger patients when compared with the elderly patients. In the 16 patients, the neck-shaft angle at (Day 1) post op was in the range of 130° to 137° , with an average angle of 133.2° . Post-surgery, after 3 weeks this neck-shaft angle reduced to the range of 124° to 132° (Day 21 follow-up), with an average of 128.5. Overall, the radiological outcome was favourable for all the 16 patients.

Complications

(20%) Patients developed early complications which are as follows: Superficial Skin Infection (10%), Screw Penetration 2 (10%). Of the 16 patients, 3 patients (15%) developed late complications as well, which are as follows Osteonecrosis 2 (10%), Joint Stiffness (5%) Majority of the patients (75%) did not experience either early or late complications post-surgery and had an uneventful recovery.

Discussion

In this prospective hospital-based study, we have analyzed 16 cases of proximal humerus fractures treated surgically using

PHILOS plates in our hospital. There was a female preponderance in our study (70%) which was in line with the conclusion of the study conducted by Hawkins & Bell or Kumar *et al.* both of which had a female preponderance. In the study by Kristiansen *et al.* involving 565 proximal humerus fractures in 5,00,000 people, women were involved in 77% of fractures in all age groups. This is thought to be a direct result of advanced osteoporosis, but our study differs from the results of these studies. In our study, the average age of the patients was 54.4 years which was corresponding to the reports by Hawkins and Bell, and Flatow *et al.* and Cornell *et al.* In our study, the most common mode and mechanism of Injury was free fall at ground level and road traffic accident, which is comparative to the results of the study conducted by Flatow *et al.* as fall on the outstretched arm was the predominant mechanism of injury. Since Indian people have poor quality of bone stock, slight differences are expected. Neer Classification is the most widely used scheme for proximal humeral fractures. It has gained universal clinical acceptance by orthopaedic surgeons and radiologists and is considered to have significant implications for both treatment options and outcomes. In our study also, we have followed Neer's 4-part classification. In order to properly employ this classification, precise radiographic evaluation is of paramount importance and it is found that Neer's 3 view trauma series to be of greatest value in evaluating these fractures. The importance of these series has been shown by Richard J, Hawkins S and R.L. Angel. Flatow *et al.* in a series of 12 patients, reported 50% excellent results and 50% good results in patients treated by ORIF with LCP for two part greater tuberosity fracture. In our study, the overall outcome was satisfactory in 50% of the patients and good in 40% of the patients. Closed treatment of 3-part fracture is often associated with moderate pain, poor range of motion and disability. ORIF was associated with good to excellent results in more than 80% of patients in a report by Hawkins *et al.* and recommended surgical treatment for healthy active individuals who have three part fractures of the proximal humerus.

Cornell and Levine reported good results with screw tension band technique for 3-part fractures. Prosthetic replacement for 3-part fracture has been used by several authors. In the treatment of 4-part fracture and fracture dislocations, less than 10% good or excellent results are obtained by open reduction and internal fixation. Isolated reports of revascularization of head of humerus following ORIF indicate satisfactory healing. In the 20 patients, the neck-shaft angle at (Day 1) post op was in the range of 130° to 137° , with an average angle of 133.2° .

Postsurgery, after 3 weeks this neck-shaft angle reduced to the range of 124° to 132° (Day 21 follow-up), with an average of 128.5° and this did not make any difference in the final outcome. It was observed that people with age < 50 years had a better range of movement (eg. abduction and forward flexion of the shoulder joint) ranging over 120° In patients aged > 50 years, the range of movement was restricted to an average of 100° which correlates with the study done by Gracitell, Mauro Emilio Conforto *et al.* In our study patient who had attended regular physiotherapy sessions and who adhered to 3 phase rehabilitation protocol had better DASH score and range of movement than patient who did independent exercises at home. Patients whose fracture were fixed earlier than 2 weeks had good and satisfactory outcome while in one patient when fracture was fixed later than 2 weeks had poor outcome. In our study In spite of most of the patients being operated early the number of patients with excellent functional outcome is less in our study because some of the patients did not come for regular

physiotherapy sessions which had direct impact on the final functional outcome. The screw tip joint distance when less than 4 mm led to screw penetration and failure in 2 patients which is in accordance with the study done by Flether *et al.* where a distance of minimum of 8 mm is recommended. We have seen few complications in our study. All fractures united and the average time taken for union was approximately ten weeks. Finally, a prolonged closely monitored and well-defined program of rehabilitation was necessary to obtain the best functional results.

Conclusion

We concluded that displaced proximal humeral fractures when treated surgically produce greater range of movements (ROM), less pain and less stiffness. Functional outcome is better with isolated fractures than with fracture dislocations. Functional outcome of 2 part fractures is better than 3 part and 4 part fractures. Radiological outcome assessed by means of quality of reduction and union of fracture in two and three part fractures is better than in four part fractures.

Conflict of Interest

Not available

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Not available

References

1. Court-Brown CM, Garg A, McQueen M. The epidemiology of proximal humeral fractures. *Acta Orthopaedica Scandinavica*. 2001;72:365-371.
2. Flatow EL. Fractures of the proximal humerus. In: Bucholz RW, Heckman JD, eds. *Rockwood and Greens Fractures in Adults*. Vol. 1. Philadelphia: Lippincott, Williams and Wilkins; c2001. p. 997-1035.
3. Young TB, Wallace WA. Conservative treatment of fractures and fracture-dislocations of the upper end of the humerus. *Journal of Bone and Joint Surgery [British Volume]*. 1985;67-B:373-377.
4. Hall MC, Rosser M. The structure of the upper end of the humerus with reference to osteoporotic changes in senescence leading to fractures. *Canadian Medical Association Journal*. 1963;88:290-294.
5. Hawkins RJ, Bell RH, Gurr K. The three-part fracture of the proximal part of the humerus. Operative treatment. *Journal of Bone and Joint Surgery [American Volume]*. 1986;68-A:1410-1414.
6. Kristiansen B, Christensen SW. Plate fixation of proximal humeral fractures. *Acta Orthopaedica Scandinavica*. 1986;57:320-323.
7. Hawkins RJ, Bell RH, Gurr K. The three-part fracture of the proximal part of the humerus. Operative treatment. *Journal of Bone and Joint Surgery [American Volume]*. 1986;68:1410-1414.
8. Kumar VR, Prabhu V, Ashokan C, Azhagan KS. A prospective study on functional and radiological outcome of proximal humeral fractures treated with locking compression plates. *International Journal of Orthopaedic Sciences*. 2017;3(3):472-476.
9. Flatow EL, Cuomo F, Maday MG, Miller SR, McIlveen SJ, Bigliani LU. Open reduction and internal fixation of two-part displaced fractures of the greater tuberosity of the proximal part of the humerus. *Journal of Bone and Joint Surgery [American Volume]*. 1991;73:1213-1218.
10. Cornell CN, Levine D, Pagnani MJ. Internal fixation of proximal humerus fractures using the screw-tension band technique. *Journal of Orthopaedic Trauma*. 1994;8(1):23-27.
11. McKlaughlin HL. Posterior dislocation of the shoulder. *Journal of Bone and Joint Surgery [American Volume]*. 1952;34A:584-590.
12. Powell SE, Zuckermann JD, Cuomo F, Newmann D, Gallagter M. 1 Part Proximal Humeral Fractures: A Prospective study of Functional Outcome: AAOS 1992; Annual Meeting; Scientific Program; c1992 Feb 24. p. 330.
13. Benirschke SK, Bigliani LU, Gerber C, Perry CR, Weber T. Symposium Proximal Humeral Fracture – An Unsolved Fracture; c1992 Feb 8.
14. Dheenadhayalan J, Prasad VD, Devendra A, Rajasekaran S. Correlation of radiological parameters to functional outcome in complex proximal humerus fracture fixation: A study of 127 cases. *Journal of Orthopaedic Surgery (Hong Kong)*; c2019.
15. Gracitell MEC, *et al.* Outcomes evaluation of locking plate osteosynthesis in displaced fractures of the proximal humerus. *Revista Brasileira de Ortopedia*. 2013;48(6):491-499.
16. Kristiansen B, Christensen SW. PHF Late results in relation to classification and treatment. *Acta Orthopaedica Scandinavica*. 1987;58:124-127.

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