

A Study On Management Of Proximal Humerus Fractures With LCP.

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Abstract

BACKGROUND AND OBJECTIVE: Proximal humerus fractures are the third most common fractures in elderly population after hip and distal radius fractures. Regarding treatment, controversies still exists whether to do conservative or operative management. Various operative procedures are carried out. The present study is undertaken to evaluate the functional outcome and complication of proximal humerus fractures treated by locking plate.

METHODS: Prospective study involving Adults(>18yrs) with proximal humerus fractures admitted in Guntur Medical College/ Government General Hospital, Guntur in the period from Feb 2018 to March 2020. In this study period 30 cases of fractures of proximal humerus were treated by open reduction and internal fixation with Locking Plate was evaluated.

RESULTS: Excellent and satisfactory results were found in 86.6% of patients with unsatisfactory results in 13.3 % according to Neer's criteria. In our series, majority of the patients were males, middle aged, with road traffic accidents being the commonest mode of injury, involving 2 part, 3part and 4part fractures of proximal humerus. The fractures united in all 30 patients.

CONCLUSION: In conclusion, the Proximal Humerus locking plate is an advantageous implant in proximal humeral fractures due to angular stability, particularly in comminuted fractures and in osteoporotic patients, thus allowing early mobilization.

Key Words: Proximal humerus fractures, locking plate, open reduction and internal fixation.

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I. Introduction

Fractures of proximal humerus are still unsolved fractures in many ways. A review of published result suggests that there is no universally accepted form of treatment. Conservative management may be associated with non union, malunion, and avascular necrosis resulting in painful dysfunction^{3,4}.

Current therapeutic options for proximal humerus fractures are plates, tension band wiring, and percutaneous (or) minimally invasive technique such as pinning, intramedullary flexible nails, screw osteosynthesis and hemiarthoplasties.^{2,3} The Choice of technique and devices depends on quality of bone, type of fracture, soft tissue, age and reliability of patients. However the goal of Proximal Humerus fracture fixation should be stable reduction allowing early mobilization of the shoulder. This study conducted to analyze the fractures of the proximal humerus that were treated with the proximal humeral locking plate and documents their union and the functional outcome. The average interval between fracture and surgery was 3.86 days.

II. Materials and Methods

This prospective observational study was carried out on 30 patients who admitted in the Department of orthopedics, Guntur Medical College/ Government General Hospital, Guntur in the period from February 2018 to March 2020. A total of 30 adult subjects (both male and females) of aged ≥ 18 years were included in this study.

Study Design: Prospective observational study

Study Location: This is a tertiary care teaching hospital, study done in Department of orthopedics, Guntur Medical College/ Government General Hospital, Guntur, Andhra Pradesh.

Study Duration: February 2018 to March 2020.

Sample size: 30 patients.

Subjects & selection method:

The study purpose is to include patients with proximal humerus fractures admitted and examined according to the protocol, Clinical and radiological evaluation done, fractures classified using Neers classification. For fractures, Open reduction and internal fixation with locking plates done under anesthesia.

Inclusion criteria:

- Two part, three part and four part fractures of proximal humerus.
- Patients with closed fractures
- Adult(>18yrs) is included
- Patients fit for surgery
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Exclusion criteria:

- children and adolescent patients <18yrs
- Acute infections
- Compound fractures
- Pathological fractures
- Patients medically unfit for surgery

Operative Techniques^{8,12,13} :

- After written informed consent was obtained, under all aseptic precautions, under antibiotic coverage, under general anesthesia, patient is in supine position and Delto pectoral approach, after reduction, fracture was fixed with Locking plate, wound is closed in layers. Patients will be followed upon OPD basis at 2 weeks post operatively, then monthly for 6 months, 3 monthly till the end of 1 year.^{1,2,4}
- The patients were examined clinically and radiological, assessed for range of motion, bony union and complications.

III. Results

The final results were evaluated using Neer's score. This system based on 100 units. Pain is the most important consideration to the patient and is assigned 35 units. The result in any patient with significant pain is graded as failure.

Thirty patients with closed displaced proximal humerus fracture were treated by Open Reduction and internal fixation with Locking plate. The following observations were made from the data collected during this study.

Majority of the patients i.e. 16 (53.3%) were from age group of 36-55 years followed by 8 patients (26.7%) in 18-35 years age group with Male : Female sex ratio is 1.7:1.

In majority (63.3%) cases the mode of injury was RTA that is high energy trauma directly or indirectly to shoulder. Other cases were due to fall (26.7 %) from standing height or Steps and (10%) of cases are due to assault.

In our study we had 14 cases (46.6%) with 2 part fractures and 11 (36.6%) with 3 part, 5 (16.6%) cases with 4 part fractures.

Complications: Shoulder stiffness (restriction of movements) was present in 2(6.7%) of cases. There was 1(3.3%) case with varus malunion and 1 (3.3%) case of varus malunion with axillary nerve injury has occurred.

Functional Results: All fractures united by 6-8 weeks interval. The final results were evaluated by Neer scoring criteria.

TABLE –1
Results according to Neer’s Criteria

Grade	No.of patients	Percentage
Excellent	7	23.3
Satisfactory	19	63.3
Unsatisfactory	4	13.3

In our study 7 (23.3%) case had excellent results and 19 (63.3%) had satisfactory result , 4 (13.3%) had unsatisfactory result and there was no case of failure.

IV. Discussion

The operative treatment of proximal humeral fractures provides orthopedician with a therapeutic challenge. Most of the proximal humerus fractures which are undisplaced can be treated conservatively. Many studies have shown that the displaced fractures of the proximal humerus have a poor functional prognosis when left untreated because of severe displacement of the fragments.⁶

Numerous investigators have described the various surgical treatments for displaced proximal humerus fracture. There is no consensus on optimal treatment of displaced proximal humeral fractures which account for about 20% of fractures. In some studies, the objective functional results of conservative treatment have been unsatisfactory. The best results are obtained if the fracture is well reduced and planned rehabilitation program is followed.

The present study was conducted to assess the results of two, three and four part proximal humeral fractures treated by open reduction and internal fixation by proximal humerus locking plate.

The average age of patient was 45.5 years. Majority of the patients are middle aged in our study. Neer’s original studies of 300 patients the average age was 55.6 years. The average age incidence in Felix Brunner et al study was 65 years⁸. The average age in K.N. Sharafeldin et al study was 61.5 years⁷.

In our study Male: Female sex ratio is 1.7:1

K.N. Sharafeldin et al⁷ reported 9 male and 18 female in the ratio of 1:2, Ramchander Siwach et al¹², reported in his series 12 were male and 13 were females at ratio of 1:1.2. In majority (63.3%) cases the mode of injury was RTA, Other cases were due to fall (26.7 %) from standing height or Steps and (10%) Of cases are due to assault. Rose SH et al, in their study of proximal humerus fracture, epidemiological study have reported 80% of cases the mode of injury was minor fall in a patients aged above 40 years and especially in osteoporotic females³.

Herbert Resch et al in their study of 27 patients with 3 part and four part fracture, 24 patients had history of high energy trauma¹¹.

The average interval between fracture and surgery was 3.86 days in our study. Average interval between fracture and surgery was 3.2 days in Gerber C. et al study⁹. 21 of 27 patients in Herbert Resch et al study the operation was done within first 4 days¹¹.

In current study of 30 cases with average age of 45.5 years with 14 ,11,5 cases of two, three and four part fractures respectively was operated with open reduction and internal fixation with PHILOS locking Plate.

We had 2 cases of shoulder stiffness, 1 case of varus malunion and another 1 case of varus malunion with (preoperative) axillary nerve injury, Malunion occurred in two cases at surgical neck. It usually involves to anterior angulation and varus deformity, decreasing neck shaft angle <120.⁰ In both the cases it was probably due to comminution of underlying bone which may go impact ion at the fracture site after reduction leading to varus malunion.

Two patients had shoulder stiffness and limitation of abduction. It is a hardware related complication, patient non compliance might have lead to the shoulder stiffness.

Comparing with other studies

- o Ramachander siwach et al in their study of 25 cases has got 8% cases of varus inclination with malunion,8% cases with impingement and 4% cases of implant loosening
- o K.N.Sharafeldin et al in 2008, has resulted in 3.7% cases of implant loosening out of their 27 cases
- o Felix Brunner et al in 2009 in their study of 158 cases of proximal humerus fractures has encountered avascular necrosis of humeral head apart from other complications

o Aksu et al in 2010 in their study of 30 cases has reported 8 % cases of varus malunion and 4.9 % cases of screw penetration.

V. Results :

The final results are graded according to Neer's scoring criteria. We had good to excellent results in 26 (86.7%) of patients treated in our institution.

We had unsatisfactory results in 4 (13.3%) patients. Two cases had shoulder stiffness which was probably due to non compliance of patients to do early physiotherapy and they had restriction of range of movements. Hence they are considered unsatisfactory. 1 more cases developed varus malunion with restriction of movements and with persistent mild to moderate pain which considered as unsatisfactory and 1 case developed varus malunion with preoperatively injured axillary nerve .

4 patients with unsatisfactory results had fair to good. All fractures united by 3 months on an average of 10 weeks (8 to 12 weeks). There was no case of failure in our study.

In comparison to other study on surgical management of proximal humerus we had similar results.

Our studies comparison with studies conducted by Hong-fei Shi et al and Ramchander Siwach et al which are similar to our study group. All three study group came up with similar results Although avascular necrosis , screw penetration and loosening of implant were not seen in our group.

VI. Conclusion

The present study was done to evaluate osteosynthesis, functional outcome and complication following surgical management of proximal humerus fracture by locking plate.

This fracture is common in middle aged patients in our study. The commonest mode of injury is road traffic accident. In Proximal Humerus Locking plate, locking of the threaded heads of the screws in the plate itself provides for a construct with angular and axial stability, eliminating the possibility of screw toggling or sliding of the screws in the plate holes. Coupled with a divergent or convergent screw orientation, this makes for much improved resistance to pull out and failure of fixation. Also, whereas conventional plating systems depend on compression between the plate undersurface and bone for stability, this is not the case for the proximal humerus locking plate. This lessens the chance of stripping the thread in osteoporotic bone, as the plate/bone interface is not loaded along the screw axis. This also allows for a more biological fixation as the underlying periosteum and blood supply to the fractured regions are much less compressed. The surgical management of this fracture is demanding, the results which are best by the operative method to give stable fixation. Fixation should be followed by early physiotherapy. The rehabilitation programme plays important role in functional outcome of surgical management of proximal humerus fracture.

In conclusion proximal humerus locking plate is an advantageous implant in proximal humeral fractures due to angular stability, particularly in comminuted fractures and in osteoporotic bones in elderly patients, thus allowing early mobilization.

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