



TO EVALUATE THE FUNCTIONAL OUTCOME OF PROXIMAL HUMERUS FRACTURES WITH LOCKING COMPRESSION PLATE.

Orthopaedics

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ABSTRACT

Proximal humerus fractures accounts for about 4 to 5% of all fractures. They are the most common fractures in elderly population. Significant controversy continues regarding the best methods of treating displaced proximal humerus fractures. The present study is undertaken to evaluate the functional outcome and complication of proximal humerus fractures treated by locking compression plate.

Prospective study involving Adults(>18yrs) with proximal humerus fractures admitted to M.L.B. Medical College & A life hospital, Jhansi UP from June 2017 to April 2019. In this study period 30 cases of fractures of proximal humerus were treated by open reduction and internal fixation with Locking Compression Plate were evaluated.

In our series, majority of the patients were males, elderly aged, with RTA being the commonest mode of injury, involving 2 part, 3 part and 4 part fractures of proximal humerus. The fractures united in all 30 patients. Excellent and satisfactory results were found in 76.7% of patients with unsatisfactory results in 23.3% according to Neer's criteria.

In conclusion locking Compression 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.

KEYWORDS

Proximal humerus fractures, Open reduction and internal fixation.

INTRODUCTION

Proximal humerus fractures are one of the commonest fractures in adult population occurring in the skeleton. They account for approximately 4–5% of the all fracture.

Conservative management may be associated with non union, malunion, and avascular necrosis resulting in painful dysfunction.

The surgery should be carried out as soon as the patients general condition permit. A delay of several days makes reduction more difficult and a significant delay results in absorption of bone, making secure fixation impossible.

Neer recommended open reduction and internal fixation for displaced three parts fractures. In a three or four part fracture dislocation when the head of the humerus is entirely devoid of any blood supply it can be replaced.

This study conducted to analyze fractures of the proximal humerus that were treated with the locking compression plate and documents their clinical and functional outcome.

OBJECTIVE

The goal of the study is to test the efficacy and functional outcome of proximal humerus fractures.

To evaluate the incidence of complication that may occur in proximal humerus fractures.

METHODOLOGY

All patients fulfilling the inclusion criteria admitted in MLB Medical College & A Life Hospital Jhansi during the study period from June 2017 to April 2019.

Method of collection of data:

Clinical and Radiological evaluation done. Fractures classified using Neer's classification. Routine investigation carried out to get fitness for surgery.

A minimum of 30 cases was studied without any sampling procedure.

Inclusion criteria:

- Two part, three part, four part proximal humeral fractures.
- Acute fracture
- Age above 18
- Patient fit for surgery

Exclusion criteria:

- Associated humerus shaft fracture
- Associated neurovascular injury
- Acute infection
- Pathological fractures
- Old fractures
- Compound fracture

The general condition of the patient and the vital signs were recorded. Methodical examination was done to rule out fractures at other sides.

Operative technique

General anaesthesia was used in all patients. In supine position on operating table with wedge a sandbag under the spine and medial border of scapula to push the affected side forward while allowing the arm to fall backward.

Surgical approaches

Deltopectoral approach:

Postoperative management :

- All patients are immobilized in shoulder immobiliser .
- Appropriate antibiotics and analgesics were used.
- Immediate post operative radiographs were taken to determine the bone alignment and maintenance of reduction.
- Sutures removed by 12th day.

REHABILITATION:

- Pendulum exercises are begun immediately depending on pain.
- Passive range of motion started at 1st week
- The active range of motion was started at 2-4 weeks postoperatively, depending on stability of osteosynthesis and bone quality.
- 4th to 6th week-immobilization discontinued
- Active assisted movements started up to 90 abduction with no forced external Rotation.
- 6th to 8th week-full range of movements with active exercises started.

Further follow ups were done at 6 weeks and 12 weeks and 24 weeks.

Functional results

The final result were evaluated using Neer 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.

NEER'S CRITERIA : (reference from-journal of orthopaedic trauma) Criteria for evaluation of results

1. Pain (35 units)		4. Range of motion (25 units) Flexion (sagittal plane)	
a. None/ignores	35	180	6
b. Slight, occasional, no compromise in activity	30	170	5
c. Mid, no effect on ordinary activity	25	130	4
d. Moderate, tolerable, makes concessions, uses aspirin	15	100	2
e. Marked, serious limitations	5	80	1
f. Totally disabled	0	Less	0
2. Function (30 units)		Extension	
a. Strength		45	3
Normal	10	30	2
Good	8	15	1
Fair	6	Less	0
Poor	4	Abduction (coronal plane)	
Trace	2	180	6
Zero	0	170	5
b. Reaching		140	4
Top of head	2	100	2
Mouth	2	80	1
Belt buckle	2	Less	0
Opposite axilla	2	External rotation (from	
Brassiere hook	2	anatomical position with elbow bent	
c. Stability		60	5
Lifting	2	30	3
Throwing	2	10	1
Pounding	2	Less	0
Pushing	2		
Hold overhead	2	Internal rotation (from anatomical position with elbow bent	
3. Anatomy (10 units) rotation, angulation, joint incongruity, retracted tuberosities, failure metal, myositis, non-union, avascular necrosis)		90 (T-6)	5
None	10	70(T-12)	4
Mild	8	50 (L-5)	3
Moderate	4	30 (gluteal)	2
Marked	0-2	Less	0

Total points

- Excellent Results Above 89 units;
- Satisfactory between 80 units to 89 units
- Unsatisfactory 70 Units to 79 units
- Failure Below 70 Units

RESULTS

Age incidence

Age variation in the series were from 30 to 70 years. Proximal humerus fractures were found to have high incidence in the 41 to 50 age group.

Sex incidence

From 30 cases there were 17 males and 13 females.

Side of fracture

18 cases had right side involved.

Mode of injury

Most of the injuries were caused by road traffic accident, another cause were fall from height.

Type of fracture

Two part fractures constituted the most common type.

Complication

Distribution of Complications of patients studied

Complications	Number of patients (n=30)	%
Nil	23	76.6
Present	7	23.4
Plate impingement	3	10.0
Varus malunion	2	6.7
Stiffness	2	6.7

Range of flexion

9 (30%) of the patient had flexion between 1500 to 1800. 15 patients (50%) had flexion between 120 to 150 degrees. .5 patient (16.7%) had Flexion between 90 degrees to 120 degrees.

1 patient (3.3%) had Flexion of less than 90 degrees

Range of abduction

9 patients (36.0%) had Abduction between 120 degrees and 150

degrees

13 patients (52.0%) had Abduction between 90 degrees and 120 degrees

3 patient (12.0%) had Abduction of less than 90 degrees.

Range of External Rotation

4 patients (16.0%) had an External rotation between 60 degrees and 90 degrees

13 patients (52.0%) had an External rotation between 30 degrees and 60 degrees

8 patient(3.3%) had an External rotation less than between 30 degrees.

Range of Internal Rotation:

13 patients (42.3 %) had an Internal Rotation between 60 degrees and 90 degrees

17 patients (57.3%) had an Internal Rotation between 60 degrees and 90 degrees

4 patients had an Internal Rotation less than 30 degrees.

PAIN

Pain	Number of patients	%
Nil	21	70.0
Mild	9	30.0
Total	30	100

FUNCTION

Function (30)	Number of patients	%
15-20	7	23.3
20-25	16	53.4
25-30	7	23.3

End result

Final result

Final result	Number of patients	%
Excellent	4	13.3

Satisfactory	19	63.4
Unsatisfactory	7	23.3
Total	30	100

CONCLUSION

The present study was done to evaluate functional out come and complication following surgical management of proximal humerus fracture.

Proximal humerus locking compression plate. In this system, 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 (windscreen wiper effect), or sliding of the screws in the plate holes.

Coupled with a divergent or convergent screw orientation to head of humerus provide 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 locking plates.

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.

Results are best when the operative method results in 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 locking compression plate is mechanically and biologically an advantageous implant in proximal humeral fractures particularly in comminuted fractures and in osteoporotic bones in elderly patients, thus allowing early mobilization.

SUMMARY

Prospective study involving Adults(>18yrs) with proximal humerus fractures admitted to MLB Medical College, Jhansi and A life hospital, Jhansi. In this study period 30 cases of fractures of proximal humerus were treated by open reduction and internal fixation Locking Compression Plate were evaluated.

Proximal humerus fracture is common in age group of 41 to 60 years (63%).

The commonest mode of injury is Road traffic accident (53.3%).

17 out 30(56.6%) patients were male.

2-part fracture (70%)was most common among proximal humerus fracture followed by 3-part(20%) and 4-part(10%) in our study.

In our study we had 4 Excellent(13.3%) and 19 satisfactory(63.4%) results and 7 had unsatisfactory (13.3%) according to Neer's criteria.

Out of 30 patients,7 (23.4%) had complication.3 patients (10%) had plate impingement,2 patients had varus malunion,2 patients had stiffness of shoulder with pain and functional restriction of movement.

REFERENCES

- Gerald R. Williams and Kirk L. Wong, 2000: "Two-part and three part fractures- Management of proximal and distal humerus fracture". Orthop Clin North Am, January 31 (1): 1-21.
- Anthony F. Depalma and Richards Cautilli. Fractures of the upper end of the humerus. Clin. ortho. 20, 1971: 73-93.
- Neer CS II, Rockwood CA: Fractures and dislocations of the shoulder, in Rockwood CA, Green DP (eds): Fracture in adults, Philadelphia, PA, Lippincott, 1984: 675-721.
- Scott E. Powell, Robert W. Chandler. Fractures of the proximal humerus. Chapter-11, In: Text book of Operative techniques in upper extremity sports injuries. Ed. Frank W. Jobe, Mosby, 1995: p.313-340.
- Zyto K. Non-operative treatment of comminuted fracture of proximal humerus in elderly patients. Injury, 1998; 29: 349-52.
- Campbell's operative orthopaedics. Fracture about proximal humerus in adults. 10th Ed., Vol-3: 2990-2994.
- Neer CS. Dispalced proximal humeral fracture : Part I: Classification and evaluation. J Bone Joint Surg (Am) 1970; 52-A: 1077-89.
- Neer CS. "Displaced proximal humeral fractures. Part II. Treatment of three part and four part displacement". J Bone Joint Surg, 1970; 52A: 1090-1103.
- Mouradian WH., "Displaced proximal humeral fractures. Seven years experience with a modified zickel supracondylar device". Clin Orthop 1986; 212: 209-218.

- Zyto K, Wallace WA, Frostick SP, Preston BJ. Outcome after hemiarthroplasty for three and four part fracture of the proximal humerus. J Shoulder Elbow Surg, 1998; 7: 85-9
- Hessmann M, Gehling H, Gotzenl, "Plate fixation of proximal humerus fracture with indirect reduction; surgical technique and results using the shoulder score.". Injury 1999; 30: 453-462.
- Wijgman A.J, Roolker W, Patt T W et al , open reduction and internal fixation of three and four part fractures of proximal humerus. Scientific Article November 01, 2002
- Moonot P, Ashwood N, Hamlet M., Early results for treatment of three- and four-part fractures of the proximal humerus using the PHILLOS plate system , J Bone Joint Surg Br. 2007 Sep; 89(9): 1206-9
- Ramchander Siwach Roop Singh Rajesh Kumar Rohilla et al Internal fixation of proximal humerus fracture by locking proximal humerus plate in elderly osteoporotic, J Orthopaed Traumatol (2008) 9:149-153
- Felix Brunner, Christoph Sommer, Christian Bahrs et al Open Reduction and Internal Fixation of Proximal Humerus Fractures Using a Proximal Humeral Locked Plate: A Prospective Multicenter Analysis, J Orthop Trauma 2009; 23: 163-172
- AA Martinez et al " proximal humerus locking plate for proximal humerus fracture -retrospective study" journal of orthopaedic surgery 2009; 17(1): 10-4
- Sameer Aggarwal et al "Displaced proximal humeral fractures: an Indian experience with locking plate" Journal of Orthopaedic surgery and research 2010; 5: 60
- Adithya c pawaskar, kee-won lee "locking plate for proximal humerus fracture in the elderly population: serial change in neck shaft angle" clin orthop surg. 2012 september; 4(3) 209-215
- Christopher M. Jobe. Gross anatomy of the shoulder. Chapter-2, In: The Shoulder, Vol. 1, ed. Charles A. Rockwood Jr, Frederick A. Matsein III, Philadelphia : W.B. Saunders Company, 1990: p.34-97.
- P. C. Strohm, P. Helwig, G. "Locking Plates in Proximal Humerus Fractures" ACTA 74, 2007, p. 410-415
- Georg Osterhoff, Christian Ossendorf, "The calcar screw in angular stable plate fixation of proximal humeral fractures - a case study" Journal of Orthopaedic Surgery and Research 2011, 6: 50
- Stanley Hoppenfield Operative exposure 4th edition page 4-15.
- Evan L. Flatow. Fracture of the proximal humerus. Chapter-25, In: Text book of Rockwood and Green's fractures in adults. Vol. 1, New York: Lippincott Williams & Wilkins, 2001: p.997-1035.
- Kenneth A. egol, Crispin C. ong, Michael walsh et al, Early complication of proximal humerus fractures treated with locked plates, J orthop trauma 2008; 22: 159-164
- Esser RD, et al, "Open reduction and internal fixation of three and four part fractures of proximal humerus". Clin Orthop 1994; 299: 244-251.
- Leonard M, Mokotedi L, Alao U et al , The use of locking plates in proximal humeral fractures: Comparison of outcome by patient age and fracture pattern, Int J shoulder surgery 2009 oct 3(4) 85-9.
- Nisan Nisan, Tahir OGUT, et al. "Fixation of proximal humeral fractures with modified tension band technique.". J of Arthroplasty and Arthroscopic Surgery, 2002; 13(3).