

Incidence and Clinical Pattern of Proximal Humeral Fractures of Patients Fixed by Locking Proximal Humeral Plate (LPHP)

Dr. A. K. M. Harun-Ar-Rashid^{1*}, Dr. Abdur Rahman², Dr. Mohammad Shaha Alam³, Dr. Ayesha Begum⁴, Dr. A. H. M. Azgar Ali Chowdhury⁵, Dr. A.T. M. Rezaul Karim⁶

¹Assistant Professor of Orthopaedic Surgery, Cox's Bazar Medical College, Cox's Bazar, Bangladesh

²Assistant Professor of Orthopaedic Surgery, Chattogram Medical College, Chattogram, Bangladesh

³Assistant Professor of Surgery, Cox's Bazar Medical College, Cox's Bazar, Bangladesh

⁴Assistant Professor of Paediatrics, Chattogram Medical College, Chattogram, Bangladesh

⁵Junior Consultant of Orthopaedic Surgery, Chittagong Medical College Hospital, Chittagong, Bangladesh

⁶Consultant of Orthopaedic Surgery, Parkview Hospital, Chattogram, Bangladesh

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*Corresponding author: Dr. A. K. M. Harun-Ar-Rashid

Abstract

Original Research Article

Objective: In this study our main goal is to evaluate the functional outcome of the treatment of proximal humeral fractures fixed by Locking Proximal Humeral Plate (LPHP). **Method:** This prospective observational study was carried out at Department of Orthopaedic Surgery, Chittagong Medical College Hospital, Chittagong. All the 30 patients are above 18 years of age and was admitted in different units of Orthopaedic ward of CMCH with displaced fractures of the proximal humerus of both sexes. **Results:** During the study, of the 30 patients, 16 (53.33%) presented with right sided proximal humeral fracture and 14(46.66%) with left sided fractures. Also, of the 30 patients, 11(36.66%) 2 part, 13(43.33%) presented with three-part fractures. 1(3.33%) with four-part fractures and 5(16.66%) with fracture dislocations. According to Constant score criteria 20(66.7%) patients can externally rotate their shoulder with hand above head and elbow forward, 6(20%) patients can do it with hand behind head and elbow backward, 2(6.7%) each can do it either with hand behind head and elbow forward or hand above head and elbow backward. **Conclusion:** From our study we can conclude that, the results show that in proximal humeral fractures treated by open reduction and internal fixation with locking proximal humeral plate (LPHP) is the good method of treatment in the absence of C-arm image intensifier.

Keywords: proximal humeral fractures, locking proximal humeral plate (LPHP), plate fixation.

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INTRODUCTION

Fractures of the proximal humerus have challenged medical practitioners since the beginning of recorded medical history. In the earliest known surgical text, the Edwin Smith papyrus (1600 BC), three cases of humeral fractures were described [1]. Hippocrates is credited with documenting the first fracture of the proximal humerus in 460 BC and describing a method of weight traction that aided in bone healing. The Alexandrian school of medicine (third century BC) mentioned shoulder dislocations complicated with fractures and the author discussed whether the dislocation should be reduced before or after the fracture [2]. Celsus (25 BC-AD 50) distinguished shaft fractures from the proximal and distal humeral fractures. Several illustrations from the sixteenth and seventeenth century surgical texts showed the ancient

methods of reduction and bandaging. Long term results of orthopedic treatments were not systematically recorded until the late eighteenth century when pathoanatomic findings from autopsy began to be compared with clinical observations by renowned pathologist like Astley Cooper [3].

An anatomical classification was developed in the late 19th century in an attempt to improve the diagnosis and treatment but this simplified scheme was not thorough enough and lacked consistency. A significant contribution was made by Codman when he divided proximal humerus into four parts. These parts were divided along epiphyseal lines and consisted of the head, greater tuberosity, lesser tuberosity and shaft [4].

Neer's classification was the most comprehensive and widely accepted one to classify

proximal humeral fractures with integration of fracture anatomy, biomechanics, and displacement [5].

In this study our main goal is to evaluate the functional outcome of the treatment of proximal humeral fractures fixed by Locking Proximal Humeral Plate (LPHP).

OBJECTIVE

To evaluate the functional outcome of the treatment of proximal humeral fractures fixed by Locking Proximal Humeral Plate (LPHP).

METHODOLOGY

Study design: This was a prospective observational study.

Place of study: This study was carried out at Department of Orthopaedic Surgery, Chittagong Medical College Hospital, Chittagong.

Study population: All the patients are above 18 years of age and was admitted in different units of Orthopaedic ward of CMCH with displaced fractures of the proximal humerus of both sexes. For diagnosis Neer's classification of the proximal humerus fracture was used. Cases were selected purposively.

Sample size: Total 34 patients were enrolled in the study. Four patients were lost to follow-up. So, finally 30 patients were available for evaluation.

Inclusion Criteria

Patients with following characteristics will be included in the study.

- Patients with closed displaced two, three- or four-part fractures and fracture dislocations.
- Age above 18 years.
- The patients who are mentally fit and physically alert (ASA-group 1-3)
- Patients without any neurovascular disorder.

Exclusion Criteria

Patients with following characteristics will be excluded from the study.

- Open fracture
- Pathological fracture
- Previous shoulder surgery
- Chronic shoulder pain
- Ipsilateral upper limb fractures

Data Collection

Pretested and predesigned pro-forma containing history and examination finding of the patients and operative procedure & follow up were used to collect the data as was approved in the protocol.

Data analysis

Once data collection was completed, data was compiled and tabulated according to key variables.

Analysis of different variables were done according to standard statistical method and calculations were done using scientific calculators & using MS-excel program in computer.

RESULTS

Table-1 demonstrates age distribution where out of 30 patients 5(16.66%) were 26 to 35 years of age, 3(10%) were 36 to 45 years old, 5(16.66%) were 46 to 55 years old, 15(50%) were 56 to 65 years, and 2(6.66%) patient were 66 to 75 years old. The mean age of the patients was 63.13 years and the youngest and the oldest patient was 26 years and 75 years respectively. The following table is given below in detail:

Table-1: Age distribution of the patients (n=30)

Age in years	Frequency	Percentage
26-35	5	16.66
36-45	3	10
46-55	5	16.66
56-65	15	50
66-75	2	6.66

Mean age = 63.13 years, Range-26 to 75 yrs.

In Figure-1 shows sex distribution. Majority (56.66%) of the patients were female and the rest (43.33%) male giving a male to female ratio of roughly 1.30:1. The following figure is given below in detail:

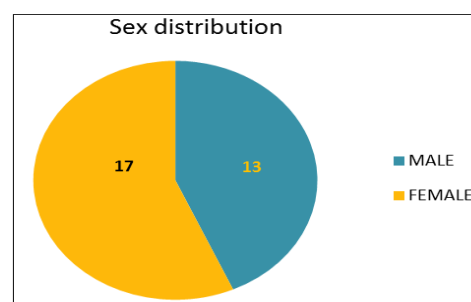


Fig-1: Pie chart shows Sex distribution of the patients (n=30)

In Figure-2 shows affected limb of the patients where of the 30 patients, 16 (53.33%) presented with right sided proximal humeral fracture and 14(46.66%) with left sided fractures. The following figure is given below in detail:

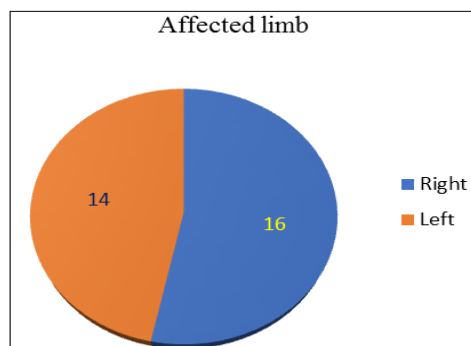


Fig-2: Pie chart shows distribution of the patients by affected limb (n=30)

In Figure-3 shows fracture pattern of the patients where of the 30 patients, 11(36.66%) 2 part, 13(43.33%) presented with three-part fractures. 1(3.33%) with four-part fractures and 5(16.66%) with fracture dislocations. The following figure is given below in detail:

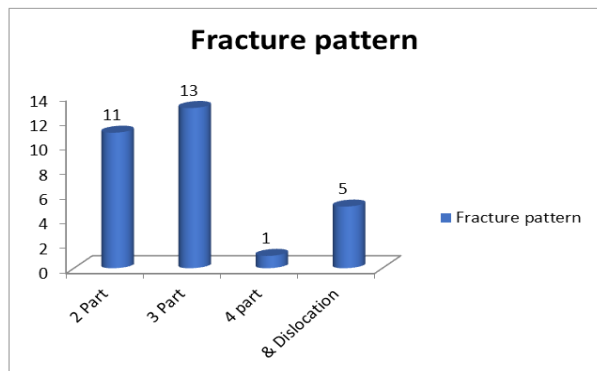


Fig-3: Bar diagram demonstrates distribution of the patients by fracture pattern (n=30)

In Table-2 shows Distribution of the patients by pain symptoms where at six months follows up, only 2(6.66%) patients complained of moderate pain, 12 (40%) patients had no pain at all, 16 (53.3%) patients had only mild pain. The following table is given below in detail:

Table-2: Distribution of the patients by pain symptoms (n=30)

Pain type	Frequency	Percentage
No	12	40
Mild	16	53.3
Moderate	2	6.66

P < 0.001 in χ^2 test, the result is highly significant

In Table-3 shows limitation of patients in daily living where on the final follow up at 6 to 18 months, 18(60%) patients had no limitation of daily activities,

Table-5: Distribution of patients according to external rotatory movement (n=30)

Rotation	Frequency	Percentage
Hand above head and elbow forward	20	66.7
Hand behind head and elbow forward	2	6.7
Hand above head and elbow backward	2	6.7
Hand behind head and elbow backward	6	20.0

P < 0.001 in χ^2 test, the result is highly significant

In Table-6 shows internal rotation of the patients. According to Constant scoring criteria the dorsum of the hand reaches D12 vertebra in 4(13.3%) patients. Waist in 18(60%) patients. Sacroiliac joint in 2(6.7%) patients. Buttock in 4(13.3%) patients and thigh in 2(6.7%) patients. The following table is given below in detail:

12(40%) patients had moderate limitation of daily activities. 16(53.3%) patients had no limitation of recreational activities and 14(46.7%) patients had moderate limitations. 20(66.7%) patients had no sleep disturbance but 10(33.3%) patients complained of some sleep disturbance due to pain. The following table is given below in detail:

Table-3: Distribution of the patients by limitation of daily living (n=30)

Limitation of daily living	NO	Moderate
Limitation of daily living	18(60%)	12(40%)
Limitation of recreational activities	16(53.3%)	14(46.7%)
Sleep disturbance	20(66.7%)	10(33.3%)

In Table-4 shows distribution of patients according to abduction movement. Abduction to the Constant score criteria the abduction of shoulder was 61⁰-90⁰ in 4(13.3%) patients 91⁰-120⁰ in 22(73.3%) patients and 131⁰-150⁰ in 4(13.3%) patients. The following table is given below in detail:

Table-4: Distribution of patients according to abduction movement (n=30)

Range of motion	Frequency	Percentage
61 ⁰ -90 ⁰	4	13.3
91 ⁰ -120 ⁰	22	73.3
121 ⁰ -150 ⁰	4	13.3

P < 0.001 in χ^2 test, the result is highly significant

In Table-5 shows distribution of patients according to external rotatory movement. According to Constant score criteria 20(66.7%) patients can externally rotate their shoulder with hand above head and elbow forward, 6(20%) patients can do it with hand behind head and elbow backward, 2(6.7%) each can do it either with hand behind head and elbow forward or hand above head and elbow backward. The following table is given below in detail:

Table-6: Distribution of patients according to internal rotatory movement (n=30)

Dorsum of the hand reaching	Frequency	Percentage
D12	4	13.3
Waist	18	60.0
SI joint	2	6.7
Buttock	4	13.3
Thigh	2	6.7

P < 0.001 in χ^2 test, the result is highly significant

In Table-7 shows constant score grading. The outcome of the patients was graded according to constant score criteria as good (>70) in 14(46.6%) patients, Fair (56-70) in 11 (36.66%) patients and poor (0-55) in 5(16.66%) patients. The following table is given below in detail:

Table-7: Distribution of patients according to Constant score grading (n=30)

Grading	Frequency	Percentage
Good	14	46.6
Fair	11	36.66
Poor	5	16.66

P>0.01 in χ^2 test, the result is significant.

DISCUSSION

In the present series, the right side was more affected (60%) than the left (40%). In one study the right side (57%) was more affected than the left side (43%) [6]. Whereas, in another study right and left hummers was almost equally affected [7].

The cause of left side involvement is probably due to unpreparedness following high velocity injury in most of the cases. Dominant right sides of female and older patients are more affected probably due to searching of support during low energy trauma.

In the present series, the basis of diagnosis was clinical examination and radiological evaluation of the affected part in both antero-posterior and lateral views. All the cases were displaced two, three or four part fractures and some were also associated with dislocation of the humeral head and all were treated by open reduction and internal fixation by Locking Proximal Humeral Plate (LPHP). After operation long arm back slab or U-cast was applied and kept for 2 weeks till the stitch is removal. Pendulum exercise was started as early as 2nd week. Physiotherapy is vital for early recovery of the patient and is supervised very closely in almost all patients.

At follow ups in this series, each patient was assessed for pain, limitation of the activates of daily living and range of motion according to constant-Morley shoulder assessment score 1987 [8].

At the final follow up at 6 to 18 months there was moderate pain in 6.6% patients with moderate of activity in 46.7% patients. In this series at the time of operation all the fractures were closed, during operation strict asepsis was followed in every step and broad spectrum intravenous antibiotics were given for three days. Initial recovery was uneventful in all the cases except two. In 8 patients there was superficial infection and were treated by regular local wound dressing with

local and systemic antibiotic according to the culture and sensitivity report. In another 8 were persistent subluxation which needed to be corrected under C-arm guidance. Only one patient (6.7%) did not show complete union even at 6 months. In the present series no patient developed avascular necrosis. It indicates that blood supply of the humeral head had not been critically impaired by open reduction and internal fixation by proximal humeral locking plate.

CONCLUSION

From our study we can conclude that, the results show that in proximal humeral fractures treated by open reduction and internal fixation with locking proximal humeral plate (LPHP) is the good method of treatment in the absence of C-arm image intensifier.

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