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The Clinical Status of Proximal Humeral Fractures and Treatment Management of Patients

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Abstract **Original Research Article**

***Background*:** Complications with surgical treatment of displaced proximal humeral fractures, particularly in comminuted or osteoporotic fractures, include malunion, non-union, osteonecrosis of the humeral head, screw loosening, and loss of reduction. There has been a push to recommend the use of a locking compression plate (LPHP) for open reduction and internal fixation of these fractures because to the decreased complication rate found with its usage. ***Objective*:** In this study our main goal is to evaluate the clinical status of proximal humeral fractures and treatment management of patients. ***Method*:** This prospective observational study was carried out at Department of Orthopaedic Surgery, Tetiary Medical College Hospital and District General Hospital, Dinajpur from January 2021 to January 2022. Total 55 patients were enrolled in the study. Five patients were lost to follow-up. So, finally50 patients were available for evaluation. ***Results*:** The participants' average age is 51.1, making those 51–60 years old 40% of the total. Also, 60% of the people involved were female. Seventy percent of patients had a locking proximal humeral plate inserted within three weeks of injury, whereas 30 percent had their plates inserted later than three weeks following injury. Yet although high velocity trauma accounted for 15% of injuries, low velocity traumas like falls accounted for 70%. Front shoulder scores between 910 and 1500 on the continuous scale were found in 12 patients (24%), 15 patients (30%), and 23 patients (46%). Subacromial impingement affected two patients (4%), delayed union affected three patients (6%), and a superficial infection affected nine patients (18%). The head screws on 3% of patients became loose, and the skulls of 1% of patients were perforated by the screws. Avascular necrosis did not manifest in any reported cases. Moreover, when the outcomes of the therapy were evaluated, 92% of patients reported satisfaction. ***Conclusion*:** Using a Locking Proximal Humeral Plate (LPHP) to stabilize an unstable proximal humeral fracture allows the patient to spend less time in the hospital, reduces associated costs, and heal more quickly so that they may return to work as soon as feasible. As a result, it is an excellent method for treating proximal humeral fractures in economically fragile nations like Bangladesh.

Keywords: Proximal humeral fractures, locking compression plate (LPHP), surgical treatment.

INTRODUCTION

The proximal humerus is the most common site of fracture, accounting for 4%-5% of all breaks. [1, 2] They pose an especially high risk to the older population. When looking at those over the age of 60, proximal humerus fractures are more prevalent than hip fractures [3]. Higher levels of dislocation in younger people are caused by high- energy trauma. Older women have a greater chance of breaking a bone due to osteoporosis. A dislocation may be present as well. Most of these breaks are rather harmless and may be treated conservatively. Yet, older people are disproportionately affected by the morbidity of unstable displaced fractures.

The absence of a safe and effective alternative to surgical treatment of proximal humerus fractures is a fundamental limitation of current practices. Fractures are often comminuted due to the low bone quality. Accurate reduction and successful repair of proximal humeral fractures remains a technical challenge in shoulder surgery. The introduction of cutting-edge implants has sparked new discussion regarding the best approach to ensuring a permanent fixation. For classifying proximal fractures, the Neer technique is

often used. This categorization is based on whether or not any of the four major segments of the proximal humerus has been displaced or angulated [4]. It is the epiphyseal line that delineates the four main parts of the proximal humerus: the anatomical head, the greater and lesser tuberosities, and the proximal shaft. Dislocations of the humeral head may occur alone or in combination with an anterior or posterior dislocation, therefore this method can be easily modified to account for both. During the course of the previous several decades, many approaches have been employed to treat proximal humeral fractures. Most experts agree that non-displaced fractures should begin with conservative care [5], but there is much debate on the optimum approach for treating displaced fractures, especially those with three or more fragments. Many implants have been the subject of study and testing, but no definitive results have been reached [6].

OBJECTIVE

In this study our main goal is to evaluate the clinical status of proximal humeral fractures and treatment management of patients.

METHODOLOGY

From January 2021 to January 2022, researchers from the Department of Orthopaedic Surgery at the Tertiary Medical College Hospital and District General Hospital, Dinajpur conducted a prospective observational study. Fifty-five patients in all participated in the research. Unfortunately, we were unable to contact five patients. As a result, 50 cases were ultimately accessible for analysis.

Patients with an open fracture, for example, a break with pathological characteristics Shoulder surgery history Participants with ipsilateral upper limb fractures and chronic shoulder discomfort were not included in the analysis. Following the protocol's guidelines, we employed tried-and-true pro-forma to record information on the patients' medical histories, physical examinations, and the surgical procedure and subsequent care.

After finishing collecting data, it was organized into tables based on the factors of most interest. Standard statistical methods were used for the analyses, and computations were carried out using both a scientific calculator and Microsoft Excel.

RESULTS

In table 1 shows age distributions of the patients where most of the patients belong to 51-60 years age group, 40%. followed by 26% belong to 31-40 years old, 20% belong to 41-50 years age group, 14% belong to >60 years age group. The following table is given below in detail:

Table 1: Age distributions of the patients

Group	N	Percentage (%)
31-40	13	26%
41-50	10	20%
51-60	20	40%
>60	7	14%

Figure 1 shows gender distribution where 60% were female and 40% were male. The following figure is given below in detail:

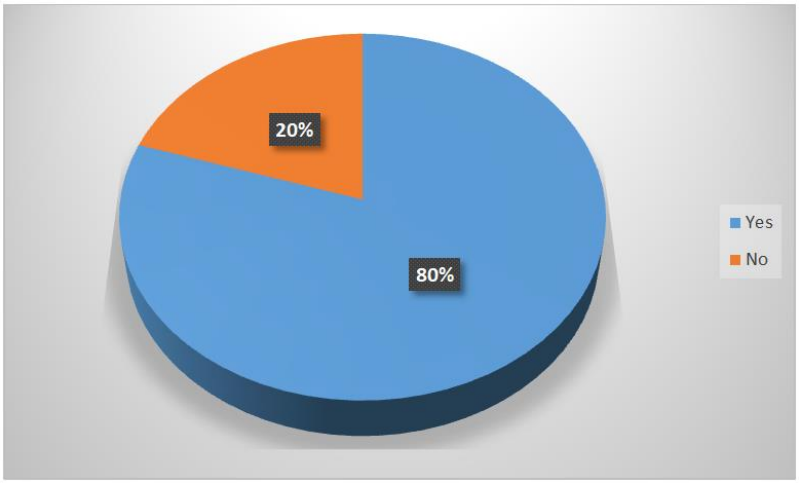

Figure 1: Gender Distribution

Figure 2 shows time interval between injury and plate fixation where in 70 percent cases locking proximal humeral plate was fixed within 3 weeks of occurrence of fracture while in the rest (30%) of cases, fixation was done after 3 weeks of the fracture. The mean interval between injury and plate fixation was 18 days and the minimum and maximum intervals were 2 and 36 days respectively. The following figure is given below in detail:

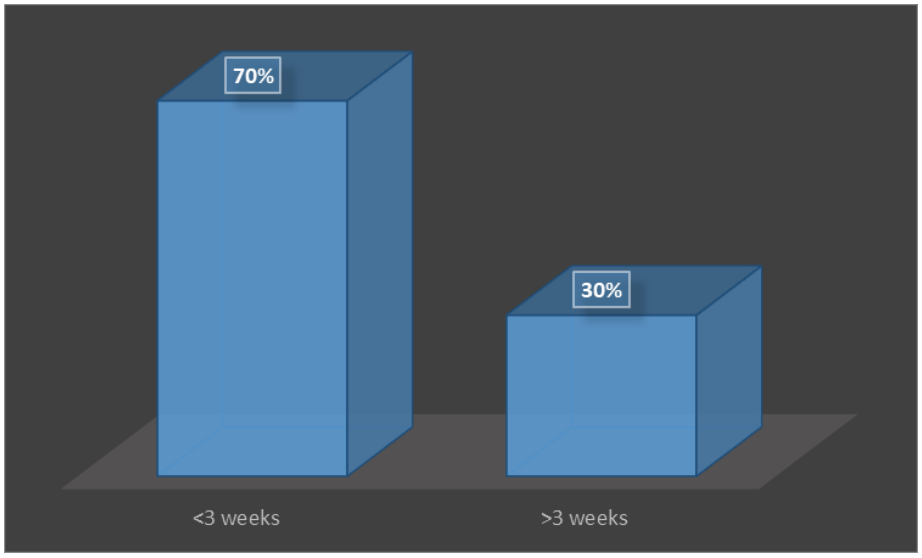

Figure 2: Time interval between injury and plate fixation

In table 2 shows distribution of the patients by mechanism of injury where Vast majority (70 %) of injury were caused by low velocity injury i,e; due to simple fall and 15(30%) was of high velocity trauma i ,e ; road traffic accident and fall from height. The following table is given below in detail:

Table 2 Distribution of the patients by mechanism of injury vast majority (70 %) of injury were caused by low velocity injury i,e; due to simple fall and 15(30%) was of high velocity trauma. The following table is given below in detail:

Table 2: Mechanism of injury

Mechanism of injury	N	Percentage (%)
High Velocity Injury	15	30%
Low Velocity Injury	35	70%

In table 3 shows distribution of patients according to forward flexion movement. According to the constant scoring criteria the forward of shoulder was 61^0 -90^0 in 12(24%) patients, 91^0-120^0in 15(30%) patients and 121^0-150^0 in 23(46%) patients. Then following table is given below in detail:

Table 3: Distribution of patients according to forward flexion movement

Range of motion	N	Percentage (%)
61^0-90^0	12	24%
91^0-120^0	15	30%
121^0-150^0	23	46%

In table 4 shows distribution of patients according to power of shoulder. According to Constant scoring criteria power was measured with a spring balance with an average record from five pulls against a measured weight and expressed in kilograms. 15(30%) patients had a power of not more than 10 kg, 23(46%) patients had a power in between 11 to 15 kg. and 12(24%) patients had a power in between 16 to 20 kg. The following table is given below in detail:

Table 4: Distribution of patients according to power of shoulder

Power of shoulder	N=50	Percentage (%)
0-10	15	30%
11-15	23	46%
16-20	12	24%

In figure 3 shows distribution of patients according to status of fracture union. At final follow up 80% patients showed union of the fracture and in 20% patients union was delayed. The following table is given below in detail:

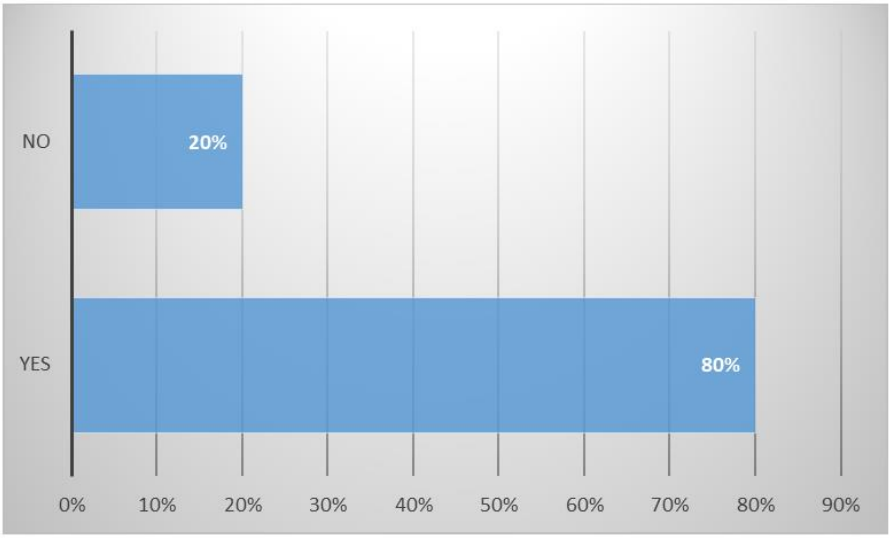

Figure 3: Distribution of patients according to status of fracture union

In table 5 shows complaints of the patients where during the course of the study 9(18%) patients developed superficial infection, 3(6%) patients developed delayed union, 2(4%) patients subacromial impringement. loosening of head screw seen in 3(6%), perforation of the head by screw was seen in 1(2%) patients each. No patient of avascular necrosis was found. Radiological evaluation revealed Varus malunion in 5(10%) and subluxation of head in 7(14%) patients. The following table is given below in detail:

Table 5: Complaints of the patients

Complaints of the patients	N	Percentage (%)
Superficial infection	9	18%
Delayed union	3	6%
Subacromial impringement	2	4%
Avascular necrosis	0	0%
Loosening of head screw	3	6%
Screw perforation of head	1	2%
Varus malunion	5	10%
Subluxation of head	7	14%

In table 6 shows evaluation of outcome at final follow up where majority were satisfied to the treatment 92%. The following table is given below in detail:

Table 6: Evaluation of outcome at final follow up

Outcome of final follow up	N	Percentage (%)
Satisfactory	46	92%
Unsatisfactory	4	8%

DISCUSSION

In this cohort study, the diagnosis was based on a combination of clinical examination and radiographic evaluation of the affected area in both anteroposterior and lateral views. All patients had two, three, or four fragments of their humerus broken, with some also suffering from a dislocated head; all were treated with open reduction and internal fixation with a Locking Proximal Humeral Plate (LPHP). The patient wore a U-cast or long arm back slab for 2 weeks after surgery, at which time the stitches were removed. Even in the second week, we started doing the pendulum workout. In almost all circumstances, physiotherapy is handled with extreme care because of how important it is to the patient's speedy recovery.

Researchers Aksu *et al.*, observed 103 patients who had had locking plate therapy for proximal humerus fractures over the course of four years to determine what complications arise.

Of the seven patients who had any kind of infection, nine (18%) had a superficial one, three (6%) had a delayed union, and two (4%) had subacromial impingement [7]. Three (6%) cases of loosened head screws were found.

Fixation failure, implant fracture, and severe infection accounted for the remaining case (n=1). Intraoperative screw perforation of the humeral head was the most common complication, occurring in 21 (14%) of 155 patients, as reported by S udkamp *et al.*, [8] Steady Stability (1984) [9] claimed a hundred percent success rate with a methodologically similar approach. The suture tension band technique was 86% effective for Neer (1970) [10]. The fracture union rate after closed reduction and percutaneous pinning was reported to be 95% by Jabber *et al.*, (1992 [11]).

Forty-six patients (92 percent) had positive outcomes with the use of the Locking Proximal Humeral Plate, whereas just four patients (8 percent) had negative outcomes. Data show numerous benefits of the LPHP plate, albeit the follow-up time in this research was fairly brief and it was not a randomized controlled study. The plate is not adjusted, there is no complicated setup involved, and the angular screw connection ensures a constant angle of support. In addition, there were few issues linked to the plates, and the functional outcome was consistent with the findings of the prior studies. This suggests that some of the problems associated with conventional plating may be avoidable.

CONCLUSION

Using a Locking Proximal Humeral Plate (LPHP) to stabilize an unstable proximal humeral fracture allows the patient to spend less time in the hospital, reduces associated costs, and heal more quickly so that they may return to work as soon as feasible. As a result, it is an excellent method for treating proximal humeral fractures in economically fragile nations like Bangladesh.

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