ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES
Knowledge to Innovation

Vol 15, Issue 10, 2022

Online - 2455-3891
Print - 0974-2441

Research Article

MANAGEMENT OF PROXIMAL HUMERUS FRACTURE IN ADULTS WITH PHILOS PLATE FIXATION IN NEER TYPE 2 AND TYPE 3

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Received: 12 August 2022, Revised and Accepted: 20 September 2022

ABSTRACT

Objective: One of the most frequent bone fractures is a fracture of the proximal humerus. They make up between 4% and 5% of all fracture. With less invasive soft-tissue injury and a lower risk of iatrogenic avascular necrosis, closed reduction and percutaneous fixation have become more popular in recent years as opposed to open reduction (OR) and extensive internal fixation (IF) (by plates and screws).
The aim of this study was to compare the functional results of proximal humerous locking osteosynthesis (PHILOS) fixation against OR and IF of proximal humerus fractures (2 and 3 Neer's classification).

Methodology: This study involved 40 patients, with a mean age of 53 and a range of ages from 18 to 55, with 2 and 3 part fractures according to Neer's classification. Patients were randomized to either group, with Group I type 2 fractures receiving OR and IF for 22 patients, and Group II (type 3 fractures) with 18 patients receiving PHILOS plate fixation, with function assessed using the CMS score.

Results: At 1 month, 3 months, and 6 months of follow-up, Group I's mean Visual analog scale (VAS) score decreased to 2.52, 2.10, and 1.22 and in Group II, 3.86, 2.64, and 2.41. The VAS score was reduced and function CMS score were significantly increased in Group I (80% VAS score, 65% CMS score) as compared to Group II (64% VAS score, and 58%CMS score). At 1, 3, and 6 months, there was a statistically significant difference between the two groups.

Conclusion: Both groups saw satisfactory results, with each method having benefits and drawbacks. We discovered that plate fixation provided stable fixation with few implant problems and early range-of-motion exercise to achieve acceptable functional results.

Keywords: Humerus fractures, PHILOS plating, Neer's classification.

 DOI: http://dx.doi.org/10.22159/ajpcr.2022v15i10.46417. Journal homepage: https://innovareacademics.in/journals/index.php/ajpcr

INTRODUCTION

One of the most frequent fractures in the human body, accounting for 4–5% of all fractures, is a fracture of the proximal humerus. Due to osteoporosis and decreasing bone density, the incidence of this fracture is higher among the elderly. In contrast, it can happen in younger age groups after high-velocity trauma. The majority of proximal humeral fractures have been treated non-operatively over the past century. In about 80–85% of cases of proximal humeral fractures, non-operative treatment has positive functional results [1-3].

Poor functional outcomes and non-union or mal-union can arise from conservative treatment of displaced two- and three-part fractures. A suitable approach for fine reduction is open reduction (OR) with internal fixation (IF), although significant soft-tissue exposure during OR compromises the vasculature and increases the risk of humeral head avascular necrosis by double (AVN) [4,5].

About 13–16% of proximal humeral fractures are three- and four-part fractures. These displaced fractures can be treated with OR and fixation. For misplaced two- and three-part fractures, Neer advised OR and IF [6]. Poor technique is mostly to blame for the poor outcomes following OR and IF of three-part fractures. When the head of the humerus in a three- or four-part fracture or fracture dislocation is completely devoid of any blood supply, it can be replaced by a humeral prosthesis. However, stable reduction allowing for the early mobilization should be the aim of proximal humerus fracture fixation.

The present study compares the clinical and functional results of treating proximal humerus fractures using percutaneous proximal humerous locking osteosynthesis (PHILOS) plating. In light of this, the research topic was chosen to see the effectiveness of closed reduction and IF with percutaneous PHILOS plates for proximal humerus fractures in the elderly. Furthermore, to compare, between 2 and 3 type fractures classified by Neer.

METHODOLOGY

This study was conducted at the Orthopedic Department, Pacific Institute of Medical Sciences, Udaipur, Rajasthan, India, from August 2021 to July 2022. It was a randomized and double-blind trial. Based on the patient's medical history and physical examination, the treatment of proximal humerous fractures were made.

All male and female patients over the age of 18 who need surgery for a displacement or comminution humerus fracture were eligible to participate in this study after giving their written consent and X-rays evidence were included in the study.

Age 18 years, pathological fractures, undisplaced fractures, and any medical condition that would preclude surgery or general anesthesia are the exclusion criteria (heart diseases, renal failure, or active chemotherapy). This prospective study compared the outcomes (radiological and functional) of percutaneous PHILOS plate fixation in adult patients with proximal humerus fractures.

The study comprised patients with proximal humeral fractures who were operated on within 2–5 days and who were between the ages of 18 and 55 and had displaced II- or III proximal humeral fractures according to the Neer classification and AO classification in patients.

Patients who have open fractures of the Gustillo types II and III and fractures in the same limb should be evaluated before skeletal maturity to accurately identify the potential, related neurovascular injury. The present study excluded patients with an acute infection, pathological fractures, non-unions, mal-unions, or delays in surgery.

Each patient underwent a shoulder trauma series that included anteroposterior (AP), axillary, and lateral scapular (Y view) radiographs, as well as a clinical examination, neurovascular examination, radiological examination, and a CT scan to assess articular involvement, degree of fracture displacement, and glenoid rim fractures. When axillary view is not possible, it was also useful.

All patients underwent the standard preoperative laboratory tests, which include a complete blood count, a random blood glucose reading, a bleeding profile, and testing for the function of the liver and kidneys.

Declaration of ethics for each pre-operative stage. Possible procedural complications during and after surgery.

Surgical strategy and data gathering

- Group I: (Plates fixation in type 2 fractures)
- Group II: (Plate fixation in type 3 fractures).

Sufferer position

The patients were positioned in a beach chair position, with a tiny sandbag beneath the shoulder and the injured shoulder resting beyond the operating table's border.

Application

An anterior approach was used to find the fracture, entailing a 12–15-cm skin incision from the coracoid process to the proximal humeral shaft (on the level of the axilla). The cephalic vein was bluntly severed between the deltoid and pectoralis muscles to expose the deltopectoral groove and the clavipectoral fascia. The route of the muscle fibers, the vein itself, and the adipose tissue around the vein can all be used to pinpoint the cephalic vein.

Microsoft Excel 2013 and GraphPad online software were used for the statistical analysis. The mean difference between the two groups was compared using an independent t-test, and the mean difference between the type1 and type 2 fractures in proximal humerous patients data was compared using a paired t-test. The effectiveness of PHILOS plate fixation therapy of proximal fracture was compared using the t-test for variance.

Table 1: Demographic characters of patients

	Group I (Type 2 fractures) (N=18)		Group II (Type 3 fractures) (N=22)	
	Number	Percentage	Number	Percentage
Male	12	66.66	16	72
Female	06	33.33	06	27
Age (years)	53.33	----	50.00	----
Road traffic accidents	11	61	15	68
By Fall on Floor	07	39	07	32

Table 2: The VAS score in Group I (Type 2) and Group II (Type 3) proximal humerous fractures

VAS	Group I (Type 2 fractures) (N=22)	Group II (Type 3 fractures) (N=18)	p-value Group I and II
Pre-treatment	6.12±1.02	6.86±1.15	0.03
1 month	2.52±1.06	3.86±0.84	0.0001
3 months	2.10±0.70	2.64±0.92	0.04
6 months	1.22±0.53	2.41±0.46	0.0001
% decrease in score	80%	64%	

RESULTS

Out of 40 patients, 22 patients were included in Group I (type 2 fractures) and 18 in Group II (type 3 fractures), and the outcomes were analyzed. The final study group included 28 male and 12 female patients. The patients in Groups I and II had respective mean ages of 53.33 and 50.00 years. Twenty-six patients' road traffic accidents (11 were in Group I and 15 in Group II) and 14 patients' Fall on floor accidents (seven were in Group I and seven in Group II) were both impacted.

The mean visual analog scale score in Group I and Group II before treatment was 6.12 and 6.86, respectively. At 1 month, 3 months, and 6 months of follow-up, Group I's mean score decreased to 2.52, 2.10, and 1.22 respectively. In Group II, the mean VAS was 3.86 at the 1 month mark, 2.64 at the 3-month mark, and 2.41 at the 6-month mark (Fig. 1). A statistically significant difference existed between the two groups at 1 month (p=0.0001), 3 months (p=0.04), and 6 months (p=0.0001). Score was decreased to 80% in Group I that is type 2 fractures and in Group II decrease in score was 64 %. The Group I or type two fractured responded better than Group II (type 3 fractures).

Before treatment, the mean CMS score (Constant and Murley score) for Groups I and II were 58 and 56, respectively. At 1 month, 3 months, and 6 months after the intervention, the score reduced to 76 in Group I and 72 in Group II, respectively (Table 3). At the 1 month, 3 months and 6-month follow-up, the difference between the two groups was statistically highly significant (p=0.0001 in 1 month, p=0.005 in 3 month and p=0.004 in 6 months follow-up of patients).

Before and after treatment, both groups had comparable X-rays. The pain score was reduced and function CMS score were significantly increased in Group I (65%) as compared to Group II (58%) (Table 3).

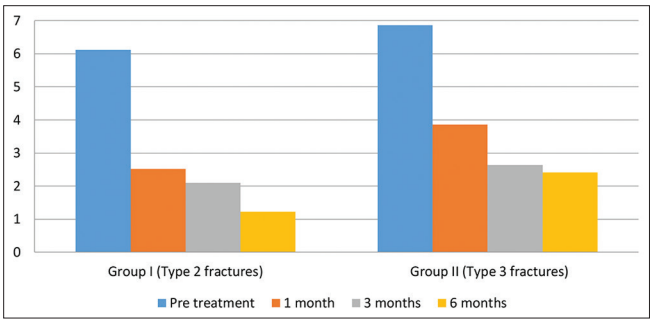

Fig. 1: The VAS score in Group I (Type 2) and Group II (Type 3) proximal humerous fractures

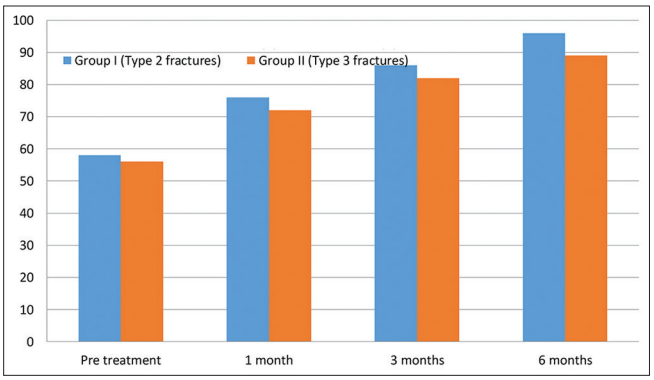

Fig. 2: The CMS Score in Group I (type 2) and Group II (type 3) treated proximal humerous fractures

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