



CASE STUDY

A COMPARATIVE STUDY BETWEEN CONSERVATIVE AND OPERATIVE MANAGEMENT IN DISPLACED PROXIMAL HUMERUS FRACTURE

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ABSTRACT

Proximal humeral fractures, defined as fractures occurring at or proximal to the surgical neck of the humerus. Nowadays proximal humeral fractures account for almost 7% of all fractures and make up 80% of all humeral fractures. In patients above the age of 65 years proximal humeral fractures are the second most frequent upper extremity fracture, and the third most common non-vertebral osteoporotic fracture after proximal femur and distal radius fractures. The treatment of this lesion depends on the conditions like the patient's age, degree of fracture displacement, the amount of damage to the soft tissue, last systematic diseases; fractured bone resulted of pathology, degree of bone damages and experience of surgeon. It might be chosen from surgical or nonsurgical treatment. Although series of conservative treatment suggest that reasonable functional results can be achieved with immobilization alone, without the morbidity associated with surgical management, even in more complex fracture types. With this background we have chosen this topic as a comparative study to evaluate the results of conservative and operative study in displaced proximal humerus fracture.

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INTRODUCTION

Proximal humeral fractures, defined as fractures occurring at or proximal to the surgical neck of the humerus. It is the commonest fracture affecting the shoulder girdle in adults (1). In the adult population, proximal humerus fractures have a unimodal distribution (2). The most commonly used classification system for proximal humeral fractures is that of Neer, which is based on the four-part anatomy of the proximal humerus. Although minimally displaced fractures appear to be amenable to conservative treatment, (3) the displaced type of fracture has a poor prognosis and the optimal treatment is still disputed. Surgical stabilization of displaced proximal humeral fractures is challenging, particularly in poor quality, osteoporotic bone. Several forms of osteosynthesis have been employed, including intramedullary devices, (4) plate and screw fixation including locking plates, (5) external fixation, (6) and techniques such as sutures (7) and tension banding (8). Hence we conducted a study to compare the result of treatment of proximal humerus fracture by two methods that is conservative and operative methods.

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MATERIALS AND METHODS

A prospective randomized and comparative study was conducted on the patients admitted in the Department of Orthopedics of Bankurasammilani Medical College. A total 100 cases were attended with proximal humerus fractures of which 40 patients were stable undisplaced fractures and managed conservatively and they are excluded from the study. The other 60 patients were displaced fractures of which 30 were two-part, 20 were three-part & rest 10 were four-part fractures. These 60 patients were divided into 30 for conservative & other 30 for operative. Inclusion criterias are- A. Age > 18 years. B. Sex >Both. C. No other fractures in the upper limb. D. Without any major systemic illness. Exclusion criterias are A. AGE = < 18 years, B. Pathological Fracture, C. Neer one part Fracture, D. Open Fracture, E. Any comorbidity affecting the end result, F. Patient have any psychiatric illness, G. Bilateral proximal humerus fracture.

The present study was undertaken with the following objectives:

1. To evaluate functional outcome and impairment.
2. To evaluate clinical outcome.
3. To evaluate anatomical restoration and residual deformity.

Parameters to be studied :

1. Neer's shoulder scoring system - Pain, Function, Range of movement, Anatomy
2. Dash scoring system

After obtaining ethical clearance from the institutional Ethics committee, study was conducted among the study populations after taking written informed consent. The relevant information was collected by using a pre-designed proforma which was filled in every case, which included a detailed history, age, sex, family history. General and systemic examination findings, photography & kiagram was taken on each and every patient under study. The "Trauma series" was used in diagnosing proximal humerus fractures. This consisted of,

- Anteroposterior view in scapular plane.
- Lateral view in scapular plane
- Axillary view

Treatment

A. Conservative treatments

Most of the cases were managed by

a. Initial immobilization and early motion: In most of the fractures were managed by cuff and collar sling and axillary pad was given, followed by gently range of motion exercises after 4-6 weeks, once pain is reduced and patient is co-operative to do range of motion exercises.

b. Closed reduction: This was done under general anaesthesia with relaxation. Displacement was corrected under image intensifier control, with patients supine and shoulder immobilizer or „U“ slab were given after reduction.

c. Slings, plaster splints and casts: These were commonly used to immobilize the fractures. A plaster „U“ slab along the humeral shaft and superior aspect of shoulder was used for extra support and comfort.

B. Operative treatments

The technique employed depends on the type of fracture, quality of bone and soft tissue, and the age and reliability of the patient. The goal of internal fixation was stable reduction allowing early motion. Limited dissection of soft tissues about the fracture fragments was done and minimal implants were used.

Open reduction and internal fixation:

The fracture was exposed through delto-pectoral approach, the biceps tendon acted as a guide to the interval between the greater and lesser tuberosities and the rotator interval between the anterior part of supraspinatus and the superior edge of subscapularis. The humeral head was usually internally rotated by the unopposed pull of subscapularis and the greater tuberosity usually was displaced proximally and posteriorly (Figure 1). It was brought back with bone holding forceps and fixed to the humeral head with No.2 0 stainless steel wire, strong non-absorbable suture, screws or tension band wiring. The joint was irrigated thoroughly to remove all debris and hematoma. If fixation was not secure, an A.O T-plate was fixed to the lateral aspect of the humerus. Careful repair of the rotator interval with multiple interrupted sutures were carried out (Figure 2,3,4). In three part fractures involving the lesser tuberosities, the humeral head was externally rotated, and the subscapularis and lesser tuberosity fragment were displaced medially. The lesser tuberosity was replaced and fixed with Krischner wires.

Post-operative care

The operated extremity was placed in a sling and swathe bandage for the first ten days. Sutures were then removed and if secure fixation was achieved, gentle pendulum exercises were started. If the bone was severely osteoporotic and fixation was less than rigid, motion was delayed, otherwise redisplacement of the fracture fragments could have occurred. Pendulum exercises were permitted by the second or third week and gentle passive forward flexion and internal and external rotation exercises by the third or fourth week. By the fourth to sixth week, active exercises were started.



Figure 1. Pre operative Skiagram

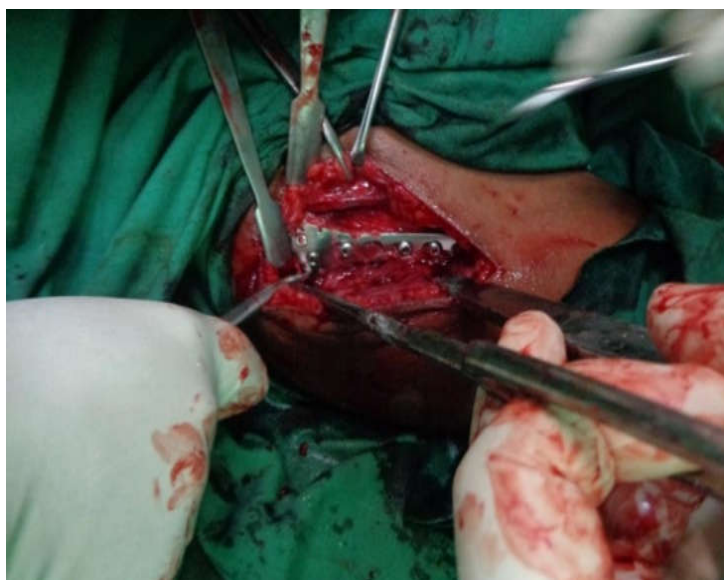


Figure 2. Intraoperative photograph for plate insertion

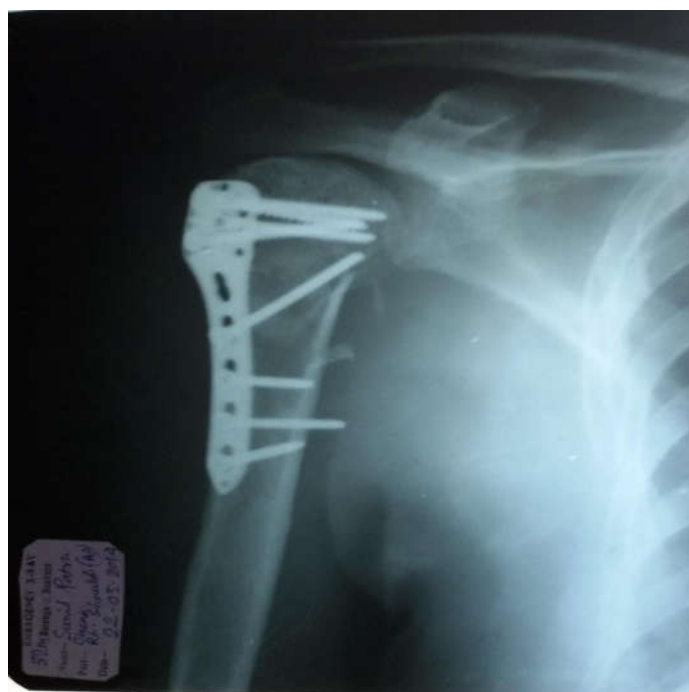


Figure 3. 6 weeks follow up



Figure 4. Post-Operative Checkx-Ray At 1 Yearfollow-Up

RESULTS

Earlier these fractures were considered simple and were managed by plaster cast technique, slings and slabs, (9) but recent advances in understanding of anatomy, good surgical skills and better instrumentation has lead to various modalities for the treatment of these fractures like percutaneous pinning, (10,11), plate fixation (12) or Prosthetic replacement (13,14). We have treated 60 cases of fractures of proximal humerus either conservatively or surgically and assessed the outcome using Neer's shoulder scoring system (15) & DASH scoring system (16). Age of the patients was more than 18 years.

In our study, 30 patients i.e. 50% patients were treated conservatively and rest 30 i.e. 50% were treated surgically and selection were randomized. All patients were examined after 6 wks, 6 months & 1 yr. In our study there were 40 males (66.7%) and 20 females (33.3%) and male to female ratio of the patients was 2 :1. There was involvement of dominant hand in 31 cases and 29 cases on non dominant side. In studies done by various authors there were similar findings (9). In our study the main mechanism of injury is road traffic accident in 31 cases (51.7%). Domestic fall includes 21 cases (35%) and 7 cases (11.7%) had history of assault and 1 case with electric burns. Thus showing high velocity injury as the main mechanism.

Table 1. Distribution of the study population according to Neer type of (Displaced) fracture

Neer type of fracture	Frequency	Percent
Two Part	30	50.0
Three Part	20	33.3
Four part	10	16.7
Total	60	100.0

Table 2. Comparison of Pain, function, range of motion, anatomy, Neer Shoulder Score & DASH score between Conservative management & operative procedure in case of two part fracture

	Type of treatment	Mean rank	Pvalue
Pain at 6 weeks	Operative	14.07	0.36
	Conservative	16.93	
Pain at 6 months	Operative	17.33	0.25
	Conservative	13.67	
Pain at 1year	Operative	18.33	0.07
	Conservative	12.67	
Function at 6 weeks	Operative	20.93	0.00
	Conservative	10.07	
Function at 6 months	Operative	19	0.02
	Conservative	12	
Function at 1year	Operative	21.57	0.00
	Conservative	9.43	
Rangeof motion at 6 weeks	Operative	19.80	0.01
	Conservative	11.20	
Rangeof motion at 6 months	Operative	18.43	0.04
	Conservative	12.57	
Rangeof motion at 1year	Operative	18.93	0.03
	Conservative	12.07	
DASH at 6 weeks	Operative	9.57	0.00
	Conservative	21.43	
DASH at 6 months	Operative	13.13	0.14
	Conservative	17.87	
DASH at 1year	Operative	12.07	0.03
	Conservative	18.93	
Neer shoulder score at 6weeks	Operative	21.10	0.00
	Conservative	9.90	
Neer shoulder score at 6months	Operative	19.70	0.01
	Conservative	11.30	
Neer shoulder score at 1year	Operative	21.87	0.00
	Conservative	9.13	

Table 3. Comparison of Pain, function, range of motion, anatomy, Neer Shoulder Score & DASH score between Conservative management & operative procedure incase of three part fracture

	Type of treatment	Mean rank	P value
Pain at 6 weeks	Operative	15.10	0.00
	Conservative	5.90	
Pain at 6 months	Operative	14.75	0.00
	Conservative	6.25	
Pain at 1 year	Operative	12.45	0.14
	Conservative	8.55	
Function at 6 weeks	Operative	13.90	0.00
	Conservative	7.10	
Function at 6 months	Operative	13.65	0.01
	Conservative	7.35	
Function at 1 year	Operative	14.40	0.00
	Conservative	6.60	
Range of motion at 6 weeks	Operative	14.50	0.00
	Conservative	6.50	
Range of motion at 6 months	Operative	14.40	0.00
	Conservative	6.60	
Range of motion at 1 year	Operative	15.30	0.00
	Conservative	5.70	
DASH at 6 weeks	Operative	6.85	0.00
	Conservative	14.15	
DASH at 6 months	Operative	9.20	0.32
	Conservative	11.80	
DASH at 1 year	Operative	6.80	0.00
	Conservative	14.20	
Neer shoulder score at 6 weeks	Operative	15.50	0.00
	Conservative	5.50	
Neer shoulder score at 6 months	Operative	15.50	0.00
	Conservative	5.50	
Neer shoulder score at 1 year	Operative	15.50	0.00
	Conservative	5.50	

Table 4. Comparison of Pain, function, range of motion, anatomy, Neer Shoulder Score & DASH score between Conservative management & operative procedure incase of four part fracture

	Type of treatment	Mean rank	P value
Pain at 6 weeks	Operative	3.60	0.04
	Conservative	7.40	
Pain at 6 months	Operative	8.00	0.01
	Conservative	3.00	
Pain at 1 year	Operative	7.60	0.03
	Conservative	3.40	
Function at 6 weeks	Operative	7.30	0.06
	Conservative	3.70	
Function at 6 months	Operative	7.40	0.04
	Conservative	3.60	
Function at 1 year	Operative	7.60	0.03
	Conservative	3.40	
Range of motion at 6 weeks	Operative	7.20	0.07
	Conservative	3.80	
Range of motion at 6 months	Operative	8.00	0.01
	Conservative	3.00	
Range of motion at 1 year	Operative	8.00	0.01
	Conservative	3.00	
DASH at 6 weeks	Operative	4.50	0.29
	Conservative	6.50	
DASH at 6 months	Operative	5.00	0.59
	Conservative	6.00	
DASH at 1 year	Operative	3.10	0.01
	Conservative	7.90	
Neer shoulder score at 6 weeks	Operative	8.00	0.01
	Conservative	3.00	
Neer shoulder score at 6 months	Operative	8.00	0.01
	Conservative	3.00	
Neer shoulder score at 1 year	Operative	8.00	0.01
	Conservative	3.00	

Table 5. Comparative study of Two-part Fracture at the end of 1 year on the basis of Neer Shoulder Scoring System

Type of treatment	Excellent	Satisfactory	Unsatisfactory	Failure
Conservative (15)	01	11	03	00
Operative (15)	08	07	0	00

DISCUSSION

All 60 cases were treated and followed up for an average period of 1 yrs & 10 months. Among these 60 cases, 30 cases were of two-part, 20 cases were three- part and 10 cases were four-part of proximal humerus fracture. (Table 1) There was statistically significant difference between Conservative management & operative procedure as p value< 0.05 (Mann-Whitney Test) found in all conditions except range of motion 6 months & DASH score at 6 months and pain in case of **two part fractures**. (Table 2)

There was statistically significant difference between Conservative management & operative procedure as pvalue<0.05(Mann-Whitney Test) found in all conditions except DASH score at 6 months and pain at 1 year in case of **three part fracture**. (Table 3)

There was statistically significant difference between Conservative management and operative management as pvalue<0.05 (Mann-Whitney Test) found in all conditions except DASH score at 6 weeks and 6month in case of **four part fracture**. (Table 4)

In case of two-part fracture, malunion in 2 patients & Frozen shoulder with 2 patients treated conservatively. One patient with surgical neck humerus was treated by open reduction and internal fixation with k-wire had a complain of pin tract infection, subsided after pin removal & antibiotics. In case of three-part fracture, malunion developed 4 patients &Frozen shoulder with 4 patients treated conservatively and one patient developed superficial infection treated surgically & infection was subsided after antibiotics. Our study had some limitations. Firstly, we excluded all undisplaced fracture of proximal humerus. Secondly, the strength of our results was limited by small sample size. Thirdly, We had not compared the results with the patients having similar fracture pattern treated with conservative & operative management. Fourthly, We had to include the patients of wide age groups, so no attempt have been made in our study to compare the results between the young patients & the older patients and also results obtained in individual type of fractures because of short sample size. Finally, The longer-term outcome analysis is not there in our study. Additional prospective and randomized larger comparative studies are needed to compare these two methods in the treatment of proximal humerus fracture.
