



## Comparative Study on Operative and Non - Operative Treatment of Proximal Humerus Fracture in Tertiary Care Hospital

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### Abstract

**Background:** Proximal humerus fractures are the third most common fractures after distal radius and hip fractures. Non-union rate of fractures in the proximal third of humerus and head of the femur is relatively very higher as compare to other regions with conservative treatment cases. The optimum treatment becomes more important for patient good life unlikely most of the cases they treated non operatively. Non operatively lead lots of problem and make patient's life uncomfortable.

**Objective:** To compare outcomes of operative and non- operative treatment of proximal humerus fracture in tertiary care hospital.

**Material and Methods:** There were 100 patient who had fracture among that 50 patients are treated with non -operatively and 50 are treated with operatively.

**Non-operative Treatment:** Upper extremity shoulder was immobilized in a sling for 2-3 weeks with passive range of motion exercises starting after ending of 2 weeks including pendulum exercises.

**Surgical Treatment:** All surgeries were performed in the beach chair position and most of the case lateral deltoid split approach are using with AO reduction techniques by surgeons in upper extremity trauma. In all operations, PHILOS plates were used and after surgery, immobilization was done with a sling.

**Results:** In 2-Part, 3 part and 4 part fractures the ASES scores was high in operative patient than non operative patient. Similarly the VAS score was high in operative patient than non operative patient. Displacement rates were 50% of non-operative treatment where as only 10% patients X ray show displacement in operative group. The healing rate was much higher in operative group as compare to non operative group.

**Conclusion:** In case of the comminuted fracture in humerus the best treatment is implanting PHILOS plates which provided best ROM muscle strength and wrist grip as compare to non- operative. Non- operative comminuted fracture may lead to not proper union and lead to a prolong problem.

**Keywords:** ASES, Non operative, Operative, Proximal humerus fracture, PHILOS plates, VAS.

### Introduction

Proximal humerus fractures are the third most common fractures after distal radius and hip fractures with an incidence of 105: 100, 000<sup>1,2</sup>.

Proximal humerus fractures are increasingly common in the elderly population<sup>3</sup>; accounting for 10% of all these patients' fractures<sup>4</sup>but it is also seen in young patients<sup>5-7</sup>.

In most of the cases non-union rate of fractures in the proximal third of humerus and head of the femur is relatively very higher as compare to other regions with conservative treatment<sup>8</sup>. In such cases the optimum treatment becomes more important for patient good life unlikely most of the cases they treated nonoperatively<sup>9</sup>. Non operatively lead lot's of problem and make patient's life uncomfortable. Recent survey reported that the operative fixations are favoured by a large number of surgeons across the world, especially for shoulder, elbow and head of the femur<sup>10</sup>. Several studies have reported a substantial increase in surgery and claim it has now become current practice in the treatment of PHF, especially among the people aged over 60 years<sup>11</sup>. This increase has been mainly due to the introduction of locking plates, even though proper evidence of the superiority of surgery is lacking<sup>12</sup>. Many studies have shown that the rate of failure was more seen in non- operative treatment specially in case of multiple fracture in one bone as compare to surgical treatment<sup>13,14</sup>. However in case of non-displaced or hair line fractures could be treated well non operatively method. The purpose of this study was to compare outcomes of operative and non- operative treatment of fracture in our hospitals.

### Material and Methods

**Study Population:** This was a retrospective observational study conducted in the Department of Orthopaedics, Mathura Das Mathur Hospital (MDMH), Mahatma Gandhi hospital [MGH] under Dr. S N Medical College, Jodhpur, Rajasthan over a period of one year from January 2018 to December 2018. There were 100 patient who had fracture among that 50 patients are treated with non -operatively and 50 are treated with operatively. All 100 patients were ready to take part in study and continue follow up to 1 year treatment program. They were divided into 2 group i.e. non operative and operative group and we take a data of muscle strength and range of motion in both non operative and operative.

**Exclusion Criteria:** Patient were suffering from pseudo-arthrosis, pathological fractures, refractures, neuromuscular diseases, open fractures, and coexisting fractures of upper and lower extremity.

### Methodology

#### Non-operative Treatment

Upper extremity shoulder was immobilized in a sling for 2-3 weeks with passive range of motion exercises starting after ending of 2 weeks including pendulum exercises, after 3 weeks progressive exercises against resistance start. Patients were seen once in a month till the 3 months and after 3<sup>rd</sup> month patient follow up every 2 month.

#### Surgical Treatment

All surgeries were performed in the beach chair position and most of the case lateral deltoid split approach are using with AO reduction techniques by surgeons in upper extremity trauma. In all operations, PHILOS plates were used and after surgery, immobilization was done with a sling. Passive ROM exercises were started after 5<sup>th</sup> day of surgery with exercises were performed by specialised physiotherapist. 30 Patients whose were without any surgical wound problems were discharge within 1 week rest 20 patients were discharge in 15 days because they had some surgical wound problem. The mean hospital stay was 6.5+1.1 days. Sutures were removed between 12<sup>th</sup> to 25<sup>th</sup> days after surgery. After complete removal of suture, active exercise was started after 2 month of surgery by physiotherapist. In the 1<sup>st</sup> month of the exercise bones and muscle was very week soon after exercise both condition going to improve muscle and bone strengths becoming normal as it before. All patients were came for follow up for 1 year in every 2 month duration. Shoulder and elbow active ROM of all patients including non operative and operative group were measured by using universal long-arm goniometer. Dynamometer were used for checking Arm flexor, extensor, abductor, and adductor

muscles; forearm flexor and extensor muscles; and hand grip strengthening both group patients. All Dominant sides were determined for all 2 groups, and comparison was done accordingly. For subjective functional analysis, the American Shoulder and Elbow Surgeons (ASES) shoulder

score and visual analog scale (VAS) pain score were used.<sup>6</sup>

### Statistical Analyses

All Statistical analysis were performed using IBM SPSS 21 software

## Result

**Table 1** Number of patients in non operative group and operative group, according to gender, age and subgroups of fractures

Parameters	Female	Male	Mean age (years)	2-Part fractures	3-Part fractures	4-Part fractures
Operative	15 (30%)	35(70%)	38.98 (20-78)	10(20%)	25(50%)	15(30%)
Non operative	10 (20%)	40(80%)	33.34 (20-70)	30(60%)	15(30%)	5(10%)

**Table 2** Comparison of ASES (American Shoulder and Elbow Score) and VAS (visual analog scale) scores for both groups according to fracture type

Parameters	ASES	VAS
<b>2- parts</b>		
Non operative group	80.1	1.5
Operative group	95.2	2.5
P Score	0.05	0.02
<b>3-parts</b>		
Non operative group	82.5	2.0
Operative group	70.9	2.8
P Score	0.085	0.24
<b>4-parts</b>		
Non operative group	65.5	2.5
Operative group	80.3	3.5
P Score	0.04	0.21

**Table 3** Comparison of shoulder Range of Motion (ROM) for 2, 3, 4-part fractures

Parameters	Forward elevation (FE)	Extension	Internal Rotation (IR)	External Rotation (ER)	Abduction	Adduction
<b>2- parts</b>						
Non operative group	120.45	50.3	48.9	61.2	110.5	30.5
Operative group	160.45	49.5	70.5	70.3	125.1	42.5
P Score	0.25	0.91	0.12	0.51	0.44	0.11
<b>3-parts</b>						
Non operative group	130.45	48.4	50.25	70.2	110.4	40.5
Operative group	125.69	45.6	55.12	50.3	100.6	41.5
P Score	0.21	0.72	0.65	0.66	0.04	0.78
<b>4-parts</b>						
Non operative group	120.5	38.5	42.2	50.4	110.5	40.5
Operative group	115.2	48.2	70.1	65.2	100.5	39.5
P Score	0.64	0.161	0.68	0.23	0.05	0.66

**Table 4** Comparison of muscle strength (in pounds) for 2-,3- and 4-part fractures

	Arm Flexors	Arm Extensors	Arm Abductors	Arm Adductors	Forearm Flexors	Forearm Extensors	Hand grip
2- parts							
Non operative group	9.5	9.0	8.1	15.5	12.5	8.6	19.5
Operative group	12.5	11.5	11.5	19.5	19.5	13.2	30.5
P Score	0.063	0.45	0.41	0.12	0.085	0.13	0.041
3-parts							
Non operative group	10.5	8.5	9.5	9.6	12.5	8.9	21.1
Operative group	15.8	11.2	12.6	13.2	18.5	11.5	31.5
P Score	0.25	0.025	0.045	0.25	0.025	0.14	0.12
4-parts							
Non operative group	9.5	9.2	10.5	8.2	15.2	9.6	22.6
Operative group	13.5	105	14.4	11.5	19.5	13.2	30.6
P Score	0.25	0.62	0.62	0.61	0.34	0.14	0.54

### 2-Part Fractures

The ASES scores of non -operative patient was 80.1 and operative patient (PHILOS plates) was 95.2 point (P =0.05). The ASES scores was high in operative patient. VAS score of non -operative patient was 1.5 and operative patient was 2.5 (P= 0.02) (table No 2). The difference between 2 group was determine in term of shoulder internal rotation. It was higher in operative group as compare to non- operative group. There was no statistical difference seen in term of arm and forearm muscle strength but in case of hand grip strength non operative group has less strength power as compare to operative patient group.

### 3-Part Fractures

In cases of the 3- part fractures the ASES scores was 82.5 in non -operative group and operative as 70.9 (p= 0.085). (Table No 2) the VAS score was 2.0 for non -operative group and operative was 2.8 (p 0.24) these difference for ROM. The muscle strength, and range motion was better in Operative treatment as compare to non- operative treatment (Table 3and 4).

**Part Fractures: In case of the 4 part fractures the ASES** scores was 65.5 in non -operative group and operative group was 80.3 (p 0.04). (Table No 2) the VAS score was 2.5 for non -operative group and operative group was 3.5 (p= 0.21). The ROM, muscle strength, adduction abduction, grip of wrist, forearm flexor & extensor was better in

operative group as compare to non -operative group.

### Radiological Results

Displacement rates were 50% of non-operative treatment where as only 10% patients X ray show displacement in operative group the healing rate was much higher in operative group as compare to non operative group. There was no difference show in displaced and non displaced fracture healing in the PHILOS plate group (p >0.05). There were valgus displacement in 15 (30%) patient with 4 -parts fractures in non-operative group. Only 2 (4%) patient were detected with loose screw.

### Complications

In operative group 5 patient having infection in there surgical sites, which was treated by oral antibiotic. 2 patients from operative group were ready for second surgery for replacing screw. 5 patients from the non- operative group facing non Union problem had refuse surgery and follow up for clinical routine. The valgus displacement complication was in the 4- part of fracture in 15 patients.

### Discussion

This study was performed between non operative or operative group patients to know response of PHILOS plates treatment in multiple bone fracture case. During study we focused on non- operative treatment of 3- and 4-part fractures, which was

lacking in the literature. The subjective result of Rom and muscle strength were more found in operative group as compare to non operatively, ASES and VAS result also telling that the group was operative more better than non- operatively group.

In case of 2-part fractures we decided according to age, sex, displacement, and angulation. Lange et al<sup>15</sup> in his study using Targon nails and he found no difference between the results in operative or nonoperatively. F. Jalestad and Hole<sup>16</sup> also did not found any difference in their randomized controlled trial, they reported no better results in surgical treatment than conservative treatment for patients with displaced proximal humeral fracture at 2-year follow-up. However Tamimi et al<sup>17</sup> used percutaneous K-wiring in their study and determined that subjective functional results in the surgical group were better as compare to non operatively group. In this study we found that the ASES scores were higher in the operative group as compare to non operatively group but it was statistically non significant. Even in, VAS scores were high in the operative group and it was statistically significant. Our findings vary from other it may be due to use of different surgical implant (PHILOS plates). In case of 3<sup>rd</sup> and 4<sup>th</sup> part of the fracture our results are concordant with both Tamimi et al<sup>17</sup> and Lange et al<sup>15</sup> where they don't found any different but in radiological report they found group was operative better than non operatively group. We also found that shoulder ROM was good in operatively group and only abduction was statistically signification different which is similar with Lange et al<sup>15</sup>.

In case of muscle strength operative group was better there arm flexor and extensor even there forearm flexor and extensor is more powerful as compare to non operatively group this may be due to physiotherapy<sup>17</sup>. Our findings are consistent with Olerud et al<sup>18</sup> who performed on 60 patient with 3- part fractures treated with PHILOS Implante found that Muscle strength Rom of shoulder was better than Non operatively group and it were statistically insignificant( $p = 0.64$ ).

Overall in both group of the patient after completed their medical treatment was fully able to perform his/her day today task without any problem and pain.

### Conclusion

In case of the multiple bones fracture in humerus the best treatment is implanting PHILOS plates which provided best ROM muscle strength and writs grip as compare to non- operative. Non-operative multiple fracture may lead to not proper union and lead to a prolong problem.

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