Volume : 4 | Issue : 7 | July 2015 • ISSN No 2277 - 8179

Research Paper

Case Series; Proximal Humerus Fractures and Different Operative Modalities

Medical Science

KEYWORDS :

Dr. Rahul R Parmar	M.S. Orthopedics ; Assistant Professor, Department of Orthopedics, Simmer Hospital, Surat
Dr. Prabhav P Tijoriwala	M.S. Orthopedics ; Assistant Professor,Department of Orthopedics,Goverment Medical college,surat
Dr. Hardik Vaghela	M.S. Orthopedics ; Senior Resident,department of Orthopedics,GMERS,Gandhinagar
Dr. Nisarg Parikh	M.S. Orthopedics ; Senior Resident,Sheth L.G. Hospital,Ahmedabad

INTRODUCTION

Proximal humerus fractures are very common fractures occurring in the skeleton. They account for approximately 4–5% of the fracture attendance at the hospital. It is the most common fracture of shoulder girdle. It is the 3rd most common fracture in elderly. Male to female ratio is 1:2[1]. They occur more commonly in elderly patients, after cancellous bone of the humeral neck has been weakened by senility; but these fractures are seen in patients of all ages. These fractures can be extremely disabling and their management often demands experienced surgical skills. Because of increasing incidence of vehicular accidents, complicated fracture patterns in proximal humerus are becoming increasingly common. The preferred treatment varies depending on the patient's age & bone quality, the expertise of the surgical team, the patient's expectations and need.

Although a number of reports have described the outcome of treatment of proximal humeral fractures; comparison of these fractures is hampered by inconsistency in fracture classification, treatment and evaluation method. The surgery should be carried out as soon as the patients' general condition permits. A delay of several days makes reduction more difficult and a significant delay results in absorption of bone, making secure internal fixation impossible. Three & four part fractures represent 13 to 16 % of proximal humeral fractures. Neer recommended open reduction and internal fixation for displaced two and three parts fractures. Most of the poor results following open reduction and internal fixation of three part fracture are due to imperfect technique. In a three or four part fracture dislocation, when the head of the humerus is entirely devoid of any blood supply, it can be replaced by a humeral prosthesis.

Although a lot of literature is available regarding classification, treatment modalities, timing of surgeries and selection of fixation methods, universally accepted treatment modalities are still not available for certain types of proximal humerus fractures. Whether to treat these fractures conservatively or operatively to achieve best possible results with minimal complications is still a matter of debate.

As these fractures affect the day-to-day human activities and variable management protocols for these fractures are available with each one having their own supporters and contradictors, we have studied the various operative methods for fixation of these fractures evaluated in terms of functional as well as clinical results.

AIMS & OBJECTIVES

1. To study the occurrence, mechanism of injury and displacement of various types of fractures.
2. To study different modalities of the fixation in proximal humerus fractures.
3. To assess and compare the results in terms of functional & clinical criteria of the different operative modalities.
4. To evaluate preferred modality of treatment of proximal humerus fractures according to the pattern of fracture.

CLASSIFICATION

NEER'S CLASSIFICATION[2](1970) It groups fractures based on the number of parts and their displacement from each other.

Minimal displaced fractures.
Two-part fracture
Three-partfracture
Four-part fracture

MANAGEMENT

TREATMENT METHODS

General treatment considerations

- Variables to consider include: age, fracture type, fracture displacement, bone quality, dominance, general medical condition

Non Operative

- Immobilization
- Universal shoulder immobilizer/Short arm sling is given to the patients.

Operative

Close Methods CRPP (Closed Reduction Percutanous Pinning) [3]CRPP WITH EXTERNAL FIXATOR ORIF (OPEN REDUCTION INTERNAL FIXATION)[1, 5] HEMIARTHROPLASTY[3,4]

MATERIALSANDMETHODS

This is a prospective as well as retrospective study of 60 consecutive patients with fracture of proximal humerus, treated in our department between time period of May, 2011 and December, 2013.

Inclusion criteria

-- Adult patients
-- Proximal humerus fractures [Neer's classification: 2, 3 & 4 part]

Exclusion criteria

--	Medically unfit patients
--	Patients with open physis
--	Shaft humerus fractures with proximal extension
--	Neer's one part fracture
--	Open fractures
--	Neurovascular injuries

Volume : 4 | Issue : 7 | July 2015 • ISSN No 2277 - 8179

	After primary management, all patients having proximal humerus

fractures were assessed clinically and radiologically. Radiographic evaluation of the shoulder was done according to Neer's trauma series which consists of:

- Anteroposterior (AP) view
- Axillary view

Fractures were classified according to the Neer's classification. Following factors were taken into consideration while deciding the modality of treatment to be used:

1. Neer's classification type with associated displacement
2. Presence of humeral head dislocation and humeral head split fracture
3. Valgus impaction and metaphyseal extension
4. Comminution
5. Quality of bone e.g. Osteoporosis
6. Age of the patient

The patients included in the study were evaluated according to the following proforma (Appendix 1) and they were randomized for different modalities of management i.e. Percutaneous method (K wire & K wire fixator) and Open methods (Locking Plates & Hemiarthroplasty) accordingly.

After operative management, appropriate rehabilitation was started according to the modality used. In the Closed group (K wire & K wire fixator) patients were kept immobilized for 6 wks period and then started with gradual mobilization with shoulder pendulum exercises and subsequently gradual active and passive ROM exercises were started. In the ORIF group patients were mobilized after stitch removal with shoulder pendulum exercise and gradually active and passive ROM exercises were started.

Follow–Up

The patients were first followed up at 2 weeks for stitch removal; then at 6 weeks to assess the progress of rehabilitation, detect any early complication and for removal of implants.

Then after, patients were regularly followed up at 3 months and 6 months intervals. On each visit, patient is evaluated for following parameters.

Clinical	Radiological
Constant Shoulder Score	Signs of Union
Return to Pre-injury Activity-Personal	
Return to Pre-injury Activity-Professional	

If any complication was noticed, it was managed accordingly.

Once a patient had regained the pre-injury status in both personal and professional aspects, the final follow-up of the patient was done. Final Constant Shoulder scores[6] were obtained. Standard AP and axillary radiographs were taken to evaluate: •Joint Status

- AVN head of humerus
- Arthritis of head
- Head shaft angle

The final results were classified into four categories: Excellent, Good, Fair and Poor according to following final scores.

Constant Shoulder Score[6]

1 Pain(15)		2.Activity Level (check all that apply) (10)		
0	Severe	2	Yes	Unaffected Sleep
		0	No	
5	Moderate	4	Yes	Full Recreation/Sport
		0	No	
10	Mild	4	Yes	Full work
		0	No	
15	None			

3.Arm Positioning(10)		4.Strength of Abduction(Pounds)(25)			
2	Upto Waist	0	0	14	13-15
4	Upto Xiphoid	2	1-3	17	15-18
6	Upto Neck	5	4-6	20	19-21
8	Upto Top of Head	8	7-9	23	22-24
10	Above Head	11	10-12	25	>24

Grading the Constant Shoulder Score
(Difference between normal and Abnormal Side)

>30 Poor 21-30 Fair 11-20 Good <11 Excellent.

SUMMARY

1. This study group comprises of 60 patients, and they were randomized for different modalities of management i.e. Percutaneous method (K wire & K wire fixator) and Open methods (Locking Plates & Hemiarthroplasty) and accordingly subdivided in three groups comprising 20 patients each. All 60 patients were followed up for an average period of 14.17 months. (7 months to 24 months)
2. Average age of the study group was 47.65 years (Range 20-80 years).
   High velocity injuries were more common in younger population.
3. 37 were male patients and 23 were female patients.
4. Road traffic accident was the most common cause of injury.
5. 33.33% (n=20) had associated injuries. Associated upper limb injuries significantly affected the functional outcome despite satisfactory shoulder function.

6. Four part and three part fractures constituted the commonest types with 23 (38.33%) patients of four part and 22 (36.67%) patients of three part fracture.
7. 11 (18.33%) fractures had metaphyseal extension in proximal fragment, among which 5 patients had favourable outcome and 6 patients had unfavourable outcome.
8. 21(35%) fractures were dislocated on presentation and most of them 14 (66.88%) patients were treated with HRA, among which 12 patients had favourable outcome and 9 had unfavourable outcome.
9. 13 (21.67%) patients had head split fractures, among which 8 patients had favourable outcome and 5 had unfavourable outcome.
10. 9 (60%) patients of 2 part fractures were treated with ORIF. Among 3 part fractures, 11 (50%) patients were treated with percutaneuos method. 17 (74%) patients of the 4 part fractures were treated with HRA. Most of the patients (31 out of 45) having complex fracture pattern were treated by open method either ORIF or HRA.
11. 10% (n=6) developed infection post-operatively.
12. 22.5% (n=9) patients showed varus collapse.
13. 4 (20%) of patients those were operated by percutanous method showed poor results and 4 (20%) patients operated by open method showed poor results. Among 4 patients of percutaneous method, 2 patients had fair and 2 had poor final results. Among 4 patients of ORIF method 2 had excellent and 2 had fair results. Thus, head shaft angle does not always correlate with outcome of the patient.
14. Radiological results were better in ORIF group.
15. Radiological results usually correlated with functional results. However, in addition to it, various other factors like old age, complex fracture pattern, associated upper limb injury and post-operative complication also hampered the functional outcomes.
16. Early mobilization was started in ORIF and HRA group. Average range of motion was better in ORIF group.
17. Mean constant score in percutaneous method is 79.2, ORIF method is 84.7andHRA method is 77.35.

CONCLUSION

There is a paradigm shift in proximal humeral fracture epidemiology, with reduction in average age group and increase in frequency of high grade fractures.

Male preponderance is due to the pre-dominant outdoor activity and active professional behaviour. In our society, female patients are mainly involved in household activities.

As there is a substantial increase in the number motor vehicles; there is increased frequency of road traffic accidents in younger active population, which has lead to complex pattern of fracture.

Most of the patients having complex fracture pattern; are treated with open method either ORIF or HRA.

Due to increased risk of osteonecrosis associated with dislocation and head split type of fractures, the preferred modality of the treatment is hemiarthroplasty.

ORIF method shows early radiological union as compared to other modalities.

Minimally displaced 3 part fracture gives better result with percutanous methods.

Though radiological outcome (Head shaft angle) does not always correlate with the clinical outcome, most of the radiological results are comparable with the clinical results.

Varus collapse is associated with restriction of range of motion and poor functional results.

The average follow-up period was only 14 months, which is very short as compared to other studies. As these fractures are prone to develop arthrosis and osteonecrosis after a longer course of time, it is necessary to follow-up the patients for a longer period.

REFERENCE

1. Rockwood and Green's fractures in adults 6th ed.Vol.1 p.1162-1180 | 2. Neer CS: Displaced proximal humerus fractures classification and evaluation, JBJS, Vol.52A, No.6, September, 1970, p.1077-1089. | 3. Mighell MA, Kolm GP, Collinger CA, et al. outcomes of hemiarthroplasty for fracture of proximal humerus. J Shoulder Elbow Surgery 2003; 12(6):569-77. | 4. Neer CS II: Shoulder reconstruction. Philadelfia PA, Saunders, 1990 | 5. Campbell Operative Orthopedics, 12th edition | 6. Constant CR, Murley AH. A clinical method of functional assessment of the shoulder. Clin Orthop Relat Res. 1987 Jan; (214):160-4.