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STUDY OF THE OUTCOME OF TREATMENT OF THE PROXIMAL HUMERUS FRACTURES

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ABSTRACT

Proximal humeral fracture is one of the most common fractures in day to day practice. Various treatment modalities are present to treat this fracture including conservative and surgical methods. High energy trauma is the main culprit. Conservative treatment includes use of cuff, collar sling, U slab and shoulder immobilization. Surgical treatment includes open reduction and internal fixation with use of plating, K wiring, percutaneous pinning and nailing. Material and methods- Study included 60 patients of proximal humeral fracture treated with conservative and surgical methods. Final evaluation was done using Neer's Shoulder Scoring system. Results- Fracture was most commonly seen in middle aged and elderly males with right side predominance. Excellent outcome was in patients receiving conservative treatment in undisplaced fractures where as surgical treatment was mainstay of treatment in displaced and unstable fractures. Conclusion- Undisplaced and stable fractures of the proximal humerus can be managed by conservative methods. In cases of displaced and unstable fractures the goal of open reduction and internal fixation was to restore proximal humeral anatomy with stability so that fracture healing occurs early with excellent functional outcome.

INTRODUCTION

Fractures of proximal humerus are commonly encountered in day to day practice by orthopaedic surgeons. This fracture has prime importance in young and middle aged people as it may hamper their working hours and efficiency. Increased chances of road traffic accidents significantly contributed to the proximal humerus fractures which may result in temporary disability. This fracture was first described by Hippocrates way back in 420 BC. Fractures of proximal humerus account for 4-5% of all fractures, more commonly in elderly due to osteoporosis. About 76% of these fractures occur in patients above 40 years. In younger individuals high energy trauma is the main reason for this fracture [1,2].

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Injury to brachial plexus and axillary nerve can lead to neurovascular deficits. Proximal humerus fractures are classified on the basis of anatomical level of fracture, mechanism of injury, amount of contact by fractured segment, displacement degree, vascular status of articular segment. Kocher [1] classified this fracture on basis of anatomical level of fracture as supratubercular, pertubercular, infratubercular and subtubercular. Watson Jone classification [1] based on mechanism of injury, was abduction type and adduction type. Codman [1,3] classified 4 major fragments: anatomical head, greater tuberosity, lesser tuberosity and shaft and concluded that all fractures were combination of various fragments. On the basis of mechanism of injury, Dehne [1] classified as lateral mechanism (forced adduction), dorsal mechanism (forced extension) and central mechanism. Neer's [1],[3] classification was based on displacement of fracture fragments and vascular supply to humeral head. He defined

"a fracture fragment is considered displaced, if there is more than 1 centimeter of separation or a fragment is angulated more than 45° from other fragment". Classification emphasizes on vascular supply to articular fragments [4]. A- for extra articular unifocal fracture, B - for extra articular bifocal fracture and C - for articular fracture. Undisplaced fractures are treated conservatively with cuff and collar sling, U slab and shoulder immobilization. Displaced fractures treatment varies depending on fracture is stable or unstable. For stable fracture, fragments are either impacted or only distal fragment is displaced medially as upper fragment is held in neutral position by equal pull of muscles over tuberosities [1]. Impacted fractures with angulation more than 45° need to be reduced. Unstable fractures require operative treatment like percutaneous pinning, lateral plating, intramedullary nailing, tension band. Anterior delto pectoral or lateral approach are used for internal fixation of this fracture. Complications include avascular necrosis of humeral head, malunion, nonunion, frozen shoulder, infection, neurovascular injury, pneumothorax, pneumo-haemothorax, rotator cuff tear.

MATERIAL AND METHOD

Study comprised of 60 patients of age more than 18 years with closed un-displaced fracture and displaced fractures . Cause of fracture, treatment modality, complications, recovery, outcome in terms of pain, strength, shoulder mobility and activity on injured side were compared with unaffected side. Analgesics were given and anteroposterior, lateral and axillary radiographs (figure 1) were taken. Detailed neurovascular examination, chest examination, abdominal and pelvis examination were done. For undisplaced or minimally displaced fractures conservative treatment like immobilization using cuffs, collar sling followed by gentle exercise after 4-5 weeks were done. Closed reduction, U slab, plaster splint and cast were also used. Surgery was done under general aneasthesia internal fixation with limited dissection of soft tissue to preserve the vascularity (figure 2- union after surgery). Final outcome was evaluated according to Neer's [5] shoulder scoring system- Based on 100 units: 35 units for pain, 30 units for function, 25 units for range of motion and 10 units for anatomy. Results were written as- greater than 89 units as excellent, greater than 80 units as satisfactory, greater than 70 units as unsatisfactory and less than 70 units as failure.

Observations

In our study, maximum number of patients 16(26.66%) were in 40-50 years age group followed by 12 patients (20%) in 50-60 years (table I). Proximal humerus fracture was more commonly seen in elderly. Male sustained this fracture twice than females (2:1). 66.66% were males and 33.33% were females (table II). Right side involvement was twice than left (table II). 42 patients (70%) had history of vehicular accidents, 12 patients (20%) presented with history of fall. 38 patients (63.33%) were treated conservatively (table III) while operative treatment was given in 22 patients (36.66%). Regarding un-displaced proximal humerus fractures 9 cases were of surgical neck fracture and 4 of greater tuberosity fractures. These were treated with conservative treatment and immobilization. Out of 9 cases of surgical neck fracture, 7 had excellent outcome and 2 had satisfactory results. 4 patients of greater tuberosity fracture had excellent outcome. According to Neer's classification of displaced fractures out of 47 patients, 11 were of two- part fracture surgical neck , 8 were of two- part greater tuberosity fracture. Three- part surgical neck fractures were seen in 5 patients.

Out of 19 patients of surgical neck fracture, 6 were treated conservatively and 13 treated surgically. 5 patients with conservative treatment 5 had excellent outcome and 1 had satisfactory. Out of 13 patients treated with surgery 2 had excellent, 10 had satisfactory and 1 had unsatisfactory outcome. Out of the patients with two- part greater tuberosity fracture 3 were treated conservatively and 5 were treated surgically. Out of conservative treatment patients 2 showed excellent and 1 was with satisfactory outcome. 2 patients of surgical treatment had excellent and 3 had satisfactory outcome (figures 3,4 and 5 showing excellent outcome). Regarding three- part fractures with conservative treatment 1 had satisfactory and 3 had unsatisfactory outcome. 1 patient with surgical treatment had excellent outcome. Complications in our study were 20 patients (33.33%) with frozen shoulder, 10 patients (16.66%) had mal-union, 9 patients (15%) had delayed union, infection was reported in 5 patients (8.33%) and non union was in 1 patient (1.66%).

Table 1. Age wise distribution of patients

Age (years)	Number of patients
20-30	**3**
30-40	**10**
40-50	**16**
50-60	**12**
60-70	**7**
70-80	**7**
80-90	**5**
Total	**60**

Table 2. Extremity side involved

Side	Number of patients
Right	40
Left	20

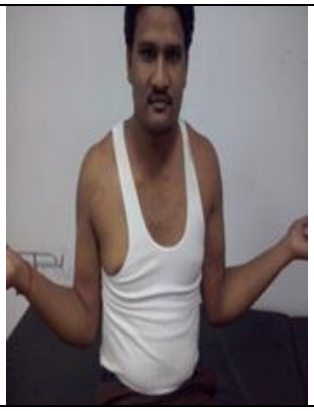
Table 3. Mode of treatment

Mode of treatment	Number of patients
Conservative	38
Surgical	22

Figure 1. Preoperative x-ray

Figure 2. X-ray showing union

Figure 3,4 and 5 showing excellent outcome after treatment



DISCUSSION

In our study maximum numbers of cases were in 40-60 years age with more number of males than females in the ratio of 2:1. In studies done by various authors similar results were observed [2]. This was concluded that vehicular accidents were the most common cause of the fracture proximal humerus i.e. increased velocity was the main culprit in causing this fracture. As conservative treatment was given in 38 patients and operative in 22 patients which was in accordance with the published studies , showed 70-80% of fractures of proximal humerus fractures can be treated conservatively with satisfactory to excellent results [1,3,6]. Outcome of displaced three part fractures was in range of published literature [7,8].

In a study of 140 cases, one part fractures of proximal humerus were treated with cuff and collar sling. They showed clinical and radiological union by 8-10 weeks, with 46% of cases having complete functional recovery [6]. Another study was done from 1994-96, 73 patients with humeral head fracture, who were treated with closed pinning. There were 48- two part fractures, 18-three part fractures, 7 fractures dislocation. All fractures united between 4-8 weeks. There were no cases of infection, axillary nerve damage and no avascular necrosis. In 1 patient reduction was lost. They concluded that closed pinning of humeral head fracture is a safe and reliable procedure and can be used alone or in combination with other procedures. The low morbidity of this method is superior to other methods [9].

In another study where in 38 patients with four part fractures and fracture dislocation were treated with

replacement of humeral head with Neer's revised prosthesis. They concluded that humeral head replacement is a dependable method to restore comfort and function of patients [10].

Regarding complications observed, a study between 1997-1990, where they studied complications of operative treatment in 63 patients. They said that there is direct relation in displaced proximal fracture between severity, greater displacement, comminution and crushing.

For displaced proximal fracture, use of minimal and simple fixation method avoids greater exposure and release of soft tissues, so reducing the risk of devascularization and soft tissue necrosis [11]. Outcome in our study in patients treated surgically was better.

CONCLUSION

Undisplaced and stable fractures of the proximal humerus can be managed by conservative methods. In cases of displaced and unstable fractures the goal of open reduction and internal fixation was to restore proximal humeral anatomy with stability so that fracture healing occurs early with excellent functional outcome.

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