



A COMPREHENSIVE STUDY OF SUPRACONDYLAR INTERCONDYLAR FRACTURES OF HUMERUS IN ADULTS

Orthopaedics

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ABSTRACT

Distal humerus fractures are uncommon injuries that account for fewer than 2% of all adult fractures, the complex shape of the elbow joint, the adjacent neurovascular structures combine to make these fractures difficult to treat. The ultimate aim of this study is to evaluate anatomical and functional outcome and impact of fixation related complications after fixation of distal humerus fracture. A prospective study of 30 cases of supracondylar / intercondylar fracture of lower end humerus were studied from July 2014 to July 2015. Total 30 cases of supracondylar / intercondylar humerus fractures were operated and observed for minimum 6 month follow up. Rigid internal fixation is best accomplished by dual plate fixation and for optimum biomechanical stability both plates should be placed at a right angle to each other. More than 90% of excellent to fair results can be obtained by open reduction internal fixation.

KEYWORDS:

Distal Humerus, Internal fixation.

1. INTRODUCTION:

"No injury of the elbow is more difficult to treat than intercondylar fracture of humerus."

-Sir Watson Jones

3 million year old elbow of partial skeleton discovered in the Afar region of Ethiopia by Dr. Donald C. Johanson in 1974.

In the last 20 years, advances in the science of fracture care have had a dramatic effect on the care of a difficult class of fractures. The injured elbow joint presents more difficulty than almost any other because it really is three joints that move synchronously. Bicondylar intraarticular fractures of the distal humerus, because of their rarity and often associated significant displacement, comminution and osteopenia, present the orthopaedician with a difficult injury to treat successfully. But modern techniques of open reduction and internal fixation provide stable construct to allow early postoperative motion without compromising bone healing.

Distal humerus fractures are uncommon injuries that account for fewer than 2% of all adult fractures, the complex shape of the elbow joint, the adjacent neurovascular structures and the sparse soft tissue envelope combine to make these fractures difficult to treat. Treatment, both surgical and non surgical has been associated with a high rate of complications and poor outcomes, when compared with other injuries.

The functions of elbow joint are essential for performing day to day activities, which requires the hands to reach the midline of the body such as in dressing, eating and combing hairs. This exact and demanding precision is frequently disturbed by inter condylar fracture which always results in loss of a few degree motion of the elbow regardless of any modalities of treatment.

The principle of anatomic restoration of articular surface, stable fixation and early motion are the optimal treatment goals. Recent treatment support, these goals and early postoperative active mobilisation. By adhering to this protocol the literature supports this as the most reliable view for a good result.

The fabrication of new implants, however, has increased the reliability of operative stabilization, while placing additional demands upon the surgeons expertise.

In this thesis, we have reviewed the functional results obtained in a series of supracondylar intraarticular fracture of the distal end of humerus treated by open reduction and internal fixation.

2. MATERIAL & METHODS :-

A prospective study of 30 cases of comminuted supracondylar /

intercondylar fracture of lower end humerus were studied from July 2014 to July 2015. Total 30 cases of supracondylar / intercondylar humerus fractures were operated and observed for minimum 6 month follow up.

INCLUSION CRITERIA

- Age between 18-70 years.
- Men and Women both included in study.
- All types of fracture at distal humerus are included.
- Different mode of injuries are included by RTA, assaulted, fall from height, direct impact / shock.

EXCLUSION CRITERIA

- Vascular injury.
- Brachial plexus injury
- Age less than 18 years
- Age more than 70 years
- All Patients coming to the Orthopaedic Department, GGH with fracture distal humerus were initially seen in the OPD or in casualty (trauma ward) and admitted. Detailed history of trauma, general examination and local examination carried out, clinical level of fracture, distal neurovascular status and associated injuries noted down. Then immobilization given and radiological diagnosis made. In all cases, routine investigations for surgery were done. ECG and other investigations were carried out whenever required. Informed and written consent of the patient will be taken for the surgical management. Then, surgery was done & Suture removal was done at 12th-14th day of procedure. Then after 1½ months, follow up examination done and X-rays were repeated and status of fracture union noted. Elbow and Shoulder, wrist mobilization exercises continued. Another follow up was done after 3 months to assess the fracture union status and shoulder and elbow movements. This was done regularly at 4 months interval till fracture was completely united. If X-ray were showing delayed union or nonunion, further surgical intervention was advised. Otherwise, full work according to his/her occupation was allowed. Patient was assessed at followup according to MAYO ELBOW PERFORMANCE SCORE.

3. Observations, Discussion & Analysis:-

A. IMPLANT USED FOR INTERNAL FIXATION

Implant used	Cases	Percentage
Double plate and screws	23	77%
One plate and screws	3	10%
Screws and k wires	1	3%
K wires	3	10%
Total	30	100%

We had fixed 87% of fracture with plates and screws - 3% of fractures fixed with screws and K wires and 10% of fractures were fixed only with K wires. Rigid fixation achieved with plates and screws gives good results compared to fixation with K-wire. This suggest that the fixation should be rigid enough for early mobilization. Rigid fixation is achieved with preferably two plates and screws. Fair results and poor results were common in fixation with screws and K-wires. The poor fixation requiring immobilization more than 4 weeks.

B. APPROACH USED FOR OPERATION

Approach	Cases	Percentage
Posterior Trans olecranon	2	07%
Tricep tongue approach	28	93%
Total	30	100%

7% patients we had done ORIF through transolecranon approach and 93% of patients ORIF done through posterior Tricep tongue approach in our series. Triceps tongue approach gives good results in type II and type III fracture because in this fracture exposure of articular surface is not required. Less periarticular dissection leads to less subsequent periarticular fibrosis. Triceps tongue causes loss of extension due to fibrosis of triceps muscle and adhesion of tricep with humerus, but this loss of extension is small range and not affect activities of daily living. Further, extension loss of small range is compensated by gravity.

Transolecranon approach were used in both type III and type IV fracture but it is more useful in type IV fracture as it gives better exposure of articular surface, less periarticular dissection allows good reduction of articular surface, less subsequent periarticular fibrosis. In present series excellent results in 9 cases, good results in 11 cases, fair results in 4 cases and poor results in 6 cases. Excellent results found in 9 cases where all fractures are closed type and these patients were operated within 72 hours, all fractures were fixed with bipillar plates and screws. In fair results most patients were closed type III or IV fracture, fixed with plates and screws, but active mobilization and exercise were started late around more than three weeks. So final outcome of range of motion of elbow joint is fair.

C. OBJECTIVE EVALUATION OF RESULTS ACCORDING TO CRITERIA GIVEN BY RISEBOROUGH AND RADIN

Result	Cases	Percentage
Excellent	10	33.4%
Good	14	46.6%
Fair	6	20.0%
Total	30	100%

Results were 33.4% excellent, 46.6% good and 20% fair. In our series patients get adequate rehabilitation and with the help of physiotherapy, the range of movement achieved adequately even after immobilising for more than 3 wks.

D. RANGE OF ELBOW MOTION AT LAST FOLLOW UP

Range of elbow movements			Cases	Percentage
	Flexion Deformity	Further flexion		
Excellent	0 - 15	> 130	7	23.8%
Good	15 - 30	120 - 130	15	50.2%
Fail	30 - 40	90 - 120	4	13%
Poor	40 - 50	< 90	4	13%
Total			30	100%

Range of motion gained after operation were excellent in 7 patients (23.8%), Good ROM achieved in 15 patients (50.2%) and fair amount of ROM achieved in 4 patients (13%) poor ROM achieved in 4 patients.

4. CONCLUSION

- Although trans olecranon approach used less commonly, but it should be used in type IV fracture than Campbell's triceps tongue approach.
- Rigid internal fixation is best accomplished by dual plate fixation and for optimum biomechanical stability both plates should be placed at a right angle to each other.
- Post operative physiotherapy is most vital part in management of SC - IC humerus fracture and preferably physiotherapy should be started within 7 days of operation.

- More than 90% of excellent to fair results can be obtained by open reduction internal fixation.

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