A COMPARITIVE STUDY OF OUTCOME OF AO TYPE C DISTAL HUMERUS FRACTURES TREATED BY OLECRANON OSTEOTOMY APPROACH AND TRICEPS REFLECTING APPROACH

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INTRODUCTION:
Distal humerus fracture remains a challenging injury to manage. Several variables are important in successful outcome of these fractures including restoration of articular congruity, stable fixation, achievement of bone healing and achievement of functional range of movements. The aim of our study was to compare the outcomes in surgical treatment of this fracture by olecranon osteotomy and triceps reflecting approach by assessing the percentage of visualization of articular surface, the radiological union, the functional outcome by MEPI score and complications associated with each approach.

MATERIALS AND METHODS:
This is a prospective and retrospective study of 16 patients with AO type C intra articular fracture distal humerus admitted to RAJAH MUTHIAH MEICAL COLLEGE HOSPITAL, ANNAMALAI UNIVERSITY, CHIDAMBARAM between July 2014 to June 2015. The mean age was 42.3 years. There were 12 men and 4 women. Right elbow involvement was found in 12 and left in 4. Average follow up duration was 8.75 months. All 16 patients were treated surgically with plate osteosynthesis. They were allotted into two groups. Group A had 8 patients treated by Olecranon osteotomy approach and Group B had 8 patients treated by triceps reflecting approach.

RESULTS:
All fractures united within average duration of 3.2 months. Excellent or good results were found in patients less than 50 yrs of old and surgery was within 12 hours and when early mobilization started. Functional mobility, radiological union, patient satisfaction were comparable. The percentage of articular surface visible after olecranon osteotomy was 60% and 35% in case of triceps reflecting approach. The functional outcome and mayo elbow performance index is better in olecranon osteotomy approach than triceps reflecting approach.

CONCLUSION:
Olecranon osteotomy approach is preferred approach for good visualization of articular surface and good anatomical reduction and early mobilization and better functional outcome.

Keywords: Distal humerus, Orif, Olecranon Osteotomy.

1. INTRODUCTION:

Elbow fractures account for approximately 7% of all adult fractures of these 30% of fractures involves distal humerus. Most distal humerus in adults are type C fractures involving both columns and extending into the articular fractures.

Although reasonable results were reported after conservative treatment in the past it usually results in loss of elbow movements and permanent disability. Moreover achieving stable internal fixation of these fractures is difficult because of multiple fracture patterns small fragment, an metaphyseal comminution and complex fragmentation of the articular surfaces.

In 2007 the AO classification supervisory committee and OTA classification database and outcome committee updated the compendium to its present form. The AO/OTA classification is an alphanumeric system that assigns the first two digits of 13 to distal humerus fractures and classifies them based on location and degree of articular
involvement and sub classifies fractures based on
displacement direction and degree of fragmentation (4)

1. AO/ASIF classification

Three types are there.
1) Type A       ;   extra articular,
2) Type B       ;   partial intra articular
3) Type C       ;  complete articular
   a) Type C1    ; articular simple , metaphyseal simple
   b) Type C2   ; articular simple , metaphyseal multi
                  fragmentary
   c) Type C3   ;  complex articular

The standard surgical techniques are used for fixation of
both columns, using combination of reconstruction plates,
dynamic compression plates, anatomical locking plates and
K wires.

Adequate exposure is critical for visualization of fracture
fragments during surgery and it is generally agreed that the
best exposure of articular surface is achieved through
posterior approach. Various posterior approaches that
mobilize the triceps tendon have been described but have
limitations in exposure and extensibility . Of
these the olecranon approach is the workhorse for
approaching the distal humerus.

2. PATIENTS AND METHODS;

This is a prospective and retrospective study of 16 cases
with AO type C inter-condylar fracture humerus in adults
attending in the department of Orthopedics RAJAH
MUTHIAH MEDICAL COLLEGE HOSPITAL,
ANNAMALAI UNIVERSITY, CHIDAMBARAM between
July 2014 to June 2015. They were allotted into two groups
.Group A had 8 patients treated by Olecranon osteotomy
approach and Group B had 8 patients treated by triceps
reflecting approach

All the patients underwent plate osteosynthesis and
stabilization. The mean age was 42.3 years. There were 12
men and 4 women. Right elbow involvement was found in
12 and left in 4.

Average follow up duration was 8.75 months.
Physiotherapy started from 3rd day post –op with passive
ROM exercises. Patient was followed at 1 months, 3 months,
6 months. Clinical outcome was assessed using MAYO
ELBOW PERFORMANCE INDEX (MEPI ) score and
radiological union.

OPERATIVE PROCEDURE;

Preoperative assessment was made by X-ray AP/LATERAL
views. The patient were operated in lateral position with
the involved extremity flexed and hanging off the operating
table. The pneumatic tourniquet was used.

A straight midline posterior incision with radial deviation
across the tip of the olecranon was made .The ulnar nerve
was then identified and released from cubital tunnel and
carefully protected

1. Olecranon osteotomy approach

Intra articular chevron osteotomy was performed at
bare area approximately two centimeters from the tip of the
olecranon with oscillating saw to cut up to the
subchondral bone. The osteotomy was completed with
the osteotome. The olecranon is then reflected
proximally along with the attached posterior elbow
capsule and triceps, revealing excellent exposure to the
articular surface (7)The first step was reconstruction of
joint surface by reduction of the condyles with the
 cancellous screw. The next step was to anatomically
reattach condyles to the humeral shaft with the medial
and lateral plates. The olecranon was reduced and fixed
with two longitudinal 2.0 mm K wires and an 18 gauge
tension band wire or 6.5 mm cancellous screw. The
 tourniquet was deflated and hemostasis obtained and
drain kept in situ. Wound closed in layers after thorough
irrigation.

2. triceps reflecting approach;

- Triceps tendon was divided at its musculotendinous
  junction
- Transection of triceps was done in V shaped manner.
- And triceps reflected and articular surface exposed.
- After doing plate osteosynthesis as described above the
  muscle ends sutured with non absorbable sutures

3. RESULTS;

All 16 patients had completed all postoperative physical
therapy at the time of study and were assessed for functional
outcome at 6 months. All fractures united with mean average
time of 3.2 months.

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<thead>
<tr>
<th>Table 1; outcome measure at 6 months follow up</th>
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<tbody>
<tr>
<td>GROUP A</td>
</tr>
<tr>
<td>MEPI(range 0-100)</td>
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<tr>
<td>Flexion extension arc(range 85-122)</td>
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<tr>
<td>Pronation(range 60-85)</td>
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<td>Supination(range 60-80)</td>
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<td>mean union rate</td>
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<th>Table 2; complications</th>
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<tr>
<td>GROUP A</td>
</tr>
<tr>
<td>Ulnar nerve neuropraxia</td>
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<tr>
<td>Infection</td>
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<tr>
<td>Delayed union at osteotomy site</td>
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<tr>
<td>Mean extensor lag</td>
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<tr>
<td>Hardware prominence</td>
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<tr>
<td>Non union of osteotomy</td>
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CASE – I

PREOP X RAYS

INTRA OP PHOTOS
POSTOP XRAY

CASE
CASE III
4. DISCUSSION;

The principles of surgical treatment of inter-condylar fracture of humerus are anatomical restoration of the articular surface for which better visualization of the articular surface is necessary and stable fixation of the fracture fragments to allow early motion.

There are numerous surgical approaches of the elbow joint. Of these olecranon osteotomy provides excellent visualization of the distal articular fragments and excellent exposure for plate application.

Dual plates are necessary to maintain the anatomic alignment of the fracture. Three different types of osteotomy can be used intra-articular transverse, extra-articular oblique, and intra-articular chevron. Of these chevron osteotomy provides enhanced stability and union (6).

Eventhough triceps reflecting approach is better in old age group because of osteoporosis related complications due to olecranon osteotomy, young adult patients needs better visualization and reduction of articular surface and good functional outcome for which olecranon osteotomy approach is the best approach.

5. CONCLUSION;

In conclusion exposure of the distal humerus fracture is enhanced by olecranon osteotomy which facilitate adequate reduction and stable fixation leading to better outcome and careful fixation of the osteotomy is mandatory to avoid the complications of olecranon fixation like delayed union and hardware prominence.

6. REFERENCES;

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