A Study of Thirty Cases of Comparison of T-Y Fractures Humerus Fixation with and without Olecranon Osteotomy

Vijay Sarukte[1], Kanchan Shingade[1], Ravi Bhanushali[1]

ABSTRACT

Introduction: The various recommended treatments includes early mobilization disregarding the fracture reduction, closed manipulation and immobilization in plaster cast, traction or open reduction and internal fixation.The advent of the new implants and surgical techniques has increased the reliability of the surgical fixation. Aim of the presented study was to evaluate the advantages and disadvantages of either exposure and to have beneficial decision making for the patients functional elbow ROM which significantly depends upon the method of exposure with or without olecranon osteotomy**.**

Material and methods: The present study was conducted on 30 patients who were having T-Y fractures and had an indication of fixation with or without olecranon osteotomy were selected for the study from the department of Orthopedic Surgery in Municipal General Hospital.

Results: Range of motion for C1 type of fracture 100% Favourable, without olecranon osteotomy range of motion 100% Favourable, C2 with olecranon osteotomy range of motion 85% Favourable, without olecranon osteotomy range of motion 80% Favourable, C3 with olecranon osteotomy range of motion 15% Unfavourable, Without olecranon osteotomy range of motion 60% Unfavourable**.**

Conclusion: Equally good result are seen in younger age and group C1 and C2 fracture for both approaches. In case of C1 and C2 type fracture one can go without olecranon osteotomy approach, olecranon oseotomy is not needed.

Keywords: Intercondylar Fixation, Internal Fixation, T-Y Fracture, Olecranon Osteotomy

INTRODUCTION

Intercondylar T and Y fractures of the distal humerus in adults present a great challenge.[1] The complications associated both with the injury itself or operative treatment include failure to unite, loss of functional motion, and ulnar neuropathy and heterotopic bone occurring alone or in combination. The operative repair of fracture of distal humerus has many difficulty because of complex anatomy of distal humerus and osteopenia due to old age as a result of previous operative fixation and disuse osteopenia Furthermore the propensity for the surrounding joint capsule to become scarred amplifies the requirement that the fixation be strong enough to allow immediate mobilization after concomitant anterior and posterior capsulectomy.[2]

Anatomical and stable internal fixation with early postoperative mobilization is expected to improve the functional outcomes.[3] Olecranon osteotomy is a well-established technique, providing access to the distal humerus for reduction and fixation of intra-articular fractures.[4] It has been the workhorse for approaching the distal humerus and provides the greatest exposure to the articular surface when compared to the triceps splitting and reflecting approaches.[5] The present study was carried to compare fixation of T-Y fractures of humerus with and without olecranon oteotomy. The study aimed to compare functional outcome between the two groups.

MATERIAL AND METHODS

The present observational study was conducted among 30 patients with T-Y fractures of humerus who reported to the emergency department and were referred to department of orthopedic surgery in Municipal General Hospital. Ethical clearance was obtained from the ethical committee of the hospital and patients consent was taken prior to the study. Traumatic fracture of elbow, Type C1, C2 and C3 (AO) and grade compound 1 were included in this study. Pediatric patients, patients with pathological fractures and compound fractures Grade 2 and 3 were excluded from the study.

Patients were prepared and draped for the surgery. Shaving and thorough preparation of the entire upper limb was done pre-operatively. The upper limb was draped free to allow manipulation during surgery. Surgery was conducted under general anaesthesia. Patient were placed in lateral position with affected side up and shoulder flexed to 90^0 and internally rotated with arm resting over an armrest with elbow flexed and forearm hanging by the side of the armrest. Tourniquet was used in all cases. Preoperative antibiotics before inflation of toruniquet were given in all the cases. 17 cases were approached by olecranon osteotomy and 13 cases without olecranon osteotomy (9 cases were approached with Campbell's approach, 2 with collateral approach and 2 with triceps splitting).

Thorough lavage was given and was wound closed over a suction drain. Wound was dressed and padded bandage and an above elbow slab was given. Perioperative parentaral antibiotics were given for 3 days. At 24 to 48 hours wound was checked, drain was removed and active elbow motion was started.

In comminuted fractures where fixation was in doubt hinge elbow orthosis was used for 6-8 weeks. Patients were usually discharged one week after surgery and called for suture removal at 14 days. Then they were called for follow up at one month, three months and every third month hereafter. At each visit subjective and objective data was collected regarding the range of motion, infection, union and complications, and assessment of effectiveness of rehabilitation was done. Cassebaum's system

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was used for evaluating range of motion. The range of motion was assigned as given in table 1.

RESULTS

In the present study total number of 30 cases were included in which C1, C2, C3 type of fracture were included. Total number of C1 type fracture was 6, C2 was 14 and C3 was 10, in which 4 cases of C1 type fracture were treated without olecranon osteotomy while 2 were treated with olecranon osteotomy. 6 cases of C2 type of fracture was treated without olecranon osteotomy and 8 were treated with olecranon osteotomy. 3 cases of C3 type of fracture was treated without olecranon osteotomy and 7 cases of C3 type of fracture were treated with olecranon osteotomy (table 2). Table 3 shows average time duration of cases with and without olecranon osteotomy approach. Range of motion for C1 type of fracture was 100% favourable, without olecranon osteotomy range of motion was 100% favourable. Type C2 with olecranon osteotomy range of motion was 85% favourable, without olecranon osteotomy range of motion was 80% favourable, Type C3 with olecranon osteotomy range of motion was 15% unfavourable, without olecranon osteotomy range of motion 60% unfavourable (table 4, Figure 1,2). The observations found in cases without olecranon osteotomy, in case of C1 type of fracture, 2 cases were having excellent and 2 were having good outcome. In C2 type of fracture, 5 cases were having good and 1 case was having fair outcome. While in C3 type of fracture, 1 case was having fair outcome and 2 cases were having poor outcome. The observations found in case of olecranon osteotomy, cases with C1 type of fracture, all the cases were having excellent outcome. In case of C2 type of fracture 3 cases had excellent outcome, 4 had good and 1 had fair outcome. In case of C3 type of fracture, 2 cases had good, 4 had fair and 1 case had poor outcome.

Range of Motion	Rating	Remark
15^0-130^0	Excellent (E)	Favourable
30^0-120^0	Good (G)	Favourable
40^0-90^0	Fair (F)	Unfavourable
Less than 40^0-90^0	Poor (P)	Unfavourable

Table-1: Post-operative range of motion outcomes

Type of fracture AO classification	Total no. of cases Fracture Anatomy	Treated without olecranon osteotomy	Treated with olecranon osteotomy
C1	6	4	2
C2	14	6	8
C3	10	3	7

Table-2: Total Anatomical Fractures with and without Olecranon Osteotomy

Type of freacture	Bone Grafting	With out olecranon osteotomy	With Olecranon osteotomy
C1	-	2 hrs	2 hr 15 min
C2	-	2 hr 30 min	2 hr 45 min
C3		2 hr 45 min	3 hrs

Table-3: Average time duration with and without Olecranon Osteotomy

DISCUSSION

In this technique the fascia and muscle are elevated from the proximal ulna and the capsule of the elbow joint is opened both laterally and medially. The ulna nerve is identified and protected. A swab is pushed through, which is very easy when the distal humerus is fractured.[6] As the bare area lies at a relatively constant location[7] at the narrowest part of the ulna, we advocated the use of a swab placed through the elbow joint. Intercondylar fractures of distal humerus in adults constitute a small percentage of fracture. Many surgeons favour open

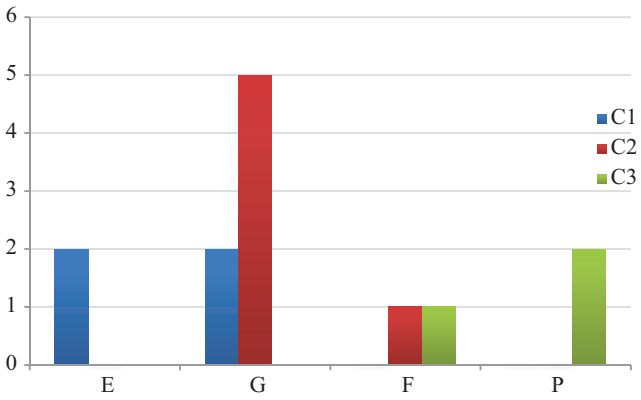

Figure-1: Outcome of with olecranon osteotomy

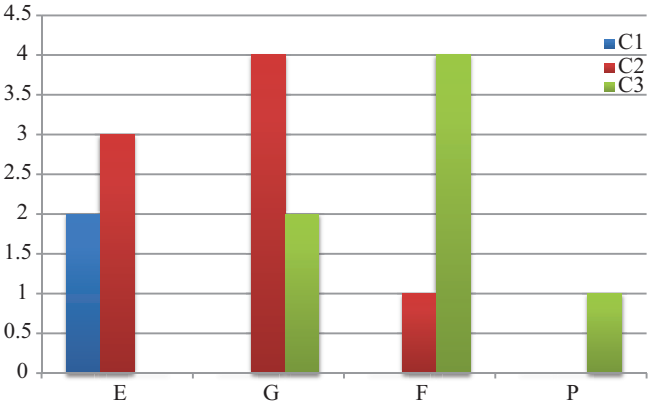

Figure-2: Outcome of without olecranon osteotomy

Type	Total no. of cases	With out olecranon osteotomy						With olecranon osteotomy					
		No.	E	G	F	P	F/UF	No.	E	G	F	P	F/UF
C1	6	4	2	2	-	-	F:100%	2	2	-	-	-	F:100%
C2	14	6	-	5	1	-	F:80%	8	3	4	1	-	F:85%
C3	10	3	-	-	1	2	UF:66%	7	-	2	4	1	UF:15%

E- Excellent, G- Good, F-Fair, P- Poor, F- Favorable, UF- Unfavorable, Favorable ratings for- Excellent and Good, Average for- Fair, Unfavorable for –Poor

Table-4: Outcome of with and without olecranon osteotomy

reduction and internal fixation through two exposure with or without olecranon osteotomy. There are two different views regarding these exposure, i.e. olecranon osteotomy offers excellent exposure for reconstruction of the articular surface. Without olecranon osteotomy, an intact olecranon act as mould over which reconstition of distal humerus is easy with an additional advantage of avoiding the creation of an additional intra articular fracture. In our study the fracture has been classified using (AO) classification Muller criteria and results has been evaluated by cassebaum range of motion of elbow.[8] Only range of motion of elbow was included in our comparison study of with and without olecranon osteotomy. Since there could be other associated ligamentous injury undiagnosed of shoulder joint and elbow joint which will affect the functional activity of the entire UL extremity.[9] The present study was carried to compare functional outcome of fixation of T-Y fractures of humerus with and without olecranon oteotomy.

The present used the AO classification, that classically categorizes extra-articular, partial articular and articular fractures and comminution and specific fracture patterns being defined by numbers 1–3.[10]

Patients with poor range of motion, were old patients and were osteoporotic. In a study in younger patients age group, the functional outcome of range of motion (ROM) of elbow was found to be good that can be attributed to quality of bone. Thus, fracture when operated with olecranon osteotomy gives, better results as compared to without olecranon ostetomy, where surface of articular surface is reconstructed properly. However in case of old age group people with T-Y fracture, there was a high rate of implant protrusion i.e. K-wire/6 5mm screw as in their case skin is thin, atrophic, leading to infection when exposed with olecranon osteotomy. We agree with Jupiter et al,[11] that more unsatisfactory results are seen in older age group, this is because of osteoporosis and comminution making the surgical fixation more difficult but with olecranon osteotomy exposure is easy, fracture fragment can be reduced properly in C3 and older age group. In a case of young patient stabilization of elbow is required. There needs to fixation. In our study young and middle age patient operated with olecranon osteotomy for Type C3 fracture has better elbow ROM as compared to without olecranon osteotomy in which case elbow ROM is restricted.

Meija S et al[12] comparing the triceps-split approach to the standard olecranon osteotomy, no significant difference in clinical outcome between the two approaches were found. McKee MD et al[13] and others[14,15] also demonstrated equal functional results in both groups with a loss of elbow extensor strength by approximately 25% in both approaches.

CONCLUSION

In comparison study of exposure for inter condylar T-Y fracture fixation with olecranon osteotomy and without olecranon osteotomy, it was found that, depending on the type of fracture i.e. C3 type fracture (muller) where comminution is greater, articular reconstruction is difficult without osteotomy of olecranon, one should go for transolecranon osteotomy. Equally good result are seen in younger age in group C2 and C2 fracture for both approaches. In case of C1 and C2 type fracture one can operate without olecranon osteotomy approach. Operative time and infection is less in without osteotomy approach and no need of olecranon fixation. The most common sequeale were seen in olecranon ostetotomy in older age group was screw and k wire protrusion, and bursitis due to that. Mostof our patients with C2 and C3 has flexion deformity of 10° to 30^0.

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