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FUNCTIONAL OUTCOME OF DISTAL HUMERUS FRACTURE BY PARATRICEPITAL TWO WINDOW APPROACH

Orthopaedics

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ABSTRACT

Background-Most of distal humerus fractures are dealt with olecranon osteotomy approach which stand as cumbersome process resulting in excessive soft tissue damage and excess hardware interposition. Alternate paratricepital two window approach has been advocated by many authors as better approach to deal with AO type A, B, and C1 type distal humerus fractures.

AIM -To evaluate functional outcome of distal humerus fracture fixation through paratricepital two window approach

Materials & Methods – A complete of 30 patients of closed fracture distal humerus fracture underwent open fracture fixation through paratricepital approach. Average age of patient was 35yr .Regular follow up and physiotherapy sessions were carried out. Average period of follow up was 12 month.

Results – Out of 30 patients 28 were finally followed up till 1 year, one patient died in between while another one undergoes implant removal due to infection. From 28, 20 patients has excellent functional outcome, 3 has good, 4 has fair outcome and one patient has poor results in terms of MEPS and DASH score.

Conclusion – Based on present study and data analysis we conclude that distal humerus fracture treated through paratricepital two window approach results in excellent functional outcome which is evident from ability to early start various day to day to day activities like performing personal hygiene, combing hairs ,putting shirt- shoes themselves and starts eating themselves by 1st or 2nd week of surgery .Unlike traditional approach like Olecranon osteotomy , it maintains adequate Tricep extensor mechanism ,does minimal soft tissue damage ,minimal post op pain ,promote early wound healing and avoid excessive hardware transposition.

KEYWORDS

INTRODUCTION-

Intra-articular distal humerus fractures are considered to be among the most challenging surgery which requires experienced surgical hands. The surgery is technically demanding and an adequate exposure of distal humerus articular surface is important for surgery. Traditionally Olecranon osteotomy has been the gold standard among surgical approaches for fracture fixation of distal humerus articular surface. It provides good visualisation of fracture site for adequate fixation. But it has numerus fallouts in terms of extensive soft tissue damage, multiple hardware transposition and most important it compromises Tricep extensor mechanism through complications like tricep avulsion, muscle weakness, wound healing issue, and long duration procedure. All of these finally ends up in post op stiff elbow, high rate of infection and compromised functional outcome.

To avoid these, in 1972 an extensor mechanism sparing paratricepital posterior approach to distal humerus through midline posterior incision was suggested first by Alanso lames & elaborated by schildhauer later on. This approach involves creation of two surgical windows along medial & lateral side of triceps muscle and tendon without disrupting its insertion on olecranon, thus overcomes the disadvantages of traditional approach and provides well functional elbow in terms of DASH & MAYO scale.

MATERIAL & METHOD –

An observational prospective study was carried out in department of orthopaedics GRMC & JAH hospital group, Gwalior (M.P.). Total of 30 cases with distal humerus fracture were being selected randomly with age group 15-60 yr and study carried between Jan 2018 to Jan 2019.

AIMS & OBJECTIVES –

To determine adequacy of exposure and functional outcome in terms of soft tissue dissection and elbow extensor mechanism functionality for fixation of various types of distal humerus fractures. Inclusion criteria includes displaced supracondylar and intercondylar distal humerus fracture in age group (15-60yr) AO OTA types A1, A3, B1, B2, C1, and C2. Exclusion criteria includes compound, un-displaced, old mal-united, Non-union fractures, AO type C3 fracture & patients with other comorbidities.

Methodology – Procedure of obtaining sample: Samples are selected randomly based on OPD and Trauma Centre admissions. (After taking prior informed consent)

Operative Procedure:

After a detailed history and through clinical examination, routine investigations and PAC fit patient is taken for operative procedure. Supraclavicular brachial plexus block (SCBB) anesthesia or GA is given, the involved limb is prepped and draped with standard aseptic precaution A posterior mid-line longitudinal incision was made over lower arm around 5-6 cm proximal to elbow and extended distally 1-2 cm beyond the elbow joint. Soft tissue & Fascia is incised & retracted to expose the muscle belly. Then ulnar nerve is explored properly, hold using appropriate instrument (IFD) and retracted medially without stressing it to clear the site of surgery. Dissection was then continued to lateral and medial triceps borders at their respective interfaces to create two windows along with clearance of posterior aspect of inter-muscular septum. Thereafter using these two windows, tricep muscle along with its tendon is lift off and distal humerus is exposed. Further fat & soft tissue around the articular surface is cleared to expose it properly through retracting triceps & its tendon medially or laterally as required.

After Retracting triceps muscle medially or laterally & exposing both column, articular fragments are reduced first provisionally using K wire & then definitive fixation is done of intra-articular part using 4 mm cannulated cancellous screws or Herbert screw followed by application of pre-contoured medial & lateral distal humerus plate is done as required.After Fixation stability and motion arcs were assessed prior to closure, Screw placement & reduction is accessed manually & under C-Arm imaging. Then Implants were covered properly with soft tissue to prevent ulnar neuritis. Layer by layer closing is done with bulky dressing around elbow and supported by elbow sling postoperatively. Post- op Patients were then followed up first in 15 days and then every month for 1 year. Post-op. exercise were

stated from 2nd or 3rd day with progressive flexion extension supination pronation of elbow.

CASE NUMBER -5/28, SANDEEP S/O POORAN SINGH, A/S – 20YR M, R/O-MORENA M.P.

DATE OF TRAUMA-08/10/18, PRE OP IMAGES

FINAL POST OP IMAGES &, CLINICAL IMAGES AFTER 1 YEAR FOLLOW UP.

CASE NO 11/28 - SHER SINGH S/O JHABBAR SINGH, A/S 43YR M, R/O MURAR, GWALIOR M.P.

DATE OF TRAUMA -11/01/19,
PRE OP IMAGES, IMMEDIATE POST OP IMAGES, FINAL POST OP IMAGES & CLINICAL PIC AFTER 1YR.

RESULTS -

We have prospectively evaluated 28 cases of fresh closed distal humerus fractures of which 19 were males and rest 9 were females. Average age was taken to be 40 years with a range of 15 to 60 years. Based on AO distal humerus classification system, 70% of fracture operated were of Grade C, 20% grade B & 10% were of grade A. Total of 30 patients were operated for distal humerus fracture with pre-contoured plating through two window approach, of which one gets complicated with persistent Infection resulting in implant removal and other died due to RTA in between, during follow-up. Delayed wound healing in 2 patients seen which got healed with regular dry dressings. The mean period for follow-up was 12 months (range, 10 to 14 months). All fractures healed in a mean time (range, 16 to 20 weeks).Physiotherapy was started by 2nd to 3rd day in most of the patients. Average time of surgery was calculated to be 120 minutes (range from 90 -180 minutes).Similarly 75% of patients had injury followed by RTA while 20% sustained injury following fall from height.

In our study out of 30 patients treated, 28 (93%) patients were finally follow up till 1 year. 1 patient died in between due to RTA and 1 patient undergoes implant removal due to persistent infection. From 28 final follow up, 20 (71.4%) had excellent functional outcome, 3 (10.7%) had good results, 04 (14.3%) had fair outcome and 01 (3.6%) patient had a poor result based on Mayo elbow performance score (MEPS) & DASH Score (Disability of Arm, shoulder & hand score).

DISCUSSION -

Olecranon osteotomy through a posterior approach has been the gold standard for intraarticular fractures of distal humerus. (Charissoux JL 2008, Werner CM 2006) However, reconstruction of osteotomy may lead to delayed union, nonunion, wound dehiscence, and excessive implant transposition which may leads to either stiff elbow or require additional surgery. (Coles CP 2006, Gofton WT 2003, Ring D 2004, Sané AD 2009, v 2006, Bryan RS, 1982) Similarly, a triceps-splitting approach does not expose the articular surface adequately compared with other approaches as shown by Wilkinson and Stanley in their cadaveric study; this approach has a further disadvantage of direct muscle trauma leading to fibrosis and damage to intermuscular nerve branches, which can cause muscle weakness, stiffness and wound dehiscence. (Wilkinson JM 2001, Kasser JR 1990) All these problem can be avoided by a paratricepital, “two-window” approach. As this approach utilizes a relatively bloodless plane and avoids direct trauma to the triceps muscle, it may limit the scar formation and reduce triceps muscle dysfunction postoperatively. .Likewise Jayanta Mondal (2017) Atalar et al (Ata Can Atalar 2009) had a mayo elbow score of 86 with 85% good to excellent results in his series (flexion –extension 120°.

CONCLUSION –

ON the basis of present study and data analysis we can conclude that distal humerus fractures which were treated through paratricepital 'two window 'approach has resulted in an excellent improvement in functional outcome of elbow which was well evident from the patients ability to early start various day to day activities like combing hairs, performing personal hygiene, putting shirt and shoes themselves and started eating by the first week of surgery itself. Open reduction and internal fixation of intraarticular distal humerus fractures with triceps sparing paratricepital approach provide adequate exposure of fracture site with no adverse effect on triceps muscle strength (extensor mechanism), minimal post op pain, and early better healing of wound, all of which finally helps in early initiation of elbow motion.

As compared to other available approaches like Olecranon osteotomy, Triceps splitting, Triceps reflecting etc., paratricepital approach avoids excessive hardware transposition, secure extensor mechanism and stand out as 'best approach' to deal with distal humerus fractures. It is also evident by other studies except in few highly comminuted fractures.