

OLECRANON OSTEOTOMY FOR DISTAL HUMERUS FRACTURES

B. CIUBARĂ¹, C. IANCU², O. ALEXA³

^{1,2,3} "Gr. T. Popa" University of Medicine and Pharmacy, Iași

Keywords: distal humerus fractures, ORIF, olecranon osteotomy

Abstract: In this study we will analyze the olecranon osteotomy approach for distal humerus fractures. For olecranon osteosynthesis were used AO tension band or a sponge screw 6.5 mm with extra washer or a screw 6.5 mm and additional wire. Following observations and measurements were recorded following imperfections of the olecranon osteotomy osteosynthesis: angulation of the fragment in the tranche of osteotomy, displacement of the osteotomy fragments, diastasis of the fragments in the osteotomy tranche. Olecranon osteotomy is a gesture which should be evaluated very carefully in traumatic surgery of the distal humerus. Therefore, when is absolutely necessary, the olecranon osteotomy can be done in V-shaped, with a thin blade saw, so loss of the bone in the tranche of osteotomy to be the smallest.

Cuvinte cheie: fractura humerusului distal, tratament chirurgical, osteotomia olecranului

Rezumat: În acest studiu se va analiza oportunitatea osteotomiei olecranului în abordarea fracturilor humerusului distal. Pentru osteosinteza olecranului s-au folosit fragmente de broșă Kirschner și fir metalic cu efect de hohană sau un șurub de spongie 6,5 mm cu șaiabă adițională sau un șurub de spongie 6,5 mm și fir metalic cu efect de hohană. În urma observațiilor și măsurărilor efectuate au fost constatate următoarele imperfecțiuni ale osteosintezii tranșei de osteotomie a olecranului: angulația fragmentelor, decalajul fragmentelor, diastazisul fragmentelor la nivelul tranșei de osteotomie. Osteotomia olecranului este un gest care trebuie evaluat foarte atent în chirurgia traumatică a humerusului distal. Prin urmare, atunci când este absolut necesară, osteotomia transarticulară a olecranului trebuie făcută în forma literei V, cu o lamă cât mai fină, în așa fel încât pierderea de substanță osoasă la nivelul tranșei să fie cât mai mică.

INTRODUCTION

In this study we will analyze the olecranon osteotomy approach for distal humerus fractures. We will review especially the status after osteosynthesis of the olecranon and the anatomy changes of the section and the impact to the joint congruency.

MATERIAL AND METHOD

This study includes a group of 50 patients aged between 20 years and 60 years with an average age of 49,7 years. The study is carried out retrospectively. At all patients was performed the olecranon osteotomy to approach the distal humerus fractures. The osteotomy was performed with oscillating saw with blade of 1 mm or 2 mm thick or with Gigli saw. In cases where the osteotomy was made with oscillating saw, the section was made right for 16 cases and V-shaped for 20 cases. Last portion of the olecranon section was fractured as AO (Arbeitsgemeinschaft für Osteosynthesefragen) technique. For internal fixation of the humeral fracture was used a posterior plate, Y-plate or two perpendicular plates as is customary AO (posterior for external column, internal for the internal column), wire fragments, wire fragments and screws for intercondilar fixation, Herbert screws or a combination of materials previously maintained according to intraoperative conditions, quality of bone or surgeon preference. For olecranon osteosynthesis were used AO tension band or a sponge screw 6.5 mm (1,4) with extra washer or a screw 6.5 mm and additional wire. After surgery, in two days was made radiological control. Radiographs from these controls were used

for radiological assessment of distal humerus fixation and evaluate osteosynthesis of olecranon osteotomy tranche.

RESULTS AND DISCUSSIONS

Following observations and measurements were recorded following imperfections of the olecranon osteotomy osteosynthesis:

- Angulation of the fragment in the tranche of osteotomy (Fig.1. a, b)..

Figure no. 1. a and b. Angulation of the fragment in the tranche of osteotomy



This angulation is due in particular to the effect it has the AO tension band on the posterior surface of the olecranon. Basically, because of the tension and compaction force that are engaged in the posterior cortex of the olecranon, combined with anterior cortical bone integrity (which was fractured) (Fig.2.a), appear this angulation (Fig.2.b), angulation, which is directly proportional with defect size produced by oscillating saw and

¹Corresponding Author: B. Ciubara, 7 Rufeni street, Iași, România; e-mail: abciubara@yahoo.com; tel +40-0744212518
Article received on 25.03.2010 and accepted for publication on 12. 04. 2010
ACTA MEDICA TRANSILVANICA September 2010; 2(3)264-265

CLINICAL ASPECTS

metal wire tension. This angle is inversely proportional with ulna size, respectively as the distance between the two cortical of the olecranon is less, the angle is greater after the osteosynthesis. Also, the angle can increase by excessive tension in metal wire, by spongy bone compacting and corticals superposition. If the osteotomy cuts is straight, the angulation results from the residual defect of the olecranon cortex after osteotomy. This defect may be important when the osteotomy is done improper (very thick blade saw, Gigli increased diameter).

- Displacement of the osteotomy fragments (Fig. 3.)

Figure no. 2. a. Defect formed by osteotomy, b. Angle formed by osteosynthesis



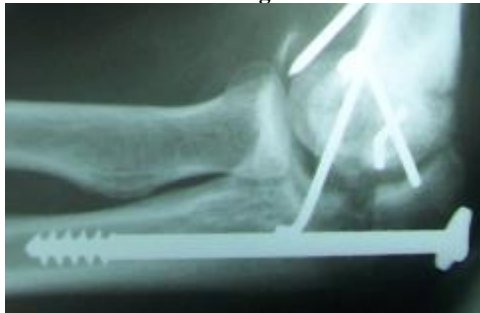
Figure no. 3. Displacement of the osteotomy fragments in a screw osteosynthesis



Displacement of the fragments appear particularly when the osteotomy tranche is right and the osteosynthesis is done with screw, because when the screw engages in the channel, it will turn along ulna channel (2,5,6), resulting the displacement of the proximal fragment, cause exists a natural angulation of the proximal part of ulna. This displacement will create a step in the joint, which if is important will reduce significantly the cubital articular surface that comes into contact with articular surface of the distal humerus. This will lead to changes in components of reaction forces that occur in the joint during flexion-extension cycle.

- Diastasis of the fragments in the osteotomy tranche (Fig.4.)

Figure no. 4. Diastasis of the fragments



Interfragmentar diastasis may have two causes: either a very large tranche of the osteotomy or cubits wide channel, where the screw has no stability. When the channel is wide, diastasis can be corrected by adding a wire with tension effect.

This can translate diastasis evolving through the development of a close pseudarthrosis (3) to the olecranon, pseudarthrosis, which generally is well tolerated. Healing is slower outbreak olecranon diastasis interfragmentar and this will interfere with functional rehabilitation program and progress are modest recovery of elbow function in this case.

CONCLUSIONS

Olecranon osteotomy is a gesture which should be evaluated very carefully in traumatic surgery of the distal humerus. Any osteotomy, regardless of how it is achieved, by osteosynthesis, induces unwanted changes in the olecranon geometry. These changes are important as both can lead joint non-congruency, mismatch can have a devastating impact on the subsequent function of the elbow (3). Therefore, when is absolutely necessary, the olecranon osteotomy can be done in V-shaped, with a thin blade saw, so loss of the bone in the tranche of osteotomy to be the smallest.

REFERENCES

1. Caja V.L., Moroni A., Vendemia V., Sabato C., Zinghi G. Surgical treatment of bicondylar fractures of the distal humerus Injury, Volume 25, Issue 7, September 1994, Pages 433-438
2. Rouleau M. Dominique, Faber J. Kenneth, Athwal S. George The proximal ulna dorsal angulation: A radiographic study Journal of Shoulder and Elbow Surgery, Volume 19, Issue 1, January 2010, Pages 26-30
3. Sané A.D., Dakouré P.W.H., Diémé C.B., Kinkpé C.V.A., Dansokho A.V., Ndiaye A., Seye S.I.L. L'ostéotomie de l'olécrâne dans le traitement des fractures de la palette humérale de l'adulte: évaluation anatomique et fonctionnelle du coude à propos de 14 cas Chirurgie de la Main, Volume 28, Issue 2, April 2009, Pages 93-98
4. Wadsworth G. Thomas Screw fixation of the olecranon The Lancet, Volume 308, Issue 7995, 20 November 1976, Pages 1118-1119
5. Wang A. Angela, Mara Michael, Hutchinson T. Douglas The proximal ulna: an anatomic study with relevance to olecranon osteotomy and fracture fixation Journal of Shoulder and Elbow Surgery, Volume 12, Issue 3, May-June 2003, Pages 293-296
6. Windisch Gunther, Clement Hans, Grechenig Wolfgang, Tesch Norbert Peter, Pichler Wolfgang The anatomy of the proximal ulna Journal of Shoulder and Elbow Surgery, Volume 16, Issue 5, September 2007, Pages 661-666.