

THE FIXING OF THE OLECRANON IN THE DISTAL HUMERUS FRACTURE - SCREW OR AO TENSION BAND? (ARBEITSGEMEINSCHAFT FÜR OSTEOSYNTHESEFRAGEN)

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Abstract: In this study we intend to compare the 2 methods of fixation of the olecranon osteotomy as a part of the surgical treatment of distal humerus fractures, respectively, the fixing screw and the fixation with a tension band AO. The study was conducted on a sample of 241 patients over a period of one year. It was intended to be a balance between fixing methods and type of fracture covered under AO classification so that each type of fracture to have both surgical methods. The osteotomy was performed with oscillating saw and the last portion was fractured (the joint part of the olecranon). Analyzing the above data it appears that there isn't significant functional differences between the two groups. There is however a trend in the first months of recovery movement of flexion - extension better for cases in which the fixation was made with the AO tension band, difference that disappeared after 3 months of evolution. It notes the emergence of cases with pseudarthrosis in group 2 who had screw fixation, pseudarthrosis correlated with no introduction of the screw in the medullary canal. In cases that was operated with tension band AO we observed an increased incidence of phenomena of intolerance to the osteosynthesis material and also a higher incidence of osteoarthritis phenomena.

Cuvinte cheie: fractura humerusului distal, tratament chirurgical, șurub sau bandă de tensiune AO, pseudartroză

Rezumat: În acest studiu ne propunem să comparăm cele 2 metode de fixare a tranșei de osteotomie a olecranului în cadrul tratamentului chirurgical al fracturilor humerusului distal, respectiv fixarea cu un șurub sau fixarea cu bandă de tensiune AO. Studiul a fost realizat pe un lot de 241 de pacienți pe o perioadă de un an de zile. S-a avut în vedere să existe un echilibru între metodele de fixare și tipul fracturii abordate, conform clasificării AO astfel încât fiecare tip de fractură să beneficieze de ambele tehnici chirurgicale. Tranșa de osteotomie a fost realizată cu fierăstrăul oscilant, cu fracturarea ultimei porțiuni din tranșă (partea articulară). Analizând datele anterioare se poate constata că nu există din punct de vedere funcțional diferențe semnificative între cele două loturi. Există totuși în primele luni de evoluție o recuperare a mișcării de flexie - extensie mai bună pentru cazurile la care fixarea a fost făcută cu bandă de tensiune AO, diferență care după 3 luni de evoluție dispăre. Se remarcă apariția a 2 cazuri cu pseudartroză pentru lotul la care s-a făcut fixarea cu șurub, pseudartroză corelată cu absența angajării în canalul medular al șurubului. În cazurile la care fixarea olecranului s-a făcut cu bandă de tensiune AO se observă o incidență crescută a fenomenelor de intoleranță la materialul de osteosinteză și deasemenea o incidență crescută a fenomenelor artrozice.

INTRODUCTION

Most trauma surgeons prefer the transolecranian approach to resolve the distal humeral fractures. For further fixation of the tranche of osteotomy there isn't a consensus about the reattachment of the olecranon. In this study we intend to compare the 2 methods of fixation of the olecranon osteotomy as a part of the surgical treatment of distal humerus fractures, respectively, the fixing screw <1> and the fixation with a tension band AO <2>. Both techniques offer advantages and disadvantages as will be seen below.

MATERIAL AND METHOD

The study was conducted on a sample of 241 patients over a period of one year. Patients were balanced distributed for each surgical technique, respectively, 120 (fig.1.a) for the method with screw (not used in any patient with metallic thread to add effect Hoban) and 121 (fig.1.b) patients for AO tension band fixation. Since the osteotomy fixation can call on any of the 2 surgical techniques, patient selection was made

randomly. It was intended to be a balance between fixing methods and type of fracture covered under AO classification so that each type of fracture to have both surgical methods. Patients were aged between 19 and 72 years with a mean age of 56.7 years. For internal fixation we use a posterior plate, Y plate or 2 perpendicular plates under practice AO (like posterior on the external column, internal to the internal column), Kirschner wire fragments, metallic thread and intercondilar fixation with screws or Kirschner wire fragments. The osteotomy was performed with oscillating saw and the last portion was fractured (the joint part of the olecranon).

Postoperative patients were enrolled in an intensive functional rehabilitation program <3>, being re-evaluated at 2 weeks, 4 weeks to 2 months, 3 months, 6 months and 1 year. At each visit patients were investigated radiologically and functionally (flexion, extension, pronation, supination, resistivity). Also, patients were assessed at each visit in terms of local state of olecranon fracture (local aspect, patient compliance, radiological examinations at 2 months, 3 months,

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CLINICAL ASPECTS

6 months and 1 year).

Figure no. 1. C3 fracture operated: a. Screw fixation, b. AO tension band fixation



RESULTS AND DISCUSSIONS

Patients had simpler postoperative evolution. We applied the principles of functional recovery in the distal humerus surgery. Such patients received postoperative immobilization with analgesic effect for 14 days, this time continuing the rehabilitation program in the territorial office of the specialist.

At the first visit (2 weeks) patients of both groups had favorable evolution. Were suppressed the immobilisation and suture threads then are redirected to physiotherapy services.

To the visit at 4 weeks was monitored progression of functional rehabilitation. Patients of both groups showed similar values of degree of freedom of movement of pronation-supination. For flexion-extension movement amplitude was observed on average 10 degrees higher for patients who have received olecranon fixation with tension band AO.

Visit at 2 months was first radiological control. We found in patients who did screw fixation, a delay in bone formation to a number of 12 cases. Increased mobility for patients who have received AO tension band fixation was maintained better, without significant differences for movement supination - pronation. Some patients in the group who had AO tension band fixation complained subjective suggestive symptoms for intolerance of osteosynthesis material.

To the visit at 3 months has been found an equalization of freedom elbow movements for both groups of patients. 82 patients in the group who used screw for olecranon osteosynthesis had a full recovery of movement in the elbow joint, 19 had a slight stiffness, 14 showed a moderate stiffness and 8 a severe stiffness. For the group that received olecranon fixation with tension band AO we found that 79 of the patients had full recovery of movement in the elbow joint, 26 had a slight stiffness, 10 showed a moderate stiffness and 6 a severe stiffness. At the radiological control was found a total of 10 cases of screw olecranon fixation group which was presented late in the consolidation (**fig.2.a**). 12 patients among those who received olecranon osteotomy fixation with AO tension band

showed subjective symptoms of intolerance (at 2 of patients objectified a moderate swelling and mild erythema at the head Kirschner wire fragments while the other group, only 1 patient had same symptoms).

To the visit at 6 months, in terms of functional rehabilitation, the two groups showed the same freedom for both movements: flexion-extension movements and the movements of pronation-supination. The number of patients with severe and moderate stiffness remained constant for both groups of patients. Radiological control showed a favorable trend for distal humerus fracture with fracture consolidation.

Figure no. 2. Consolidation problems: a. Late in the consolidation, b. Pseudarthrosis



Regarding olecranon consolidation is noted good evolution for 2 patients in the group for which the fixation was made with a screw. Between 3 to 6 months was required for the extraction of the material for olecranon osteosynthesis in 2 patients in the group where was used the AO tension band fixation, due to local inflammatory phenomena. At this visit, the other 4 patients in this group that fixation was made with AO tension band, showed phenomena of intolerance at the olecranon level.

At one year postoperatively was made final evaluation. From the functional point of view it was found that the consignment which was AO tension band fixation, 92 patients had full recovery of movement in the elbow joint, 9 showed a slight stiffness, 14 showed a moderate stiffness and 8 a severe stiffness, and for the other group, 91 of the patients had full recovery of movement in the elbow joint, 14 had a slight stiffness, 10 showed a moderate stiffness and 6 a severe stiffness. Radiological control revealed favorable evolution of the humeral fracture. Pseudarthrosis (**fig.2.b**) of the olecranon was found to 2 cases of the group that was operated with screw (noted that for both cases - not screw engage medullary canal). For the group that was operated with AO tension band fixation was found in 11 patients degenerative osteoarthritis changes while in the other group only 2 patients presents the same change. In a number of 6 patients was required extraction of the material for olecranon fixation within 6 months - one year for intolerance or migration of the material for osteosynthesis.

PERSONAL CONSIDERATIONS

Analyzing the above data it appears that there isn't significant functional differences between the two groups. There is however a trend in the first months of recovery movement of flexion - extension better for cases in which the fixation was made with the AO tension band, difference that disappeared after 3 months of evolution.

It notes the emergence of cases with pseudarthrosis in group 2 who had screw fixation, pseudarthrosis correlated with no introduction of the screw in the medullary canal.

CLINICAL ASPECTS

In cases that was operated with tension band AO we observed an increased incidence of phenomena of intolerance to the osteosynthesis material and also a higher incidence of osteoarthrosis phenomena.

It may be inferred that there are some differences between the 2 methods of fixing which requires an investigation of local causes involved in various evolutions

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