## RATIONAL TREATMENT OF AO TYPE C DISTAL HUMERAL FRACTURES (ARBEITSGEMEINSCHAFT FÜR OSTEOSYNTHESEFRAGEN)

### <sup>1</sup>B. CIUBARĂ, <sup>2</sup>O. ALEXA, <sup>3</sup>C. IANCU

<sup>1,2,3</sup> "Sf. Ioan" Clinical Emergency Hospital, Iaşi

Abstract: This work aims at addressing the correct treatment of distal humeral fractures type C3 - AO classification. This study includes a group of 67 patients. Of these, 35 have benefited from open reducing and internal fixation (ORIF) and 32 by conservative treatment and cast immobilization for 4-6 weeks. We used regional anaesthesia and transolecranian posterior surgical approach. Internal fixation was performed with 2 plates, with a plate and screws, or wire depending on surgical conditions and bone quality. Conclusions: The primary solution is ORIF.In cases with extreme osteoporosis ("bag of bones") we recommend primary total elbow replacement.

# *Keywords: distal humeral fractures, ORIF, primary total elbow replacement*

Rezumat: Această lucrare își propune să abordeze tratamentul corect al fracturilor humerusului distal tip C3 - clasificarea AO. Prezentul studiu cuprinde un lot de 67 pacienți. Dintre aceștia 35 au beneficiat de reducere sângerândă și fixare internă și 32 de tratament conservator, respectiv imobilizare gipsată timp de 4-6 săptămâni. Pentru intervenția chirurgicală s-a folosit anestezie regională, abord chirurgical posterior transolecranian. Fixarea internă s-a realizat cu 2 plăci înșurubate mulate, cu o placă înșurubată și fragmente de broșă Kirschner în funcție de condițiile intraoperatorii și calitatea osului. Concluzii: Soluția primară este chirurgicalizarea a acestor fracturi cu intenția de reducere sângerândă și fixare internă. În cazurile cu osteoporoză extremă și fracturi cu un grad ridicat de cominuție ("bag of bones") recomandăm protezarea cotului de primă intenție.

*Cuvinte cheie:* fractura humerusului distal, tratament chirurgical, protezarea cotului

#### INTRODUCTION

Distal humeral fractures type C3 - AO represent the combination of intra end extraarticular fracture. Production mechanism of these fractures is generally directly. Due to the difficult surgical technique, rather reserved prognosis of elbow surgery and the associated pathology many patients receive the conservative treatment.

#### PURPOSE OF THE RESEARCH

This work aims at addressing the correct treatment of distal humeral fractures type C3 - AO classification.

#### MATERIAL AND METHODS

This study includes a group of 67 patients aged between 23 years and 81 years with an average age of 61.1 years. Of these, 35 have benefited from open reducing and internal fixation (ORIF) and 32 by conservative treatment and cast immobilization for 4-6 weeks. The study is carried out retrospectively. Patients, who were included for conservative treatment, have benefited from this method of treatment because they refused the surgical treatment or had associated pathology that contraindicated the surgery.

Patients were operated in an average of 36 hours of presentation, and an interval of one to 4 days from producing the injury. There were not included the cases that had other injuries or the fracture of humerus has soft tissue lesions. We use regional anaesthesia and transolecranian posterior surgical approach. Internal fixation was performed with 2 plates <4,7,9>, with a plate and screws, or wire depending on surgical conditions and bone quality (fig1.a, fig.1.b, fig.2.a, fig.2.b).

#### Picture no.1. Type C3 fracture - a. before, b. after



Generally we follow the best possible stabilization of the fracture. For fixation of the olecranon we use tension band -type AO or screw for sponge with

additional washer. The management after the surgery was active and passive mobilization at 48 hours and with antalgic immobilization for 2 weeks.

All patients received early functional rehabilitation in specialized regional office.

#### Picture no. 2. Type C3 fracture - a. before, b. after



#### **RESULTS AND DISCUSSIONS**

Patients had postoperative simple development. Cases had an average of 8 days of hospitalization. We initiate an individualized rehabilitation program for each patient in the hospital, depending on the stability of the fixation and quality of bone found <1,3,12>.

In young patient, who present a high comminuted fracture was necessary the grafting outbreak of fracture with bone substitute and fixation of the elbow joint with a fragment of wire for 2 weeks. After this period we suprime the fragment of wire and the patient was sent to the kinetotherapy territorial cabinet.

Operate patients were evaluated first time at 2 weeks after surgery when they were measured the arc of flexion and extension and the arc of pronation and supination. The registered values were between 30° and  $60^{\circ}$  for flexion and extension and between  $20^{\circ}$  and  $40^{\circ}$  for pronation and supination. On the second visit, at 4 weeks after surgery registered values were between 55° and 100° for flexion and extension and between  $45^{\circ}$  and  $80^{\circ}$  for pronation and supination. At the visit at 2 months after surgery registered values were between  $70^{\circ}$  and  $140^{\circ}$  for flexion and extension and between 80° and 150° for pronation and supination. At the visit of 3 months, 29 (82.85%) patients from the study had maximum values in terms of functional recovery with considerable value for flexion and extension, between 130° and 160° (fig.3.a, fig3.b ) and for pronation and supination, between 140° and  $170^{\circ}$ . At 6 months after surgery only 2 (5.71%) patients had a functional deficit between 15 to 20° for flexion and extension and a deficit between 35 to 45° for pronation and supination.

Patients who were treated conservator were periodically evaluated at 1 month after the suppression of the cast, at 2 months, 3 months and 6 months. Results at 6 months were unsatisfactory. 22 patients (68.75%) had ankylosis of the elbow with values for flexion and extension and between  $10^{\circ}$  and  $20^{\circ}$  and for pronation and supination between  $20^{\circ}$  to  $30^{\circ}$ . The remaining patients had a high deficit of functional rehabilitation with values for flexion and extension between  $50^{\circ}$  to  $70^{\circ}$  and for pronosupination between  $60^{\circ}$  to  $90^{\circ}$ .

Picture no. 3.	Type C3 fracture 3 months after sur	gery
- a. extension.	b. flexion	



#### CONCLUSIONS

Analyzing data obtained from this study can be inferred that should be reconditioned therapeutic position as regards the treatment for distal humerus fracture classification AO type C3. The primary solution is ORIF. Surgical intervention should be immediately followed by an intensive functional rehabilitation <6> to obtain immediate and at distance satisfactory results and a faster social and professional reintegration. In cases with extreme osteoporosis and fractures with high comminuted fracture ("bag of bones") we recommend primary total elbow replacement <5,8,10,11> as shown in other studies, because of a prosthetic elbow stiff posttraumatic is more difficult and functional recovery is more precarious <2>.

We also recommend avoiding conservative orthopaedic treatment and application of functional treatment in patients inoperative, because in treatment of orthopedic the rate of ankylosis is very high.(68.75%)

#### **BIBLIOGRAPHY**

- Aslam N, Willett K. Functional outcome following internal fixation of intraarticular fractures of the distal humerus (AO type C) Acta Orthop Belg. 2004 Apr;70(2):118-22.
- Baksi D. Sloppy hinge prosthetic elbow replacement for post-traumatic ankylosis or instability. J. Bone Joint Surg 1998, 80 B:614-619.
- 3. Caja V, Moroni A, Vendemia V. et al: Surgical treatment of bicondylar fractures of the distal humerus. *Injury* 25:433-438, 1994.
- Celli A, Donini M, Minervini C. The use of precontoured plates in the treatment of C2-C3 fractures of the distal humerus: clinical experience Chir Organi Mov. 2008 Feb;91(2):57-64. Epub 2008 Mar 3.
- 5. Cobb T and Morrey B. Total elbow arthroplasty as primary treatment for distal humeral fractures in

elderly patients. J Bone Jt Surg 79(A):826-832, 1997.

- Gofton W, Macdermid J, Patterson S, Faber K. King G. Functional outcome of AO type C distal humeral fractures J Hand Surg. 2003;28(2):294-308.
- 7. Huang T, Chiu F, Chuang T, Chen T. Surgical treatment of acute displaced fractures of adult distal humerus with reconstruction plate Injury. 2004 Nov;35(11):1143-8.
- 8. Huang T, Chiu F, Chuang T, Chen T. The results of open reduction and internal fixation in elderly patients with severe fractures of the distal humerus: a critical analysis of the results J Trauma. 2005;58(1):62-9.
- Joaquin Sanchez-Sotelo, Michael E, Shawn W. O'Driscoll Complex Distal Humeral Fractures: Internal Fixation with a Principle-Based Parallel-Plate Technique J. Bone Joint Surg Am, May 2007;89:961-969.
- Morrey B, Mansat P. Prothèse de Coonrad-Morrey dans le coude traumatique. Cahiers d'enseignement de la SOFCOT. Paris, Expansion Scientifique Publications, Elsevier 2001;77:178-18.
- Müller L, Kamineni S, Rommens P, Morrey B. Primary total elbow replacement for fractures of the distal humerus Oper Orthop Traumatol. 2005;17(2):119-42. English, German.
- 12. O'Driscoll SW. Optimizing stability in distal humeral fracture fixation. J Shoulder Elbow Surg. 2005;14(1 Suppl S):186S-194S.

AMT, v. II, no. 3, 2009, p. 232