



Management of complex joint fractures of the distal end of the humerus in subjects over 60 years of age prospective study of 31 patients (minimum setback of 1 year)

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ABSTRACT

Introduction: The management of distal humerus fractures in adult is surgical. The purpose of this study was to assess the results of internal fixation of these fractures with two reconstruction plates through a posterior approach.

Materials and methods: This study involved 31 in-patients between January 2021 and december 2022. It was ten men and twenty-one women with a mean age of 73 years (60-85 years). The fractures were classified according to AO system in A3 (n=5), C1 (n=17), C2 (n=7), and C3 (n=2). The surgical approach was posterior with an olecranon osteotomy (n=27), and a trans-tricipital incision (n=4). Internal fixation was realized with reconstruction plates placed in parallel (n=24), and perpendicular (n=7). The results were assessed according to the Elbow Performance Score.

Results: All fractures consolidated within an average time of 45 days. The outcome was excellent (n=9), good (n=14), fair (n=5), and poor (n=3). Related complications were a superficial infection (n=0) and an elbow stiffness (n=2).

Conclusion: Distal humerus fractures plating through a posterior approach gives excellent and good results.

Keywords: Fractures distal humerus, Posterior approach, Old patient, Osteoporosis

INTRODUCTION

Due to the complexity of distal fractures of the humerus and the poor quality of bones in elderly patients, these entities remain a challenge. However, due to a high rate of complications related to total elbow replacements, reconstruction of distal fractures of the humerus should always be considered as a therapeutic option, even in the elderly patient. The aim of the present study was

to investigate clinical outcomes after open reduction and internal fixation and to assess whether the results warrant reconstruction even in elderly patients. We hypothesized that, despite advanced age, reasonable clinical results can be achieved, using a standardized surgical technique and post-treatment protocol for the treatment of distal fractures of the humerus in elderly patients.

MATERIALS AND METHODS

Patients

This series involved adult patients (>60 years) with a recent fracture (<5 days) of the extremity lower humerus treated surgically between January 2021 and December 2022. The surgical method retained was the fixation with two reconstruction plates placed posteriorly in Series:

- 31 patients
- 21 Women
- 10 Men
- **Average age:** 73 years (60-85 years)
- The Katz scale is presented in the form of a questionnaire concerning 6 criteria of ability of everyday gestures. Wash, Dress, The so-called acts of transfer (getting up, sitting, lying down) and moving, Go to the bathroom, Continence, Eat.
- X-rays of the front and profile elbow were taken in all patients. A scanner of the elbow with a three-dimensional reconstruction was performed; in all our patients Fractures were classified according to classification of the AO.

Lesion mechanism

- Low energy
- The type of fracture always depends on the position of the elbow at the time of the trauma.
- Diagnosis is usually easy
- **Radiological assessment:** Rx of the elbow face+profile Ct

Group A: A3: 7 patients

- **Group B:** B4; B5; B7: 10 patients
- **Group C:** C2; C3; C4: 14 patients

Treatment of fractures of the lower end of the humerus in adults is surgical (Mikiéla A, 2015). Open osteosynthesis or elbow replacement can Allow early rehabilitation to ensure a mobile and painless elbow (Gregory J, 2010). Anatomical complexity and the comminution of fractures make the reduction and difficult osteosynthesis (Lecestre P, 1980). This osteosynthesis takes place usually by a posterior route with plates this osteosynthesis takes place usually by a posterior route with plates screwed (Hani R, 2017). The current trend is the use of two plates for recon structing the pillars (Taouili H, 2008). We have used the method of fixing by two plates of reconstruction posed posteriorly. The purpose of our study was to evaluate the outcomes of this therapeutic approach (Figures 1-10).

For treatment: surgical for the 31 patients under general anesthesia.

Ways first

- **Transolecranial approach:** 19 cases
- **Parabicipital approach:** 07 cases
- **Transtricipital approach:** 05 cases

Stabilization

- **Group A:** A3: 7 patients
- **Group B:** B4; B5; B7: 10 patients
- **Group C:** C2; C3; C4: 14 patients treated by a plate in: 5 associated cases have a screwing or embroiling and two plates in 9 cases.



Figure 1: Fonctionnel impotence and elbow hematoma

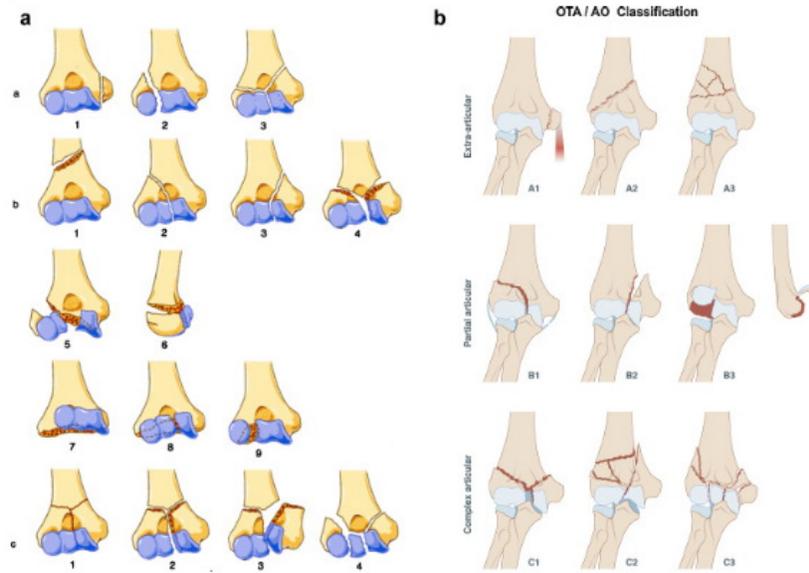


Figure 2: Classification SOFCOT (a) and (b) AO/OTA



Figure 3: 74-year-old patient Standard X-ray supplemented by scanner objectifying a supra and intercondylar fracture of the lower end of the humerus

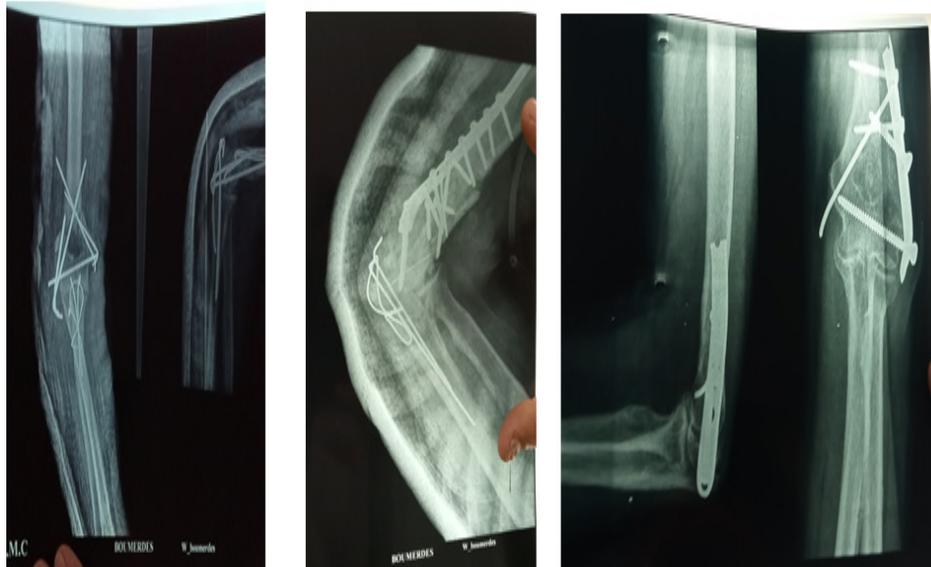


Figure 4: Plate associated screwing or embroidring operate by transolecranial approach

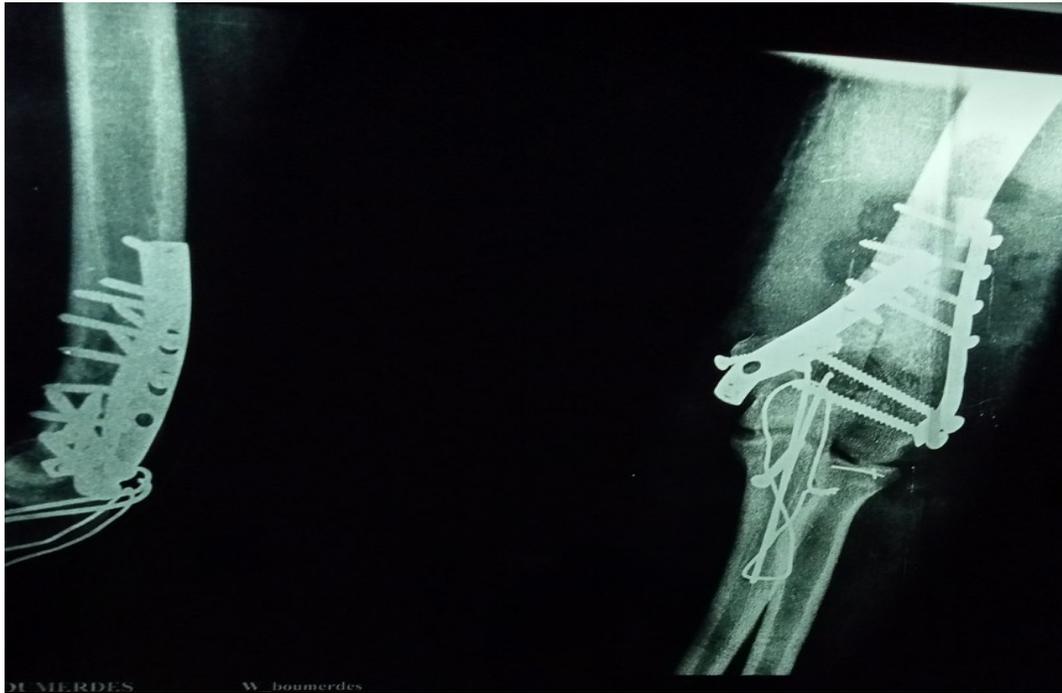


Figure 5: Two plates operate by transolecranial approach



Figure 6: Type c for AO



Figure 7: Transolecranial approach

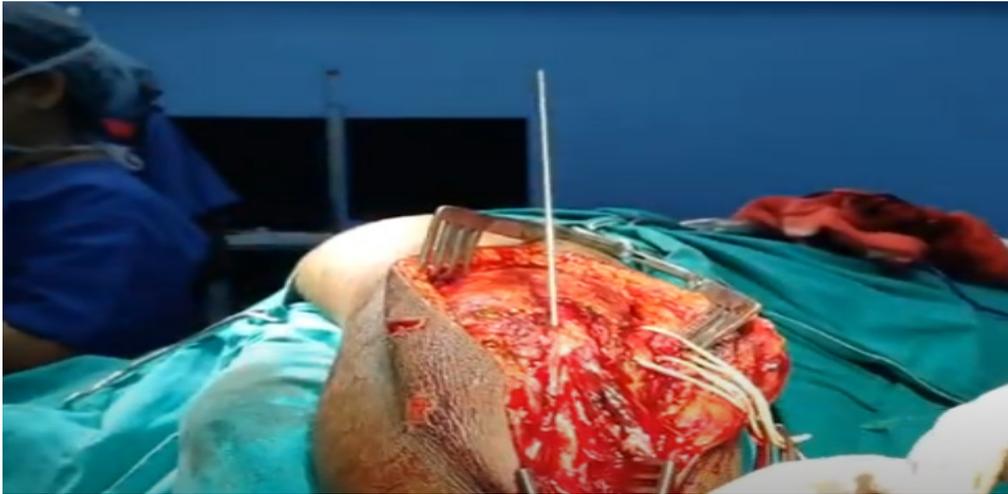


Figure 8: Protects the ulna nerve

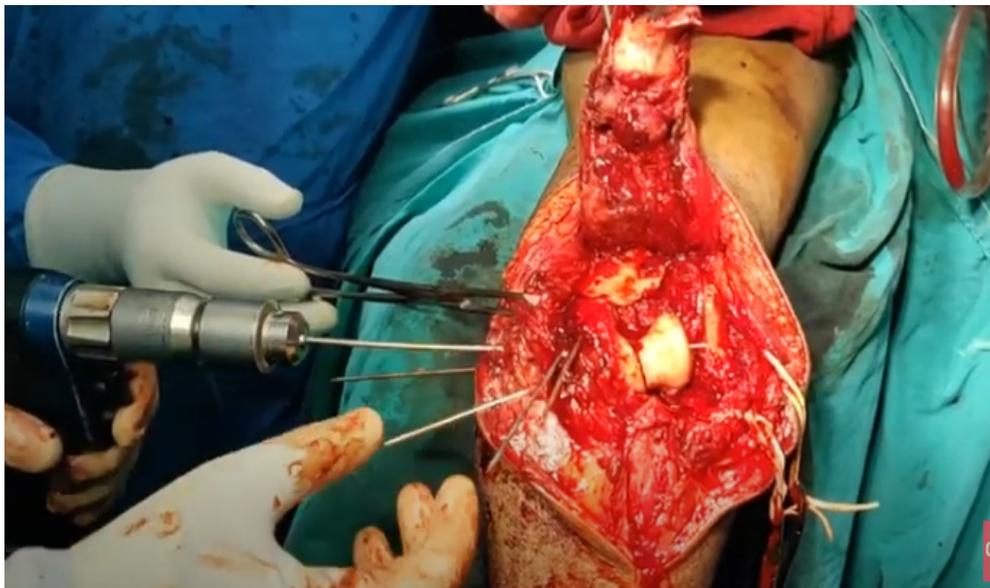


Figure 9: Fixation of the reduction by pins

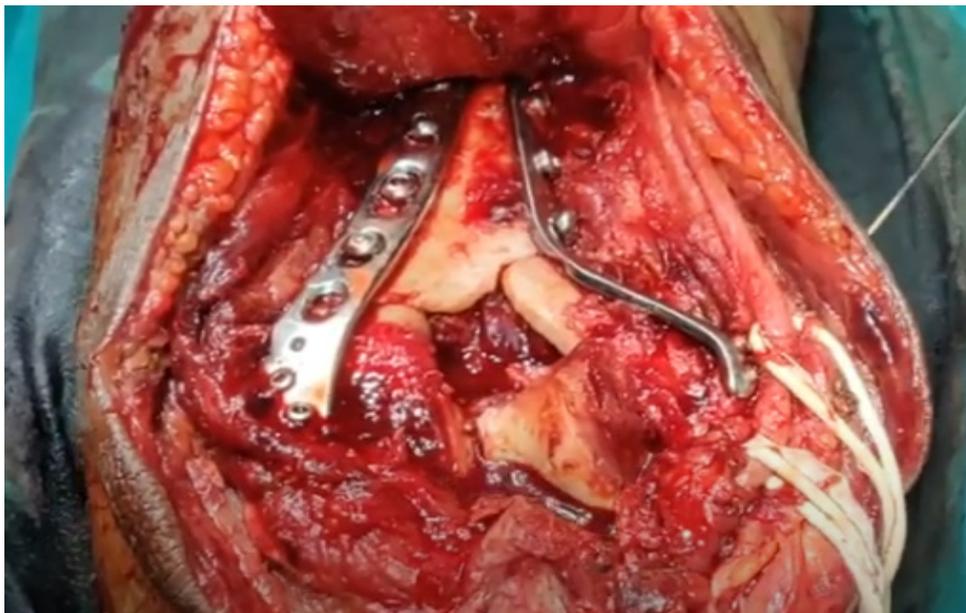


Figure 10: Two plates

RESULTS

- **At 3 months:** mobility arc was in the functional area of 32° extension deficit and 100° bending.
- **Between 6 months and 1 year:** the mobility arc extended by 28° of extension deficit and 110° of flexion.
- This extension deficit is more in osteosynthesis by two plates Pronosupination deficiency in 7 patients.

Post-operative complications

- **Early sepsis:** 2 cases
- **Scar disunion:** 1 case

Secondary complications

- **Elbow stiffness:** limitation of extension more than flexion in 95% of cases and pronosupination in 17% of cases.
- **Pseudarthrosis:** olécran in 1 case.
- **Vicious calluses:** 3 cases.
- **Periarticular ossifications:** 6 cases.
- Stripping of the plate placed externally
- **Pain:** In the 5 cases where stabilization has used pins+post splint requiring removal of the equipment 7 months after the surgical procedure (Figures 11-12).

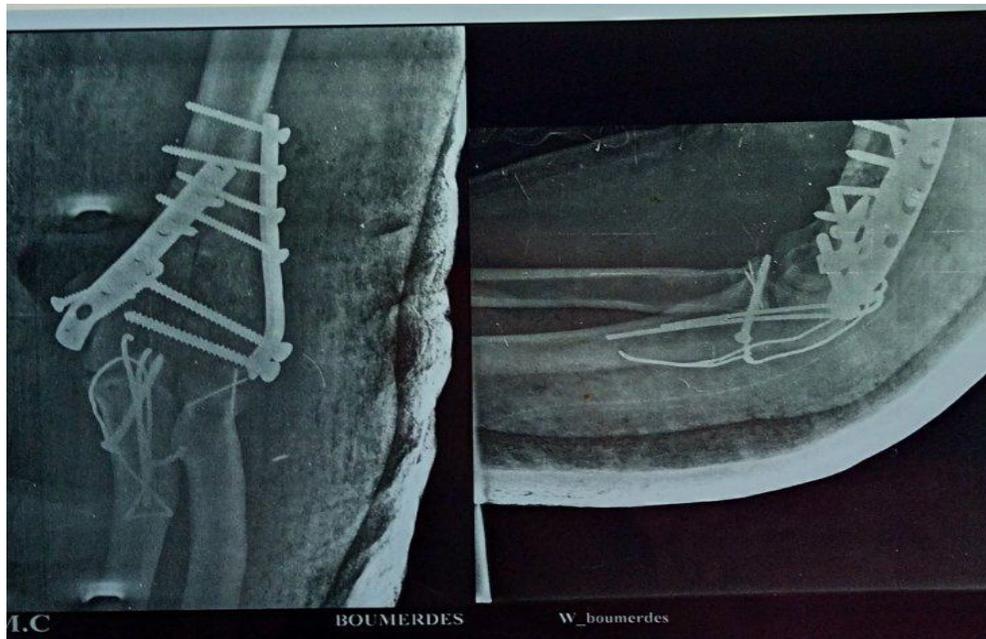


Figure 11: Control radiology



Figure 12: Functional results of our patient at 3 months **Note:** * Extension : -20° * Inflection : 100°

DISCUSSION

These patients had the same functional outcome as in the published series at 1 year, in our prospective series, the size of this series is too small to show statistically significant values. The results of this approach depend on the quality of osteosynthesis humeral and that of the olécrane. We realized osteosynthesis with reconstruction plates placed in parallel and perpendicular. According to Morrey et al conventional plates would give poor results in 5 to 30% on osteoporotic bones. This has fostered development locked plates and anatomical plates which ensure a solid attachment of both columns Osteosynthesis with medial and posterolateral plates are a reliable method of attachment of fragments intra-articular of the humeral palette (Abzug J, 2010).

The Way first posterior allows simultaneous control of the two columns of the distal end of the humerus (O'Driscoll SW, 2005). The Control of the rotation of distal fragments is also easy (Atalar AC, 2017). Our functional results were satisfactory in both parallel and orthogonal mounting types. The position of the plates is a matter of school. Shin et al made a clinical comparison of the two types mounting. They concluded that the parallel plates would provide a stiffer attachment (Susshant UC, 2017). Nevertheless, they have clarified that there was no significant difference between the two arrangements in terms of clinical results and complications (Shin SJ, 2010).

We used one or the other method of fixation depending on our operating difficulties. For C2 and C3 fractures, Celli et al would prefer pre-molded plates lay in parallel on both columns (Puchwein P, 2011). Kural et al advocated an osteosynthesis by two plates, one medial and the other posterolateral (Celli A, 2008; Kural C 2017). Nehad et al in a series of 30 supracondylar fractures systematically operated posteriorly and stabilized by two plates on each column achieved 75% excellent results (Nehad EM 2012; Lucas BJ, 2016).

CONCLUSION

Fracture results were good or excellent in 85% of our patients based on their Mayo Elbow performance score. Pain scores were also low. A good functional result does not, of course, reflect the general health of patients. However, any treatment that can preserve the independence of older persons must be valued. Advanced age should not be a contraindication to open reduction and fixation in distal fractures of the humerus.

Current evidence supports the indication of Open Internal Reduction Fixation (ORIF), even in the elderly patient. Advanced age should not be considered a contraindication to ORIF of fractures of the distal hu-

merus. Although the complication rate is higher than in younger patients, complications such as non-union are often asymptomatic, patient satisfaction scores are high, and the possible devastating complications of a replacement elbow failures can be avoided.

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