

Original Research Article

Evaluation of surgical treatment of recent diaphyseal fractures of the humerus in adults based on 42 cases

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ABSTRACT

Background: Humeral shaft fractures (HDF) in adults account for 2% of all fractures. Surgical treatment can be either closed or open.

Methods: This was a retrospective, descriptive and evaluative study conducted from January 2020 to December 31, 2023, at Centre Hospitalier National Matlaboul Fawzaini de Touba (CHNMFT) on 42 cases. The exclusion criteria were all patients under 15 years of age receiving orthopaedic treatment.

Results: The average age of our patients was 40 years, with a male predominance. The most common circumstances were road traffic accidents (32 cases). According to the AO classification, type A fractures were the majority (32 cases). According to the surgical technique, pinning was the most common (22 cases). No complications were noted and all our patient's achieved union within 12 to 24 weeks. At a mean follow-up of 13.5 months, according to the modified Stewart and Hundley classification, 61% of our patients were classified as Good versus 32% as Very Good.

Conclusions: FDHs in adults are very common. The radial nerve remains the dread of every surgeon and surgical treatment yields the best results.

Keywords: Adult, Fracture, Humerus, Osteosynthesis, Radial nerve, Shaft

INTRODUCTION

Fractures of the humeral shaft occur in a region bounded at the top by the lower edge of the pectoralis major muscle and at the bottom by the lower edge of the insertion of the anterior brachialis muscle. They account for 2% of all fractures.¹ They are most common in the elderly, in the case of low-energy trauma and in the young, in the case of high-velocity trauma.^{2,3} The radial nerve is the dread of every surgeon and surgical treatment remains the gold standard. The aim of this study is to evaluate the surgical treatment of these fractures.

METHODS

From January 2020 to December 31, 2023, that to say for a period of 4 years, we collected 42 cases of recent diaphyseal humeral fractures in adults aged on average 40 years, with extremes of 16 and 82 years, in the Orthopaedic Traumatology Department of Centre Hospitalier National Matlaboul Fawzaini de Touba. It was a retrospective, descriptive and analytical study. Exclusion criteria included all patients with humeral shaft fractures under 15 years of age and those who had undergone orthopedic treatment. Data analysis was obtained using Sphinx Plus 2 software.

The study population comprised 31 male and 11 female victims of road traffic accidents (32 cases), domestic accidents (8 cases), accidents at work (one case) and one case of a brawl. Shopkeepers were in the majority (12 cases), followed by drivers (10 cases). The left hand was the most affected non-dominant side (22 cases). According to the AO classification, the fractures were divided into.¹

A2 : 7 B2 : 2 C2 : 1, A3 : 17 B3 : 3 C3 : 0, A1 : 8
B1 : 4 C1 : 0

Treatment was surgical, with pinning (22 cases), screw-plate (9), centromedullary nailing (10) and external fixator in one case of an open fracture. Rehabilitation began around 21 days on average and was effective in all cases in a specialized setting. Evaluation after an average follow-up of 13.5 months, with extremes ranging from 6.5 months to 18 months, was based on functional, anatomical and radiological aspects, according to the modified Stewart and Hundley criteria.

RESULTS

We noted a predominance of males (74%) with an average age of 40, 76% of whom were victims of road traffic accidents. Authors noted 3 cases of preoperative radial nerve damage classified as SUNDERLAND GRADE I, all of which recovered under medical treatment. The most frequently encountered fractures were types A3, A1, A2, B1, B3, B2 and C2 (Figure 1). Pinning was used in 52.5% of cases (Figure 2).

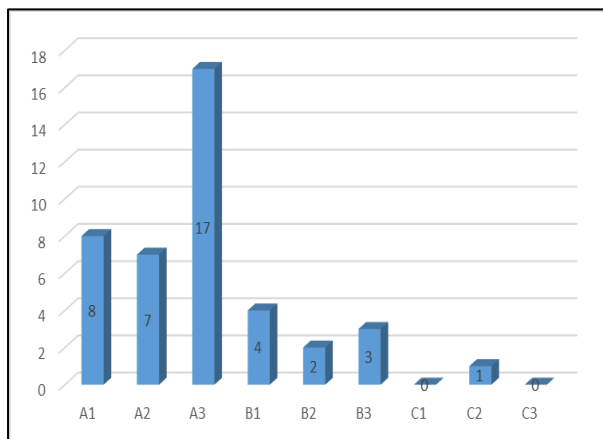


Figure 1: Distribution of humeral shaft fractures.

Delayed rehabilitation (3 weeks) was instituted in all patients. Radiologically, bone consolidation was achieved in all our patients within 12 to 24 weeks. No cases of delayed consolidation or septic pseudarthrosis were recorded. However, we deplore one case of death at M5 in a patient treated with FE for Kahler's disease. Functional results were very good in 13 cases, good in 25 and fair in 3.

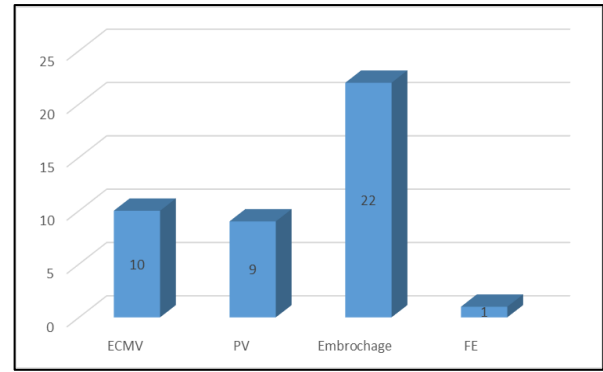


Figure 2: Distribution of surgical treatment.

Table 1: Stewart and Hundley score modified.²

Stewart and Hundley score modified	
Very good	No pain, normal shoulder and elbow mobility good radiological alignment
Good	No pain or climatic pain, shoulder and elbow stiffness less than 20°. Vicious callus less than 20°.
Fair	Minor pain, shoulder and elbow stiffness between 20 and 40°. Vicious callus greater than 20.
Bad	Persistent pain, shoulder and elbow stiffness greater than 40°, pseudarthrosis

Table 2: Epidemiological aspects of patients.

Epidemiological aspects	
Age in years	40 (average age)
Gender	74% male
Occupation	28.5% traders
Rate reached	52% left
Dominant side	95% right
Circumstance	76% ACR
Mechanism	68% direct

DISCUSSION

The focus is on treatment and results. In the case of humeral shaft fractures, orthopedic treatment is opposed to surgical treatment. Surgical techniques are diverse and varied and can be either closed or open focus. In our series, we prefer closed-focus surgical techniques, given the acceptable level of technical resources available. Open focus has the advantage of being more effective, but is more prone to infection and radial nerve paralysis. Some authors have recorded more open than closed cases, probably due to the department's habits and technical resources.³⁻⁵ The surgical technique for diaphyseal fractures of the humerus is therefore debatable, depending on whether or not the radial nerve is initially involved, the type of fracture line and the technical set-up. During the study period, no postoperative clinical complications were reported. As for DEMBELE and PARIS, postoperative infections were considerable, in the order of 11.5% and 10.4%, which are related to the surgical technique.^{5,6}

Radial nerve damage is the most frequently described complication in humeral shaft fractures. We noted three cases of preoperative radial nerve neuropraxia, all of which recovered with medical treatment. Our results are similar to those of OUEDRAOGO and BADJI, but unlike DEMBELE, nerve damage was significant (26.2%), with 3 cases requiring nerve transfer.^{4,6,7} No radiological complications were noted in our series and consolidation was achieved in all our patients within 12 to 24 weeks. The young adult age of our population is an important factor that may explain these results. Our results are similar to those of FAN and SEIDEL, who reported 100% consolidation and better than those of LAHRACH, CORMACK and OMAR.⁸⁻¹² At a mean follow-up of 13.5 months, we assessed our patients according to the modified Stewart and Hundley functional score. Results were very good in 13 cases, good in 25 cases and fair in 3 cases. These results are similar to those of several authors.¹²⁻¹⁴ No poor results were recorded in our study. However, other authors have noted cases of poor results.^{13,15,16} During the study, we encountered some archiving difficulties that limited our sample. Some files found did not meet our inclusion criteria. Some patients followed in the department did not consent to our study.

CONCLUSION

Fractures of the humeral shaft in adults are the prerogative of the elderly in the case of low-energy trauma and of the young in the case of high-velocity trauma. The radial nerve is every surgeon's worst enemy and surgical treatment remains the gold standard, with good anatomical and functional results. Indications are discussed on a case-by-case basis, depending on whether or not the radial nerve is initially involved and on the technical resources available.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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