International Surgery Journal
Camara A et al. Int Surg J. 2024 Mar;11(3):358-361
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20240567

Original Research Article

Humeral shaft fractures in adults: management and evaluation of treatment in 50 cases

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Received: 05 November 2023
Revised: 06 January 2024
Accepted: 17 January 2024

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ABSTRACT

Background: The management of humeral shaft fractures is a real challenge in our regions.
Methods: This was a prospective, descriptive single-center study involving 50 patients meeting our inclusion criteria. Inclusion criteria focused on adult patients, received for fractures of the humeral shaft, treated and followed up, then evaluated during the study period. Exclusion criteria included humeral shaft fractures in children, patients not having been evaluated during the study period.
Results: We enrolled 50 patients, 43 men (86%) and 7 women (14%), with a sex ratio of 3.07. Mean age was 32.3 years, with extremes of 18 and 79 years. The left side was affected in 46 cases (92%). Lesions were predominantly located in the middle 1/3 in 39 cases (78%). Treatment was orthopedic in 30 patients (60%). Surgical treatment was performed in 20 patients (40%), with screw-plate predominating in 14 cases (28%), followed by hackethal pinning in 5 cases (10%) and combined treatment in one case (2%). At six months' follow-up, our results were very good and good in 36 cases (72%) according to the modified Stewart and Hundley functional score.
Conclusions: Humeral shaft fractures are rare fractures for which orthopedic treatment is still indicated. Complications include radial nerve paralysis and pseudarthrosis.

Keywords: Callus, Humeral shaft, Fracture, Orthopedic treatment, Radial, Pseudarthrosis

INTRODUCTION

A fracture of the humeral shaft (FDH) is defined as a fracture whose line is located between the insertions of the pectoralis major muscle proximally and the brachialis muscle distally.[1,2] Fractures of the humeral shaft are relatively common, representing approximately 1% to 5% of all fractures.[3,4] The diagnosis of humeral shaft fractures is easy and their most frequent complications are nonunion and radial nerve palsy.

The treatment of these fractures is not consensual because they benefit from an extensive and varied therapeutic arsenal.[5-7] Good therapeutic results have been reported, both with surgery and with non-surgical treatments. It is the nature of the fracture and the characteristics of the patient that generally require this or that type of intervention.[1]

Conservative treatment is therefore recommended in situations with bone displacement of less than 20˚ in the sagittal plane (antero-posterior), less than 30˚ in the coronal plane (varus-valgus), or with shortening of less than 3 cm. Surgical treatment is reserved for open fractures, when associated with an ipsilateral fracture of the forearm, in multiple trauma patients and patients who cannot tolerate prolonged immobilization. Loss of bony alignment and failure of conservative treatment also represent an indication for surgery.[8,9]

The objective of our work was to evaluate the results of treatment of humeral shaft fractures.

METHODS

This study was carried out in the Orthopedics-Traumatology department of the Donka University Hospital Center, Conakry (Republic of Guinea).

This was a prospective, descriptive single-center study running from January 1, 2018 to December 31, 2020 involving 50 patients meeting our inclusion criteria.

Inclusion criteria focused on adult patients, received for fractures of the humeral shaft, treated and followed up, then evaluated during the study period.

Exclusion criteria included humeral shaft fractures in children, patients not having been evaluated during the study period.

Our study variables were epidemiological (age, sex), clinical (the dominant side, the affected side, etiological circumstances), therapeutic (time to treatment, therapeutic modalities, average length of stay); progressive (time to consolidation, complications, functional evaluation of results).

We recorded closed and open fractures in our series. For open fractures, we used the Gustilo-Anderson classification. Bone lesions were classified according to the AO classification into type A (1; 2; 3); B (1; 2; 3) and C (1; 2; 3).

The treatment was orthopedic by hanging cast or brachio-antibrachio-palmar cast (BABP) and surgical by 8-hole screwed plate, Hackethal pinning with Kirschner wires or the combined treatment combining the two previous ones. We did not perform intramedullary nailing treatment in our series. The results were evaluated using the Stewart and Hundley functional score (Table 1).[10]

Our data sources were hospitalization and consultation registers, operative report registers and patient medical files.

The entry was made using word software and analyzed by Epi info software version 7.2.

Table 1: Functional assessment of patients according to the modified Stewart and Hundley score.[10]

Results	Pain	Shoulder-elbow range	Vicious calluses
Very good	Nothing	Normal	None
Good	Meteorol ogical	Limitation <20°	<20°
Good enough	Not very important	20°<limitation <40°	>20°
Bad	Persistent	Limitation >40°	Pseudarth-rosis

RESULTS

We collected 50 patients including 43 men (86%) and 7 women (14%). The average age was 32.3 years with the extremes of 18 and 79 years. The most affected age group was 41 to 50 years old with 17 cases (34%). The socio-professional strata were dominated by motorbicycle taxi drivers with 14 cases (28%).

Table 2: Distribution of patients according to age.

Age groups (years)	Workforce	Percentage
≤20	2	4
21-30	4	8
31-40	12	24
41-50	17	34
51-60	8	16
≥61	7	14
Total	50	100

Table 3: Distribution of patients according to socio-professional strata.

Socio-professional strata	Workforce	Percentage
Motorcycle taxi drivers	14	28
Farmers	1	2
Masons	4	8
Carpenters	2	4
Pupils/students	8	16
Tradespeople	7	14
Retired person	6	12
Functionary	8	16
Total	50	100

The etiological circumstances were dominated by road traffic accidents with 41 cases (82%). Our patients were right-handed in 44 cases (88%) and the left side was affected in 46 cases (92%). The fractures were closed in 45 cases (90%). The site of the lesions was predominant in the middle 1/3 in 39 cases (78%) followed by the lower 1/3 in 7 cases (14%) and 4 cases in the upper 1/3 (8%). We recorded one case of radial nerve injury (2%), contemporary with the trauma. The treatment time was less than 24 hours for patients treated by the orthopedic method. This period was between the 48th hour and 7 days for surgical treatment. The treatment was orthopedic in 30 patients (60%). Surgical treatment was carried out in 20 patients (40%) with a predominance of the screwed plate in 14 cases (28%), followed by Hackethal pinning in 5 cases (10%) and one case of combined treatment (2%), combining the Hackethal pin-out and the screwed plate in the patient who presented a bifocal fracture.

The average length of stay was between the 72nd hour and 3 weeks depending on the case. Consolidation was obtained after 12 weeks on average, reaching up to 16 steaminess in certain cases. As complications, we recorded

a case of radial nerve injury intraoperative; 2 cases of infection following surgery in patients with open fractures whose treatment was delayed. After 4 months of evolution, we recorded 5 cases of elbow stiffness, one case of nonunion, 3 cases of malunion whose angles were less than 20° in the sagittal plane, less than 30° in the coronal plane and inferior at 3 cm shortening.

At six months' follow-up, our results were very good in 42 cases (84%), according to the modified Stewart and Hundley functional score.

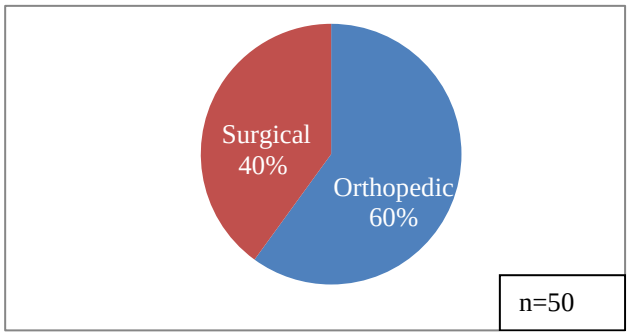

Figure 1: Distribution of patients according to type of treatment.

Table 4: Distribution of patients according to the Stewart and Hundley functional score.

Score	Workforce	Percentage
Very good	13	26
Good	29	58
Good enough	05	10
Bad	03	06
Total	50	100

DISCUSSION

It appears in our study that fractures of the humeral shaft are the prerogative of young male subjects and occur during road traffic accidents, dominated by motorbicycle accidents. These results can be superimposed on data from the literature which also notes a predominance of young male subjects, during road traffic accidents, found in several series.[7,11,12]

The involvement of the left side was predominant and the fractures were closed in the majority of cases, most often located in the middle 1/3 and the fracture line was simple transverse, oblique, complex or comminuted, justifying the predominance of the choice of the left side. Indication of orthopedic treatment in our series. Combined treatment was carried out in the case of bifocal fracture.

In the literature, the treatment of humeral shaft fractures is not unambiguous. It depends on the schools, the age of the patient, the type of lesion or the failure of orthopedic treatment. In our series orthopedic treatment. Ouahidi et al, Diémé et al, and Barsaoui et al found the predominance of surgical treatment with ascending intramedullary pinning in their respective series.[11-13]

The most common complication in our series was elbow stiffness, in patients who had received orthopedic treatment with plasters (BABP, hanging cast), who were sent to physiotherapy for elbow mobilization. But also in certain operated patients who did not continue rehabilitation by physiotherapy; they were admitted to the operating room for elbow mobilization under general anesthesia. There were two cases of damage to the radial nerve, including one case of immediate complication (contemporaneous with the trauma) and one case of iatrogenic intraoperative injury. They benefited from drug treatment with neurotropic and vitamin therapy (vitamin B): the first fully recovered after 6 weeks. The second did not recover after 2 years of progression, and in this patient after performing the electromyogram which revealed adhesions on the radial nerve and a nerve conduction disorder, we offered him a tendon transfer.

The two cases of infection benefited from targeted antibiotic therapy after the results of the antibiogram and healing was obtained. The pseudarthrosis was returned to the operating room for treatment of the pseudarthrosis and osteosynthesis using a screwed plate, with cortico-cancellous bone graft. Furthermore, we opted for therapeutic abstention for malunions whose deformation thresholds were within the tolerated ranges and had no clinical manifestations.

Our functional results according to the modified Stewart and Hundley score were very good and good in 84% of cases. This is explained by the early rehabilitation of most of our patients.

The limitations of the study were the poor quality of certain radiographic images, which were no longer usable and the patients lost to follow-up during the evaluation of the functional results.

CONCLUSION

Fractures of the humeral shaft are rare fractures, for which orthopedic treatment is still indicated. Complications remain radial nerve palsy and pseudarthrosis, which must be born in mind when making therapeutic decisions.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Camara A, Camara NM, Diallo MM, Lamah L. Humeral shaft fractures in adults: management and evaluation of treatment in 50 cases. Int Surg J 2024;11:358-61.