

Surgical Treatment of Lower End of Femur Fractures in Chu - Gabriel Toure

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Abstract

Introduction: Fractures of the distal end of the femur are difficult to understand and treat, with significant repercussions on the knee joint. The aim of our work was to assess the outcome of the treatment of fractures of the lower extremity of the femur.

Materials and Methods: This was a retrospective study carried out at the orthopedic-traumatology service of the CHU Gabriel TOURE concerning patients with a fracture of the distal end of the femur over 6 years (January 2013 to December 31, 2018).

Results: We collected 41 patients with a fracture of the distal end of the femur. The male sex represented 65.9% with a sex ratio 1.92. The average age was 41, 36 with extremes of 17 and 75. Road traffic accidents were the main etiology with 87.8%. The most frequent anatomoradiological variety was type VI of SOFCOT. Associated lesions were observed in 53.6%, and open fractures type II of Gustilo and Anderson in 21.9%. Osteosynthesis with the plate blade was the most frequent with 46.3%. The prognosis was dominated by stiffness of the knee (43.9%) and vicious calluses (17.03%). At an average follow-up of 30.87 months, functional results were good in 41.5% according to SOFCOT.

Conclusion: Fractures of the distal end of the femur are frequently associated with other lesions. Surgical treatment performed early and appropriately, guarantees an excellent functional result. Sometimes despite this treatment the stiffness of the knee is inevitable especially with the complexity of the fracture.

Keywords: Fracture; Distal End; Treatment; Results

Introduction

Fractures of the lower extremity of the femur are not frequent (4 - 7% of fractures of the femur) [1]. They most often occur as a result of violent trauma. Joint or sub-articular, fractures of the lower extremity of the femur are difficult to understand and have all been the source of therapeutic difficulties [2-4]. They will have a significant impact on the knee joint (stiffness, misalignments, destruction of the articular surfaces). The treatment is almost exclusively surgical, often complex, which can give way to complications and serious sequelae on the knee joint function [5,6]. Surgical treatment gives better anatomical and functional results, in the short and long term. Painful stiffness is the ransom, still too common for these fractures. The aim of our work was to assess the outcome of the treatment of fractures of the lower extremity of the femur.

Materials and Methods

This was a retrospective study of patients with a fracture of the lower extremity of the femur over 6 years (January 2013 to December 31, 2018) at the Department of Orthopedics-Traumatology CHU Gabriel TOURE Bamako.

Inclusion criteria: Were included all patients who presented a fracture of the lower extremity of the femur according to the classification of SOFCOT, whose treatment and monitoring were carried out in the department.

Non-inclusion criteria: Patients less than 16 years of age, unicondylar fractures, and patients lost to follow-up were not included.

Data management and analysis were done using SPSS 20.0 software, Word and Excel 2010, Fisher statistical test with a risk $p < 0.05$.

The results were assessed according to the classification of SOFCOT (Table 1).

Functional criteria	Quotation			
	4	3	2	1
Mobility	Flexion 120°	Bending between 90 and 120°	Bending between 60 and 90°	Flexion at 60°
Pain	No pain	Intermittent	A l'effort	Permanent
Stability	Normal	Normal	Mild instability	Severe instability
Market	Normal	Exercise lameness	Permanent in the book	With cane

Table 1: Evaluation of functional results according to SOFCOT.

Results

We collected 41 patients with a fracture of the distal end of the femur. The male sex represented 65.9% with a sex ratio 1.92. The average age was 41, 36 with extremes of 17 and 75. The circumstances were road traffic accidents with 36 cases (87.8%), work accident 2 cases (4.9%), ballistic trauma 2 cases (4.9%) and 1 case of life accident domestic (2.4%). The mechanism was direct in 40 cases (97.6%) and indirect in 1 case. The anatomoradiological types were the complex supracondylar fractures (type VI of SOFCOT) with 44% (Figure 1), the simple supracondylar fractures with 27% (Figure 2), the simple supracondylar fractures (type IV of SOFCOT) with 17%, diaphyso-metaphyso-epiphyseal fractures (type VII of SOFCOT) with 7% and complex supracondylar fractures (type II of SOFCOT) with 5%. Associated lesions were observed in 22 cases (53.6%):



Figure 1: X-ray of a Type VI SOFCOT fracture of the right femur.



Figure 2: X-ray of a type I supra-condylar fracture of the right femur associated with a femoral diaphysis fracture.

Skin lesions with open fractures type II of Gustilo and Anderson were noted in 7 cases (17.03%), bone lesions associated with other limbs in 7 cases (17.07%), polytrauma in 5 cases (12, 19%): head trauma in 2 cases and trauma to the thorax, abdomen and pelvis in each case. Therapeutically we have performed in 100% surgical treatment. The average time for osteosynthesis was 12.7 days with extremes of 3 days and 28 days. Internal osteosynthesis was performed in 38 cases (92.68%) and external fixation in 3 cases. Osteosynthesis with the plate slide was performed in 19 cases (46.3%) (Figure 3) and as for osteosynthesis by DCS it was performed in 18 cases (43.9%) (Figure 4) and osteosynthesis by pin in 1 case completed by a plastered splint. External osteosynthesis was performed in 3 cases (7.3%). After the treatment we recorded the following complications: 2 cases of sepsis including a deep and a superficial, the stiffness of the knee in 13 cases (32%), the vicious callus in 4 cases (10%), osteoarthritis in 4 cases (10%) and the vicious callus associated with stiffness in 3 cases (7%). At the average follow-up of 30.87 months, the anatomical results were good and average in 31 cases (75.6%) and poor in 10 cases (24.3%). As for the functional results, they were good in 41.5% according to SOFCOT. The prognosis was dominated by stiffness of the knee (43.9%) and vicious calluses (17.03%).



Figure 3a: Type I supra-condylar fracture of the right femur associated with a femoral diaphysis fracture (front).



Figure 3b: Osteosynthesis of a supra-condylar fracture with a 95° plate blade and right femoral diaphyseal femoral plate (front and profile at 8 months of evolution).



Figure 4a: Type VI SOFCOT fracture Right femur (face and profile).

In statistical analysis: there was no relationship between the age group and the functional results: Fischer test value (11.398) Exact 0.575.



Figure 4b: Osteosynthesis of a type VI fracture of SOFCOT by DCS associated with a screwing of an epiphyseal fragment (evolution at 2 years): face and profile.

There was also no correlation between the type of osteosynthesis and the functional results: Fischer Test Value (10,617) Accurate (0,052).

On the other hand, we found a correlation between the age group and the sex: Fischer test 13,268, $p = 0.012$; and between the anato-mo-radiological type and the functional results: Fischer test 13,897, $p = 0.029$.

Discussion

When carrying out this work, we encountered some difficulties. Among other things, this involved recruitment limited to hospital cases, making it difficult to use statistical tests, financial inaccessibility to CT examinations for the lesion assessment and the relatively high cost of osteosynthesis equipment.

In descriptive analysis: The average age of our patients was 41, 36 years with extremes of 17 years and 75 years. Our average age is close to that of Madougou S., *et al.* [7] and Pradip Padil., *et al.* [8] with 40.62 years and 47 years respectively. On the other hand, it is lower than that of Lamraski G., *et al.* [3] and of Jerbi., *et al.* [9] with 64 and 54 years respectively. This is explained by the great mobility of our young population.

The male sex represented 65.9% of our series with a 1.92 sex ratio. This male predominance has been observed in the series by Madougou S., *et al.* [7] and Ramavtar S., *et al.* [10] with 73.3% and 87% respectively. As for Lamraski G., *et al.* [3], the female sex predominated with 70%. This situation can be explained by the fact that young men are the most mobile and users of two-person machines and more often involved in accidents of all kinds.

Road traffic accidents were the main etiology (87.8%). This is close to most of the data in the literature: Madougou S., *et al.* [7] with 85.18%, Ramavtar S., *et al.* [10] with 90% and Chiron [11] with 70%.

This situation can be explained by the proliferation of two-wheeled vehicles and the behavior of road users. The mechanism was direct in 97.6%. Dimitov N [4], also found a high number of direct shocks in the occurrence of fractures of the lower extremity of the femur, unlike Chiron P [11] who finds the direct mechanism rare. This direct mechanism can be explained by the use of two-person vehicles and the involvement of pedestrians. Complex supra and intercondylar fractures (type VI of SOFCOT) were the most frequent pathological type in our study (44%). In contrast, Madougou, *et al.* [7] and Lamraski G., *et al.* found the most frequent type I with 36% and 56.30% respectively. This is explained by the violence of the trauma with the involvement of motorbikes and car-pedestrians. In our study, associated lesions were observed in 53.6%. This high frequency of associated lesions corroborates the data from most series: Lamraski, *et al.* [3], Ramavtar S., *et al.* [10], Olivier Cornu, *et al.* [12] and Rakotomena, *et al.* [13] with 30%, 43%, 50% and 59.09% respectively. Gustilo and Anderson type II open fractures were noted in 17% of cases. These skin lesions testify to the violence of the trauma. But our open lesions remain lower than those of most authors: Lamraski G., *et al.* [3] with 19%, Madougou S [7] with 40%, Ramavtar [10] with 30% and finally Chiron P [11] with 29%. We performed surgical treatment in 100%, as in most series; Lamraski G., *et al.* [3], Pradip Patil, *et al.* [8], Ramavtar S., *et al.* [10]. This surgical treatment allows early lifting and avoiding complications of decubitus. Following the treatment, we recorded some complications. The knee stiffness rate is high 32%. This is explained by the somewhat long delay in osteosynthesis, frequency of associated lesions, the high type IV frequency of SOFCOT as well as the late rehabilitation in our series. However, our data are similar to those of Lamraski G., *et al.* [3] with 21% and Madougou S., *et al.* [7] with 35.55%; on the other hand, lower than those of Ramavtar S., *et al.* [10].

The vicious cal was noted in 10%, these data can be superimposed on those of Lamraski G., *et al.* [3] with 11%, Madougou S., *et al.* [7] with 16, 29%, Pradip Patil, *et al.* [8] with 50% and Ramavtar S., *et al.* [10] with 13%. Two cases of sepsis (4.87%) were observed. This low rate can be explained by the limited size of our sample; this rate is slightly lower compared to the series of Lamraski G., *et al.* [3] (6.5%), Madougou S., *et al.* [7] (12.59) and Ramavtar S., *et al.* [10] (7%). At the average follow-up of 30.87 months, the functional results were good in 41.5% according to SOFCOT. Our rate is below most series: Lamraski G., *et al.* [3] (85%), Madougou S., *et al.* [7] (63.3%), Pradip Patil, *et al.* [8] (88%), Jerbi, *et al.* [9] (64%) and Ramavtar S., *et al.* [10].

This is explained by the late surgical management in addition to the frequency of associated lesions and also the delay and insufficiency of physiotherapy.

Conclusion

Fractures of the distal end of the femur are frequently associated with other lesions. Surgical treatment performed early and appropriately, guarantees an excellent functional result. Sometimes despite this treatment the stiffness of the knee is inevitable especially with the complexity of the fracture.

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