

Open Leg Fractures at Gabriel Toure Chu

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Received: July 24, 2019; **Published:** August 22, 2019

Abstract

Introduction: The open fracture is probably one of the most difficult to treat. Even nowadays, consolidation failure and infection are common and the functional prognosis is poor because of residual deformities, joint stiffness and remaining length inequalities. The purpose of this internship was to evaluate the treatment of a serious fracture of the leg.

Material and Methods: This was a retrospective study in patients with severe open leg fractures who were treated in the Orthopedics-Traumatology Department of Gabriel Toure Teaching Hospital from 01-07-2014 to 31-12-2015.

Results: We have 25 men and 3 women. The average age was 35.46 years with extremes of 10 years and 61 years. AVP and ballistic accidents were the most common etiologies with 16 cases and 10 cases, respectively. The histopathological types were the types IIIA (14 cases), IIIB (4 cases) of Gustilo and Anderson and the type I of Mechelamy with 10 cases. The treatment consisted of a fixation and osteosynthesis by FESSA type external fixator (22 cases). The bone cover was obtained by directed healing with sometimes skin grafting. Septic non-union was the most common complication (11 cases). However, we got 60.71% good results.

Conclusion: They constitute a surgical emergency. Their treatment uses different methods. Directed scarring, sometimes with a patch graft, is an alternative to flap surgery. The complications remain dominated by the difficult treatment of non-union pseudarthrosis.

Keywords: *Open Fractures; Leg; Septic Pseudarthrosis*

Introduction

Open leg fractures are the most common open fractures of long bones and most often after AVP [1]. They testify to a violent trauma, responsible for lesions often pluritissulaire which can burden the function of the member [2]. They are observed in the young subject most often male [3].

High-velocity firearm open fractures are classified as Gustilo type III open fractures due to the severity of tissue damage and the high incidence of complications such as: infection, delayed union, non-union and nerve damage [4].

These open fractures constitute a medical-surgical emergency [4].

Because of the complexity of the initial treatment and the frequency of the complications, they constitute a therapeutic challenge [5].

They can be life-threatening [6].

The care is delicate, with the poverty of choice of immediate immobilization.

The prognosis has been improved by the gestures of plasty (external fixator and flap recovery) [7].

The most common complications are delayed union and septic pseudarthrosis [8-10].

Purpose of the Study

The purpose of our work was to evaluate the results of the treatment of severe open leg fractures at CHU Gabriel Toure.

Material and Methods

We collected 28 patients. This was an 18-month prospective retrospective study (from 01/07/2014 to 31/12/2015) at Gabriel Toure University Hospital.

The inclusion criteria were:

- The open leg fractures with GUSTILO type III radiological assessment and MECHELAMY types whose treatment was carried out at Gabriel Toure University Hospital,
- Patients who have been followed for at least 18 months.

We did not include:

- Patients whose care was taken elsewhere.
- Patients who have not been followed for at least 18 months.
- Patients who had a traumatic amputation.

The results were evaluated according to JOHNER and WRUHS 'Criteria for Evaluation of Final Results after Tibial Shaft Fracture (Table 1).

	Excellent (Left=Right)	Good	Fair	Poor
Nonunion, osteitis, amputation	None	None	None	Yes
Neurovascular disturbances	None	Minimal	Moderate	Severe
Deformity				
Varus/Valgus	None	2° - 5°	6° - 10°	> 10°
Anteversio/Recurvation	0° - 5°	6° - 10°	11° - 20°	> 20°
Rotation	0° - 5°	6° - 10°	11° - 20°	> 20°
Shortening	0 - 5 mm	6 - 10 mm	11 - 20 mm	> 20 mm
Mobility				
Knee	Normal	> 80%	> 75%	< 75%
AnkleSubtalar joint	Normal	> 75%	> 50%	< 50%
	> 75%	> 50%	< 50%	-
Pain	None	Occasional	Moderate	Severe
Gait	Normal	Normal	Insignificant limp	Insignificant limp
Strenuous activities	Possible	Limited	Severely limited	Impossible

Table 1: Johner and Wruhs criteria for evaluation of final results after tibial shaft fracture.

Data collection was done from emergency room records, consultations and clinical records.

The analysis was done on SPSS Statistics software.

Results

Male sex accounted for 25 cases (89, 7%) with a sex ratio of 8.33.

The 20 to 49 age groups were the most affected.

The average age of our patients was 35.46 years with extremes of 10 years and 61 years.

The etiologies were dominated by AVP (n = 16), firearm injury (n = 10) and work injury (n = 2).

According to Gustilo and Anderson, serious open fractures included 14 Type III A cases and 4 Type IIIB cases, and open fractures due to firearms were Type I Mechalamy.

In 17 cases (60.7%) the treatment was carried out between 12 AM and 24 AM (Figure 1).

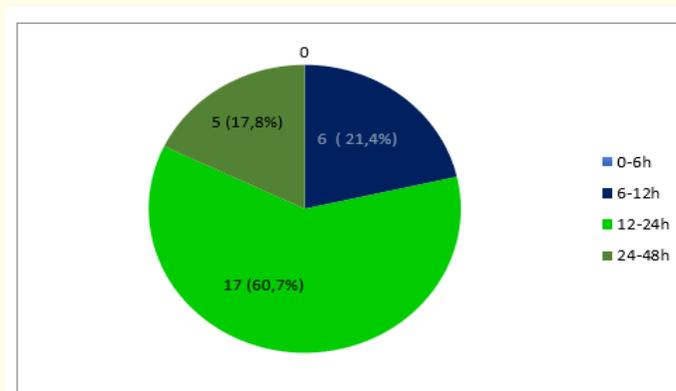


Figure 1: Support time.

According to the treatment method: After initial trimming in various timeframes, the fractures were fixed by various methods: the orthopedic treatment (cure-foot plaster) was performed in 5 cases, the external fixator in 22 cases including FESSA in 20 cases (Figure 2A); and intramedullary nail in a case having taken over with a cruropedous plaster. Skin coverage for cutaneous loss was obtained by directed scarring after iterative tracts, sometimes with pastille graft in 2 cases (Figure 2B).

The bone graft was performed in one case.

We recorded the following complications: septic pseudarthrosis in 10 cases (Figure 3D), 2 cases of malunion (Figure 2D), a case of involvement of the common fibular nerve linked to a gun wound.

At a minimum follow-up of 18 months we obtained 17 cases of good results (60.7%) and 11 cases of poor results.

Discussions

During our study we noted some shortcomings among others the sample size, the minimum follow-up period of 18 months.

Male sex predominated with a ratio of 8.33. This is consistent with most data in the literature [11]. The average age of our series was 35, 46 years old. This average age is close to those of Raphael K., *et al.* [4], Hoang P., *et al.* [13], Monka., *et al.* [14] who respectively found 40 years, 30 years, 33, 7 years. On the other hand, it is lower than those of Rymer., *et al.* [7], Fiovaranti., *et al.* [8] and Charles., *et al.* [16].



Figure 2A: Open fracture type III B of Gustilo treated with FESSA.



Figure 2B: Healing of the wound after graft transplant..



Figure 2C: Cicatrization of the sampling site at the level of the anterior surface of the contralateral thigh.



Figure 2D: Consolidation in malunion.



Figure 3A: X-ray right leg F/P.



Figure 3B: Fracture treated with Hoffmann type external fixator.



Figure 3C: Healing of the skin in progress.



Figure 3D: Septic pseudarthrosis.

Figure 3: Complex open fracture of Gustilo type III straight leg B.

These serious fractures were mainly caused by road accidents (AVP) with 16 cases and firearms (10 cases). These data are superimposable to those of the literature [15,17]. This situation is explained by the upsurge of AVPs, particularly two-wheeled vehicles, as well as the security context of our country. Our histopathological types were Gustilo and Anderson types IIIA (n = 14) and IIIB (n = 4) and Mechelany type I (n = 10). We find that Gustilo and Anderson types IIIA and IIIB as well as open firearm fractures are serious open fractures. As for Raphael K., *et al.* [5] found that severe open fractures consist largely of type IIIB of Gustilo and Anderson. For Xiao F., *et al.* [9], Court-Brown C., *et al.* [18], Dellinger E., *et al.* [19], Cross WW., *et al.* [20] according to them, serious open fractures are represented by types III A, IIIB, IIIC of Gustilo and Anderson. Firearm fractures are similar to Gustilo and Anderson type III open fractures because of the severity of tissue damage and the high incidence of complications [6]. Initial trimming was performed between 6 and 12 hours in 6 cases, between 12 and 24 hours in 17 cases. This initial management time is much higher than in the literature [21]. According to authors Dubrana., *et al.* [1], Le Nen D [2] and Raphael K., *et al.* [5], regardless of the stage of opening, an open fracture remains a surgical emergency and should ideally be managed within 6 hours after the trauma. This delay of care is explained by the non-availability of the operating room in the emergency room (common block for all surgical emergencies), delay of admission of the wounded, difficulties of acquisition of external osteosynthesis equipment in emergency. After the initial trimming, the fractures were immobilized by various means: the crural-pedulous

plaster with windows facing the wound (n = 5), the external fixator (n = 22) and the centromedullary locked nail (n = 1) who took over a cruropedous plaster ten days after the trauma (type III A of Gustilo and Anderson). For skin coverage, we opted for directed healing (n = 4) with, in 2 cases, a cutaneous skin graft. Currently, most authors opt for a plasty procedure for Gustilo and Anderson type IIIB open fractures [22,23]. This directed cicatrization was motivated because the local conditions did not lend to a plasty by muscular or fasciocutaneous flap. Although plasty is performed by most authors, directed wound healing is still relevant [24]. We recorded complications such as septic pseudarthrosis (n = 10), 35.71%, malunion (n = 2), and common fibular nerve injury (n = 1). Moyikoua., *et al.* [17] and Bhandari., *et al.* [23] find respectively 11 cases/78 (for type III), 24% (type IIIB). Our complication rate, despite our small sample is greater than those of these authors' series, reinforcing the hypothesis of Le Nen [2]: an open fracture of the leg should be considered a programmed nonunion. This could be explained by the initial management time and repetitive debridement. Our malunion rate is lower than that of Monka., *et al.* [14], Mouyikoua., *et al.* [17], Giannoudis., *et al.* [22], Bhandari., *et al.* [23]. This difference can be explained by the size of our sample and the type IIIB lesions only in Giannoudis [22] and Bhandari [23]. Our functional results, at 18 months minimum, were 17 cases of good results (60.7%) and 11 cases (39.3%) of poor results. Our results are similar to those of Monka., *et al.* [14].

Conclusion

Serious open fractures of the leg are the preserve of the young and male subjects. The most common etiologies are motor vehicle accidents (PVA) and firearm trauma. These serious open fractures are a medical and surgical emergency. Their treatment uses different methods. Directed scarring, sometimes with a patch graft, is an alternative to flap surgery. The complications remain dominated by the difficult treatment of non-union pseudarthrosis.

Conflicts of Interest

The authors do not declare any conflicts of interest.

Contribution of Authors

All authors have contributed to this study since conception, reading and have all approved the final version of this work.

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Volume 10 Issue 9 September 2019

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