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Simultaneous, Asymmetrical, Comminuted and Bilateral Ballistic Fractures by Multiple Gunshot Wounds and a Review of Its Literature: A Case Report in Chad

Siniki Fandebnet[1*], Ngamai Kotyade[1], Adamou Abbasi[2], Dingamnodji Magloire[1], Mahamat Bahar Abdelsalam[3], Yusra Aboulbachar[4], Assi Constant[5], Andre Daniel Sane[6]

[1]Department of Orthopaedics and Traumatology, Renaissance University Hospital, N'Djamena, Chad
[2]Department of Anesthesia, Renaissance University Hospital, N'Djamena, Chad
[3]Department of Accident and Emergency, Renaissance University Hospital, N'Djamena, Chad
[4]Department of Medicine, Renaissance University Hospital, N'Djamena, Chad
[5]Department of Cardiology, Renaissance University Hospital, N'Djamena, Chad
[6]Department of Surgery, Cheik Anta Diop University, Dakar, Senegal
Email: *siniki_fandebnet@yahoo.fr

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Abstract

Although open leg fractures are very common in orthopedics and traumatology, bilateral open leg fractures are extremely rare and are usually associated with an increased risk of complications. We report a case of a simultaneous, asymmetrical, comminuted and bilateral open fracture of the tibia and fibula by a firearm that occurred during an escape attempt in a 29-year-old prisoner. The pre-operative radiological assessment found an open fracture of both legs of the ballistic type; multiple traumatic gunshot wounds with a narrow entry hole and a wide exit hole. Early surgical intervention of intravenous antibiotics, tetanus prophylaxis and open fracture irrigation and debridement was performed within the 6 hour rule. The treatment consisted of a posterior splint followed by trimming andosteosynthesis using a FESSA external fixator from the military health service. A second operation was not needed. Evolution was favorable with ambulation starting from the 45th day. Simultaneous and bilateral tibia-fibula fractures by a firearm are exceptional, therefore, the treatment was surgical with the pre-operative and post-operative protocols well managed.

Keywords

Simultaneous Bilateral Tibia-Fibula Fractures, Gunshot Wounds, External

Fixator, Ballistic Fractures

1. Introduction

Bilateral stress fractures of the legs have been reported in the literature [1] [2]. These can be simultaneous, symmetrical, asymmetrical, open or closed [3] [4] [5] [6] [7]. These are quite rare and are usually observed in young adults. Open bilateral leg fractures are also rare in road accidents [2]. The trauma can be of ballistic origin, particularly in war situations [8]. But to our knowledge, simultaneous, asymmetrical, comminuted and bilateral fractures of the tibia and fibula bones of ballistic origin are rare in civilian orthopedic practice. We report a case of a 29-year-old patient with simultaneous, asymmetrical, comminuted and bilateral tibia-fibula fractures that suffered multiple gunshot trauma during an attempted prison break.

2. Observation

A 29-year-old patient, shot during an escape attempt from prison, was hospitalized for multiple ballistic trauma. On clinical admission, we noted punctiform wounds corresponding to the entrance wounds of the bullets and to the fasciomusculocutaneous deterioration (GustiloIIIB classification) at the exit wounds of the bullets (**Figure 1**). No associated vascular or neurological disorders were noted. In the preoperative X-ray, on the right (**Figure 2** D), a comminuted open fracture of the middle 1/3 of the tibia and fibula and on the left (**Figure 2** G), there is a comminuted open fracture of the proximal 1/3 of the tibia and fibula. The patient was immediately transported to the hospital. After irrigation and debridement of the wounds, osteosynthesis with a FESSA external fixator from the army health service was placed (**Figure 3**). Direct admission to the operating room and surgery took place within 6 hours post trauma. The postoperative wound care was performed daily, followed by physiotherapy starting from the

Figure 1. Punctiform wounds corresponding to the entrance wounds of the bullets and to the fasciomusculocutaneous deterioration (GustiloIIIB) at the exit wounds of the bulle.

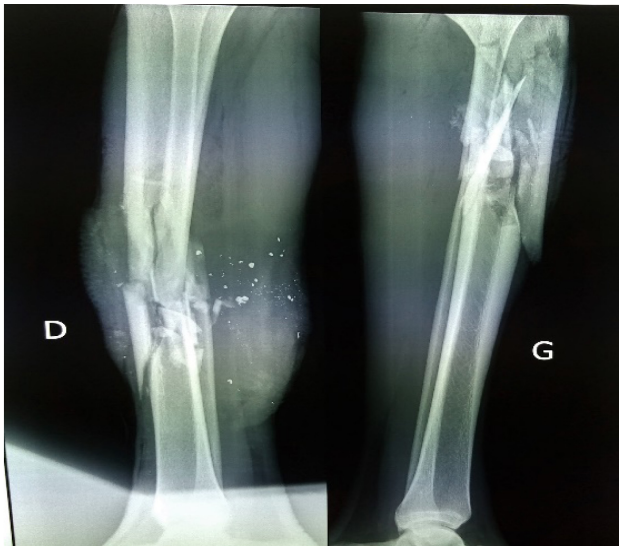

Figure 2. A pre-operative X-Ray image of a simultaneous, asymmetrical, comminuted and bilateral ballistic fractures of the tibia and fibula. D—right and G—left.

Figure 3. A post-operative X-Ray image of a FESSA external fixator in the tibia and fibula bones.

3rd day by passive wheelchair mobilization and, passive and active mobilization of the ankle and knee joints. The patient was on an injectable anticoagulant; Lovenox (Enoxaparin Sodium), which was given at a prophylactic dose for 30 days. Triple antibiotic therapy was initiated based on the combination of Amoxicillin + Clavulanic acid, Gentamycin and Metronidazole for 4 weeks. On the 45th day, ambulation was authorized with partial support of the two lower limbs, marked more on the right. The patient was not brought back for a follow-up consultation.

3. Discussion

The particularity of our clinical case was the simultaneous, asymmetrical, com-

minuted and bilateral ballistic fractures (middle 1/3 on the right and proximal 1/3 on the left) of the tibia-fibula bones of both legs. To our knowledge, this is the first clinical case of this type reported of an adult patient in Chad. However, in Africa, two cases of bilateral fractures and simultaneous fractures of the tibia have been published in Tunisia [9] and in Côte d'Ivoire [2], respectively. In the first case, it was an asymmetrical diaphyseal lesion and in the second case it was a symmetrical proximal metaphyseal lesion [2] [9], which were both of non-ballistic origin. The observed ballistic mechanism of this type of lesion, outside of an armed conflict, was exceptional in current practice [10] [11] [12]. The comminuted nature of the lesions reflected the bullet impact effect. The usual mechanisms found in bilateral leg fractures are physical stress, trauma or pathological bone fractures [2] [13] [14]. This treatment, in accordance with the literature, in the event of a comminuted open fracture, consists of debridement of the wound followed by placement of an external fixator [8] [15] [16] [17] [18]; all within the time duration of less than 6 hours [8]. The evolution was favorable with ambulation starting from the 45th day. This was not the case with the patient of Sie Essoh *et al*. who had died in a context of polytraumatic injuries 3 days after being admitted to the hospital [2]. Simultaneous bilateral fractures of the tibia and the fibula are extremely rare but have a significantly higher risk of death and are usually associated with an increased risk of complications. These fractures are usually associated with polytraumatic injuries or high impact trauma resulting in shock. Closed diaphyseal fractures are best managed by intramedullary nailing, however, management becomes difficult if there are open fractures and late arrivals.

4. Conclusion

Cases of simultaneous, asymmetrical, comminuted, bilateral, ballistic fractures are rare in everyday civilian orthopedic practice.

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Author Contributions

S.F., K.N. and A.M. were the performing surgeons, developed the project, reviewed the literature, collected and analyzed the data, and drafted the manuscript. A.C. and S.A. collected and analyzed the data and interpreted the results. All authors contributed to the writing and revision of the manuscript, reviewed the results and approved the final version of the manuscript.

Informed Consent

An informed consent was obtained from the patient for the publication of this report and any other accompanying images.

Conflicts of Interest

The authors have nothing to declare.

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