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Management of Acute Traumatic Wounds in an Emergency Structure in a Developing Country, Case of University Clinics of Kinshasa in the Democratic Republic of Congo

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Abstract

The objective of this descriptive study is to present the management of acute traumatic wounds in an emergency structure in a developing country, the case of the Democratic Republic of Congo. Sampling was exhaustive and covered a total of 232 patients, each presenting a single wound and meeting our inclusion criteria. The age group of 20 to 29 years was the most represented, with a proportion of 27.2%. A delay of <6 hours between the trauma and arrival at the hospital was present in 134 patients (57.8%). The lesions observed were contused wounds in 180 patients (77.6%). The wounds were localized to the lower limbs in 139 patients (59.9%), to the trunk in 35 patients (15.1%), to the head and neck for 34 patients (14.2%), and to the upper limbs in 24 patients (10.3%). Surgical trimming, whether or not associated with wound suturing (84%), was the most performed surgical procedure. Monoantibiotic therapy and tetanus seroprophylaxis supervised the surgery. Only one patient out of the 134 (0.4%) who consulted before the 6 experienced an infection compared to 5 out of 69 patients (2.2%) who consulted between 12 and 24 hours. The infection rate remains very low (<3%), and the lesions generally heal by first intention.

Keywords

Acute Traumatic Wounds, Emergency Structure, Type of Lesions, Management, Developing Countries

1. Introduction

Acute traumatic wounds were the subject of recommendations by the French Society of Emergency Medicine (SFMU) in 2017 [1]. These recommendations have brought new elements of management that are still poorly applied and understood by health professionals.

The goal of wound care is to promote healing and limit the aesthetic consequences [2].

The objective of this work is to categorize the types of lesions and to describe their management. To our knowledge, there is no published study on the emergency management of acute traumatic wounds in the Democratic Republic of Congo. Thus, this study proposes to fill this gap and make an inventory with a view to improving its management. It is therefore a preliminary study that can be extended to the whole country.

Background

The management of acute wounds is an emergency. Wounds represent 13% of emergency admissions, placing them among the top reasons for the consultation. The aim of this study was to provide an overview of the management of acute traumatic wounds at the University Clinics of Kinshasa in the 24 hours between the trauma and arrival at the hospital.

We conducted a descriptive documentary study in the Integrated Emergency Department of the University Clinics of Kinshasa from January 2022 to January 2023.

In relation to the evolution of acute wounds in the Emergency Departments of the University Clinics of Kinshasa, there are, although encouragingly, 2.2% less good compared to the data in the literature. For example, a study carried out by Pierre Lafouasse-Messmer found that 2.8% of the infection rate in his study was infected [3].

2. Patients and Methods

This is a descriptive documentary study carried out at the Emergency Department of the University Clinics of Kinshasa in the Democratic Republic of Congo. It covers a period of 12 months, from January 2022 to January 2023. It is a single-center study within the framework of the Integrated Emergency Department of the CUK. The sampling was exhaustive and covered a total of 232 patients, each presenting a single lesion.

To be included in this study, the files of identified victims should include the following elements: Any patient consulted urgently for a breach of the skin barrier by an injuring agent with a break in the skin; Having consulted before the 24 hours of the trauma; Having presented a single lesion (single acute traumatic wound).

Excluded from this study were burns, wounds associated with fractures, joint wounds, and wounds associated with damage to noble structures or visceral lesions.

3. Results

The distribution by age group of 232 patients received in emergency for acute traumatic wounds is shown in Table 1 and Figure 1.

Table 1. Distribution of patients by age group.

Age	N	%
<10	13	5.6
10 - 19	32	13.8
20 - 29	63	27.2
30 - 39	56	24.1
40 - 49	31	13.4
>50	37	15.9
Total	232	100

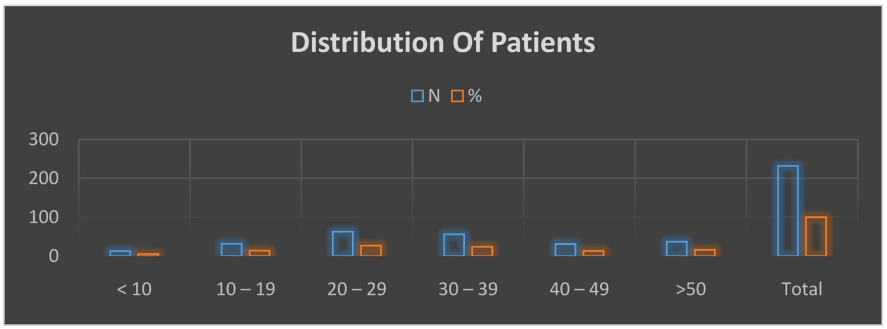

Figure 1. Patient's distribution chart.

The age group of 20 to 29 years was the most represented with a proportion of 27.2%.

The time between the onset of the trauma and arrival at the hospital is <6 h for 136 patients (58.6%), between 6 h to 12 h for 20 patients (8.6%) and between 12 h to 24 h for 76 patients (32.8%).

The lesions observed were contused wounds in 180 patients (77.6%), wounds with loss of skin substance in 33 patients (14.2%) and linear or punctiform wounds in 19 patients (8.2%).

The wounds were localized to the lower limbs in 139 patients (59.9%), to the trunk in 35 patients (15.1%), to the head and neck in 34 patients (14.2%), and to the upper limbs in 24 patients (10.3%).

For the measurements of the wounds, the wounds had a diameter of 3 cm at most in 42.2% of patients, between 4 - 6 cm in 29.7% of patients, between 7 - 10 cm in 10.8% of patients, and >11 cm in 17.2% of patients. As for the depth, they were 1 cm deep (25.4% of patients), 2 cm (46.6% of patients), 3 cm (19.8% of patients) and >4 cm (8.2% of patients).

From the therapeutic point of view, the majority 196 patients (84.5%) received Paracetamol as an analgesic; 226 patients (97.4%) received anti-tetanus serum therapy. Antibiotic therapy was essentially mono antibiotic therapy (combination

amoxicillin—clavulanic acid) in 165 patients (71.1%), dual antibiotic therapy in 50 patients (21.6%), no antibiotic therapy in 15 patients and tri-antibiotic therapy in 2 patients. Povidone Iodine was the most used antiseptic in 229 patients (98.7%). From the point of view of surgical treatment of the lesions, we present in Table 2 and show in Figure 2 the types of treatment instituted.

Table 2. Type of treatment instituted.

Surgical treatment	N	%
1st intention (direct suture)	179	84
2nd intention (directed healing)	7	3.3
3rd intention (secondary suture)	27	12.7
Total	213	100

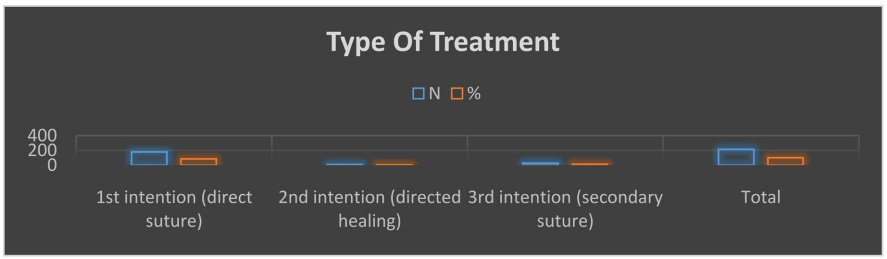

Figure 2. Treatment type chart.

The most common treatment in our series was direct suture (84%).

As for the 179 patients who benefited from a direct suture, 94.8% progressed well with healing by first intention. In Table 3, we present the relationship between treatment time versus evolution, as shown in Figure 3. Table 4 shows the evolution according to the type of treatment, as represented in Figure 4.

Table 3. Relationship between treatment time and progression.

	Evolution		
Delay	Healing 1st intention	Infection	Lack of healing
<6 h	134 (57.8 %)	1 (0.4 %)	1 (0.4 %)
6 h - 12 h	17 (7.3 %)	3 (1.3 %)	0 (0.0 %)
12 h - 24 h	69 (29.7 %)	5 (2.2 %)	2 (0.9 %)

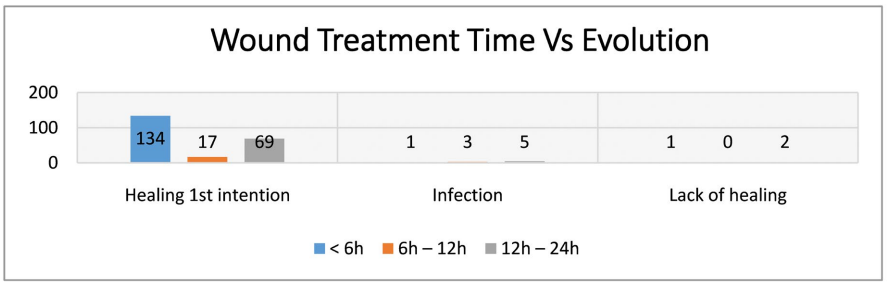

Figure 3. Wound treatment time versus evolution.

This table shows that:

- 57.8%, or 134 wounds treated before 6 hours between the trauma and arrival at the hospital, healed by first intention, with an infection rate of 0.4%, or 01 wound, with a healing failure of 0.4% or 01 wound;
- 7.3%, or 17 wounds treated before 6 hours between the trauma and arrival at the hospital, healed by first intention, with an infection rate of 1.3%, or 03 wounds, with zero healing failure;
- 29.7%, or 69 wounds treated before 6 hours between the trauma and arrival at the hospital, healed by first intention, with an infection rate of 2.2%, or 05 wounds, with a healing failure of 0.9% or 02 wounds.

In order to prevent infections and promote good healing, the management of acute wounds within 24 hours after the injury remains crucial.

Table 4. Evolution according to the type of treatment.

Treatment initiated	Evolution		
	Healing 1st intention	Infection	Lack of healing
Direct suture	170 (79.8%)	6 (2.8%)	3 (1.4%)
Directed healing	0 (0.0%)	4 (1.9%)	2 (0.9%)
Secondary suture	0 (0.0%)	3 (1.4%)	1 (0.5%)

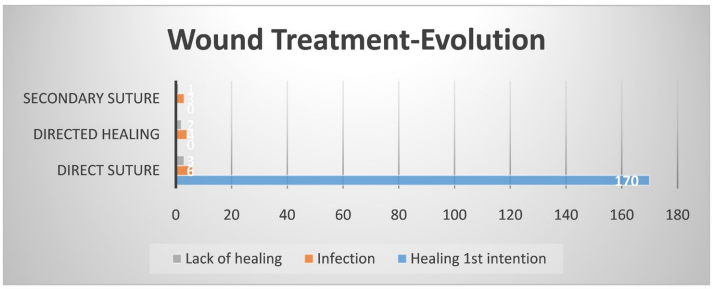

Figure 4. Treatment types versus evolution.

This table shows that regardless of the type of treatment instituted, the proportion of infections remains low, ranging from 1% to 3%.

- 79.8% or 170 wounds healed on the first intention, with an infection rate of 2.8% or 06 wounds, and with a healing failure of 1.4% or 03 wounds;
- 0.0% healed on the first intention, with an infection rate of 1.9% or 04 wounds, and with a healing failure of 0.9% or 02 wounds;
- 0.0% healed on the first intention, with an infection rate of 1.4% or 03 wounds, and with a healing failure of 0.5% or 01 wounds.

Table 5. Types of wounds.

Types of wounds	N	%
Wounds with PDS	33	14.2
Contusion wounds	180	77.6
Punctiform wounds	19	8.2
Total	232	100

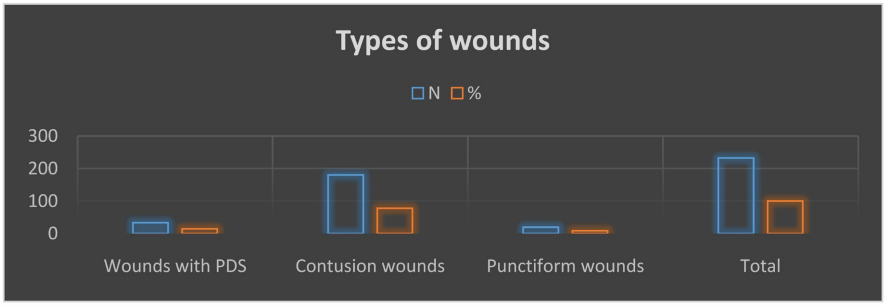

Figure 5. Wound's types chart.

Seventy-seven point six percent (77.6%) of cases were contused wounds.

Table 6. Location of wounds.

Location	N	%
Head and Neck	34	14.2
Trunk	35	15.1
Lower Limbs	139	59.9
Upper Members	24	10.3
Total	232	100

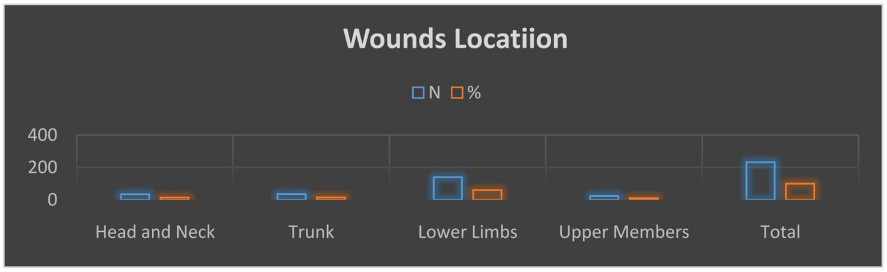

Figure 6. Wound's location chart.

The wounds were most often located on the lower limbs (59.9%).

4. Discussion

The age of patients consulting for wounds in the emergency department is generally young. This is partly explained by the fact that the general population in the Democratic Republic of Congo, as well as in Kinshasa (place of study) is young. The young population in this social stratum is the most exposed to accidents [4]. Concerning traumatic lesions of the soft tissues received in emergency structures, the young population is the most observed [5]. In our study, the most affected age group was 20 to 29 years old, or 27.2% of cases, compared to Aoua Diarra [6], who found 37.5% for an age group of 15 to 29 years old and Abdharamane, whose study reported 61.9% for the age group of 16 to 30 years.

In our study, contused wounds were the most represented, with 77.6% of cases demonstrated in **Table 5** and **Figure 5**, compared to other African studies, and

more particularly to that conducted in the Republic of Mali by Touré A with 57.1% of cases [7]. Quinn JV *et al*. also report contused lesions in acute traumatic wounds [8]. Contused wounds vary from a simple superficial skin lesion to avulsion disintegration of tissue.

The lower limbs were mainly represented by 59.9%, as shown in **Table 6** and **Figure 6**. In the series of Ehlissou-Kolima AK *et al.* [9]; of the 127 lesions identified in the 60 injured, 109 (85.8%) were on the limbs. The lesions were located in the lower limbs in 51.9% of cases and in the upper limbs in 33.8%. Twenty-nine (48.3%) patients presented with a single lesion, 17 (28.3%) patients presented with two lesions and 14 (23.4%) patients presented with three or more lesions. In the lower limbs, lesions predominated in the leg (16.5%) and the thigh (11.1%), while in the upper limbs, the shoulder (11.1%) was the seat most affected [9]. This could be explained by the fact that the limbs are the most exposed parts of the body.

Prophylactic antibiotic therapy was adopted in the majority of cases. Single antibiotic therapy represented 71.1% of cases and was administered orally for most cases. Our approach is no different from that reported by Bowler PG *et al.* [10].

In effect, exposure of subcutaneous tissue due to a wound provides a warm, moist environment that leads to microbial colonization and proliferation. Hence, the risk of infection of an acute wound is taken care of in the emergency room. This has been demonstrated by the study by Stamou SC *et al.* [11].

The time to arrive at the emergency room after the trauma was less than 6 hours, *i.e.*, 58.6% of the study population. On the other hand, Magassa [12] found in his study on traumatic wounds of the limbs 82.5% of Acute Wounds consulted within a period of less than 6 hours between the trauma and treatment.

In case of infection, bacteria multiply, healing is interrupted and wound tissue is damaged. The occurrence of a malfunction during the healing process that may be responsible for a chronic wound, or pathological healing.

Povidone-iodine (betadine) was used the most, at 98.7%. The use of povidone-iodine in emergency trauma wound care has been widely reported by Khan MN *et al.* [13] and Ghafouri HB [14].

Almost all of the patients 97.4% (226/232) benefited from anti-tetanus serum therapy. The interest of anti-tetanus serum therapy in our environment no longer needs to be demonstrated [5] [15].

We performed surgical debridement with suture of the wound in 53.9% of our cases. The evolution was favorable with suture by healing by the first intention in 94.8%.

This table shows that regardless of the type of treatment instituted, the proportion of infections remains low <3% in our series.

Contusion wounds were the most represented at 77.6%, compared to Abdharamane Touré, who found 57.1% [7], and Magassa, at 42.1% [12].

Contusion wounds vary from simple superficial skin fraying to tissue damage due to avulsion. The lower limbs were mainly represented with 59.9%. Our results were higher than those of Magassa who found 46.7% [12]. This could be explained

by the fact that the limbs are the most exposed parties.

5. Conclusion

It appears from this study on acute traumatic wounds admitted in an emergency structure of a developing country, the case of the Democratic Republic of Congo, that the patients concerned are young. The wounds are contused and are mostly localized to the limbs. Surgical trimming, whether or not associated with wound closure, remains the most common surgical procedure. Monoantibiotic therapy and tetanus seroprophylaxis supervise the surgical procedure. Lesions generally heal by the first intention. The infection rate remains low, and still very low for a delay <6 hours between the onset of the trauma and arrival at the hospital.

Ethics Statement

Three fundamental principles of research ethics were respected in the present study: respect for the person, beneficence and justice.

Conflicts of Interest

The authors declare that there is no conflict of interest.

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