

Major Limb Amputations: Etiological and Clinical Profile in a Hospital in Sub-Saharan Africa

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Abstract

Introduction: During the 19th and 20th centuries, the Wars were the cause of many amputations among military and civilians. Despite the absence of armed conflict in our country, we notice a high frequency of major amputations in our activity. **Objective:** The aim of this work was to study the causes of major amputations observed in our practice in order to develop preventive measures. **Materials and Method:** This was a descriptive retrospective study over a 6-year period, from January 1, 2008 to December 31, 2014. The following parameters were studied: epidemiological aspects (age according to WHO age groups and gender of patients), type of amputation, level of amputation and causes. **Results:** Two hundred and fifty-two patients were included. The distribution of amputations by cause and age group showed two distinct entities: The forms of the young subject where there was a predominance of tumour and traumatic causes; and the forms of the elderly person caused by vascular infections and conditions. Infections were the main cause of amputation in both sexes. **Conclusion:** The causes of major limb amputations vary according to age and limb: tumor and trauma in young people and for the upper limb, infectious and vascular in the elderly and for the lower limb.

Keywords

Diabetes, Disarticulation, Infections, Limb, Major Amputation, Tumors

1. Introduction

Major limb amputations are defined as any level of amputation above the hand and foot [1].

Performing a limb amputation is one of the least attractive gestures for a surgeon. This is because of psychological effects and the handicap it causes in a patient who has to adapt to a new way of life.

Management begins with communication with the patient and their family. It then continues with all aspects related to amputation surgery, ending with the principles of prosthetic limb fitting.

Limb amputation seems to be, together with craniotomy, the oldest surgical practice. In fact, traces of upper limb amputations have been found on skeletons dating from the prehistoric Mesolithic period, *i.e.* before the 9th millennium BC.

The main causes of these amputations were, of course, the consequences of hunting injuries in the face of wild animals, but also the sequelae of battles between rival clans and tribes. These were done with axes and other carved flints. One can easily imagine the injuries that these could cause.

During the 19th and 20th centuries, the American civil war and the two World Wars were the cause of many amputations among military and civilians.

Nowadays, the causes of these major amputations are rarely studied in the literature [2]. Despite the absence of armed conflict in our country, we notice a high frequency of major amputations in our activity.

The objective of this work was to study the causes of major amputations observed in our practice in order to develop preventive measures.

2. Materials and Method

We conducted a descriptive retrospective study in a teaching hospital over a period of 6 years, from January 1st 2008 to December 31st 2014. We used the admission registers of all the hospital's departments. We also consulted the registers of the operating theatre and the staff of the Orthopaedic-Traumatology department (the only department that performs amputations). Thus, we were able to include all patients who had a major amputation (amputation site above the foot or hand) regardless of age or sex. We then consulted the patients' files.

We carried out a data collection sheet which allowed us to study the following parameters: the demographic aspects (age: according to WHO age groups and the sex of the patients), the type of amputation, the level of amputation and the causes.

3. Results

A total of two hundred and fifty-two patients were selected. The mean age was 50.9 ± 23 years. Our population was divided into seven (7) age groups according to the WHO (**Figure 1**).

The frequency peaks of amputations were observed in older adults (65 cases) and in senior adults (63 cases). For the other age groups, 47 major amputations were performed in young adults, 35 in the elderly, 11 in older children, 10 in adolescents and five (5) in the very old.

Our series included 159 men and 93 women. The sex ratio was 1.7.

This was limb amputation proper in 94.1% (n = 239). Disarticulations represented 5.5%. We observed one case of bilateral limb amputation (Figure 2).

The lower limb was the most amputated site with 236 cases including 181 amputations in the leg, 47 at the thigh and eight (8) hip disarticulations (Table 1).

Infections were the main cause with 53.2%, followed by vascular diseases with 17.9% (Figure 3). Trauma and tumors accounted for 11.9% and 11.5% respectively.

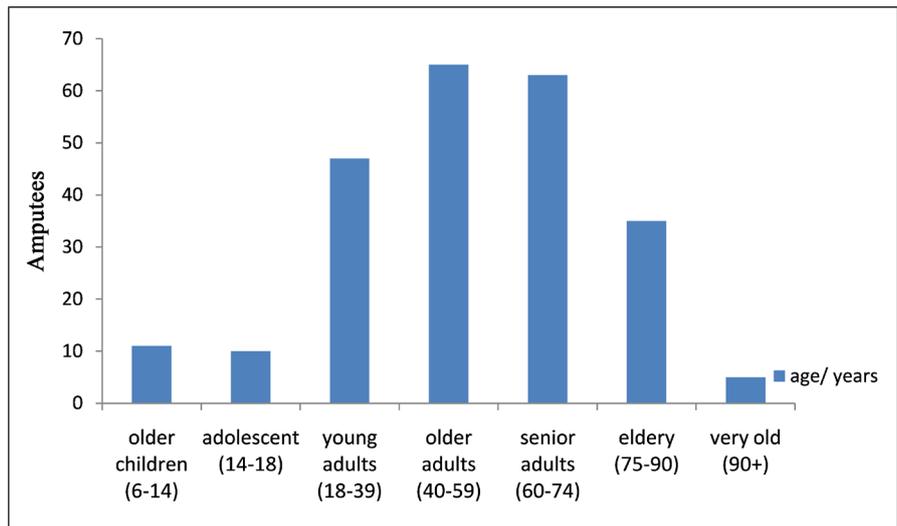


Figure 1. Distribution of amputees by WHO age groups.



Figure 2. Bilateral amputation of the Leg.

Table 1. Distribution of patients according to the level of amputation.

Amputation zone		Number (N = 252)	Percentage
Lower limb	Leg	180	71.43
	Thigh	47	18.65
	Hip	08	3.17
Upper limb	Forearm	03	1.19
	Upper arm	08	3.17
	Shoulder	06	2.38

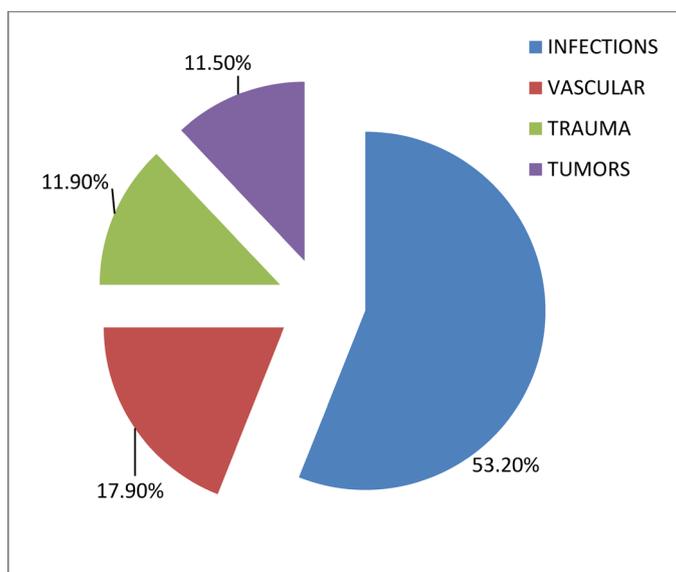


Figure 3. Distribution of amputees according to causes.

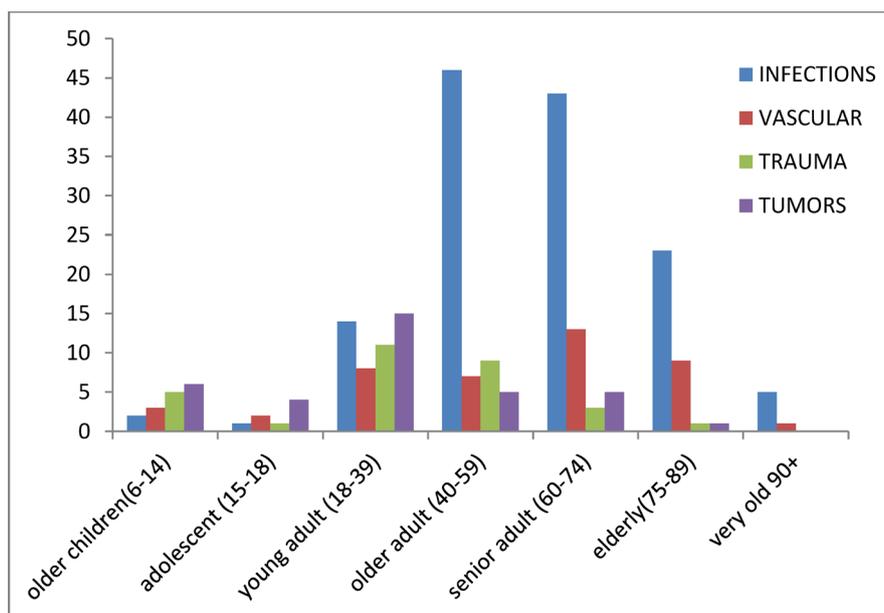


Figure 4. Distribution of amputees according to cause and age group.

The distribution of amputations by cause and by age group showed two distinct entities (**Figure 4**):

- the forms of the young subject (older children, adolescents and young adults) where tumour (n = 25) and traumatic (n = 17) causes were predominant. There were 17 cases of infectious causes and 13 cases of tumoral lesions;
- and the forms of the elderly (older adults, geriatrics, the elderly and the very old) caused mainly by infections (n = 117) and vascular diseases (n = 30). Traumatic (n = 13) and tumour causes (n = 11) were less frequent.

Infections were the main cause of amputation in both sexes with 86 cases in men and 52 cases in women (**Figure 5**). The second cause was tumoral in men

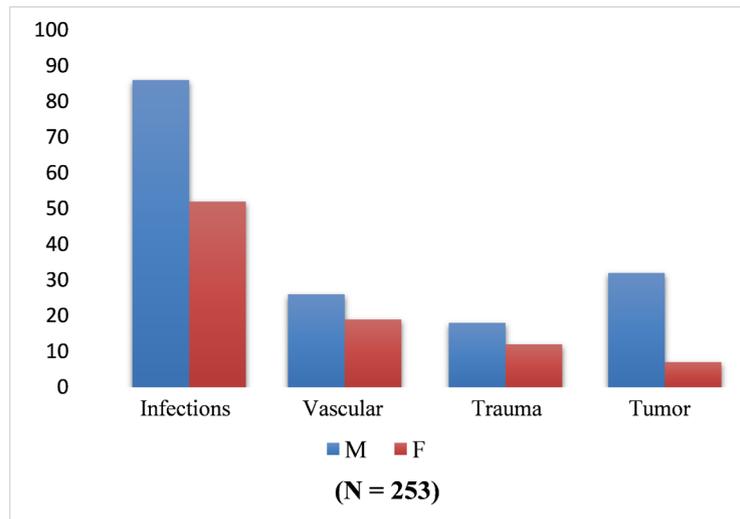


Figure 5. Distribution of causes of amputation according to sex.

Table 2. Distribution of cases according to amputated limb segment.

Limb segment		Infections	Vascular diseases	Trauma	Tumoral
Lower limb	Leg	120	34	18	09
	Thigh	15	08	05	19
	Hip	01	00	00	07
Upper Limb	Fore arm	00	00	02	01
	Upper arm	00	00	05	03
	Shoulder	00	01	01	04

(n = 32) and vascular in women (n = 19). The third cause was vascular in men (n = 26) and traumatic in women (12). Trauma was the least common cause in men (n = 18). Tumors were the fourth most common cause in women (n = 7).

There was a higher frequency of infectious (n = 136) and vascular (n = 42) causes in the lower limbs (Table 2). Tumors and trauma accounted for 28 and 23 cases respectively.

In the upper limbs, traumatic (n = 6) and tumoral (n = 7) causes predominated. Vascular causes represented one (1) case. There were no infectious causes.

4. Discussion

• Epidemiology

The average age in our series was 50.92 ± 22.97 years and the predominance of the male sex (63.4%) is close to those reported in the work of André JM and Paysant J [3].

A lower average age has been described by Souna *et al.* [4] and by Onuminya *et al.* [5] with 37.7 years and 30 years respectively.

This difference is explained by the predominance of the elderly in our study. In fact, 66.7% of our patients were >40 years of age.

- **Causes**

Infections, the main cause in our study (53.2%) occurred almost entirely in diabetic patients.

Glaser JD *et al.* [6] and Lombardo FL *et al.* [7] reported 77% and 58.6% of diabetes in their work, respectively. The particular susceptibility of diabetics to infections could be related to hyperglycemia, capable of altering the functions of leukocytes (phagocytosis, adhesion, bactericidal, chemotaxis) [8]. Neuropathy and arteriopathy play an aggravating role. Neuropathy leads to indolence which can delay diagnosis in the event of infection [9] [10]. Arterial disease promotes delayed healing and anaerobic infections through hypoxia [11].

In contrast, in the series by Souna BS *et al.* [4] traumatic causes predominated. This is due to the higher frequency of young subjects in his study.

Vascular diseases, the second cause in our series (17.9%), represent the first cause of major amputation in the northern countries with 85.8% due to the aging of their population [1].

We must emphasize the particularity of tumor causes in our practice: second cause in men. These results could be explained by the fact that men are generally more exposed to carcinogenic risk factors due to their activities (tobacco, alcohol, asbestos, mine workers, etc.).

The overall prevalence of tumors in our study (11.5%) is similar to that reported in the literature: Souna *et al.* [4], Ba [12] and Umaru *et al.* [13] reported prevalence of 11.49%, 12.1% and 14.6% respectively.

These tumors mainly affect children. The indications for amputation at this age are due to a delay in consultation in our countries. In fact, these patients first seek traditional treatment and are often secondarily received at an advanced stage of their disease. This delay in consultation is not only due to beliefs and traditions in our country but also to the high cost of hospital charges.

The limits of our work lie first and foremost, as in any retrospective study, in the selection of patients. Because we could not include all patients who had a major amputation. Secondly, it is a monocentric study. And finally, we did not carry out any statistical analysis that could have given more value to our results.

5. Conclusion

Major limb amputations are not uncommon in our practice. Infectious and vascular causes are predominant. The causes vary according to the age and the limb concerned: tumors and traumatic in young people and for the upper limb, infectious and vascular in the elderly and for the lower limb. Tumors are the second most common cause in men. Prevention must be encouraged because there are possibilities of acting on infectious, vascular and traumatic causes.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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