

Necrotizing fasciitis in sub-Saharan Africa: A study of 224 cases

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ABSTRACT

Background: The aim of this study was to describe the epidemiological, clinical aspects, and outcome of necrotizing fasciitis (NF) in sub-Saharan Africa. **Patients and Method:** We conducted a descriptive study in hospital dermatology departments in five sub-Saharan African countries over a two-year period (April 2017 to July 2019). Patients over fifteen years of age received for NF were included. **Results:** During the study period, 224 patients with NF were included. Their mean age was 51.9 ± 18.3 years and their sex ratio (M/F) was 1.3. NF was present in the lower limbs in 88.8% (n = 199) of the patients. The main local signs of NF were cutaneous necrosis (83.9%; n = 188) and spontaneous intense pain (75.9%; n = 170). NSAIDs (32.6%; n = 73), obesity (16.5%; n = 65), the use of decoctions/poultices (21.4%; n = 48), diabetes (16.5%; n = 37), nicotine addiction (11.6%; n = 26), alcoholism (8%; n = 18), voluntary cosmetic depigmentation (6.7%; n = 15), and HIV infection (3.8%; n = 8) were the main comorbidities. We recorded 14.7% (n = 33) of deaths. **Conclusion:** This study shows that NF of the lower extremities is the most often observed clinical form in sub-Saharan Africa. Some factors or comorbidities (diabetes, obesity, alcoholism, nicotine addiction) seem to be relatively frequent.

Key words: Necrotizing fasciitis; Sub-Saharan Africa

INTRODUCTION

Necrotizing fasciitis (NF) is a fast-progressing infectious process that evolves with superficial and even deep muscle fascia necrosis of the subcutaneous tissue, dermis, and epidermis, and may lead to death in up to 40% of cases [1,2]. The annual incidence of NF ranges from 0.3 to 15.5 cases per 100,000 of the worldwide population [3-6]. NF is a surgical diagnosis characterized by friability of the superficial fascia, dishwater-gray exudate, and a notable absence of pus. This and other necrotizing soft-tissue infections

have multiple causes, risk factors, anatomical locations, and pathogenic mechanisms, yet all such infections result in widespread tissue destruction, which may extend from the epidermis to the deep musculature [7]. In sub-Saharan Africa, some studies have described the epidemio-clinical profile of NF [8-10], yet none was multicenter. It appeared opportune to us to conduct this multicenter study in order to extrapolate the results at a sub-Saharan Africa scale. The purpose of the study was to describe the epidemio-clinical profile and outcome of NF in sub-Saharan Africa.

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METHODS

It was a multicenter, descriptive, transversal study conducted over a two-year period (April 2017 to June 2019) in hospitals of some dermatology services in five African countries in the south of Sahara (Togo, Burkina Faso, Mali, Senegal, Guinea-Conakry).

Inclusion Criteria

The study included patients over fifteen years of age received in the dermatology service for NF. In each center, the diagnosis of NF was based on criteria essentially clinical and validated by a senior dermatologist and/or a surgical minute after scouring. Clinical symptoms were local (big legs with a dark tint integument, bubbles or hemorrhagic blisters, foul leakages, necrotic wounds, hypoesthesia/anesthesia or, on the contrary, intense pains, induration hitting the spot, cold legs, and sometimes perceptions of snowy crackles) associated with serious general symptoms (high fever or hyperthermia, agitation, obnubilation, disorientation, and even shock symptoms). The final diagnosis of NF in all cases was established by explorative/therapeutic surgery [7].

Collected Data

The survey was conducted thanks to a preset questionnaire validated during a pre-survey in a center participating in the study. The questionnaire used for the cases was on behavioral habits (alcoholism, smoking, the use of cosmetic depigmentation products with specific questions helping to determine whether the cosmetic products used did or did not have a depigmentation effect while taking into account the reputation of the “whitening aspect” of the products), the search for a case history (diabetes, arterial hypertension, HIV infection, heart disease), and the notion of NSAIDs at the beginning of symptomatology. Each case was subject to a clinical examination and paraclinical examinations in the search of variables as follows:

- Locally, the existence of an entrance door (neglected traumatic wound, intertrigo inter-toe, excoriated dermatosis, leg ulcers), local symptoms (pain, foul smell, indurated edema, bubbles, purpura, skin necrosis, hypoesthesia, the presence of snowy crackles).
- The existence of symptoms of voluntary cosmetic depigmentation (skin atrophy, stretch marks, leukomelanoderma, etc.).

- Generally, the search for obesity (weight, height, and the calculation of the body mass index (BMI); obesity being defined as a BMI above or equal to 30 kg/m²), arterial pressure measurement, the search for septic shock symptoms (agitation, prostration, hypotension, hypothermia, or disorientation), the measurement of blood glucose (considered hyperglycemia with blood glucose above 110 mg/dL), the realization of HIV serology, and a complete blood count.

Ethics Statement

Ethical clearance was obtained from the Ethics Committee Board of the universities of five countries participating in this study. The participants signed an informed consent form, after a verbal explanation. For underage participants, we asked for the consent of the parents or the legal guardian. The survey was anonymous and confidential.

RESULTS

During the study period, we recruited 224 NF patients (an average of 2.4 patients per month and per country). The mean age of the patients was 51.9 ± 18.3 years and the sex ratio (M/F) was 1.3. In half of the cases (n = 112), the patients consulted one or two weeks after the onset of the symptoms. The existence of a point of entry was found in 77.2% (n = 173) of the patients overwhelmed with neglected trauma (46.9%; n = 105). The main comorbidities noted were the use of NSAIDs at the onset of the symptoms (32.6%; n = 73), obesity (29%; n = 29), the use of brew/cataplasms (21.4%; n = 48), and voluntary cosmetic depigmentation (6.7%; n = 15). The lower limbs were the location of NF (88.8%). The general, functional, and local symptoms were dominated by hyperthermia (50.9%), spontaneously increasing pain (75.9%), and skin necrosis (83.9%), respectively (Table 1).

On the para-clinical ground, the stocktaking was especially blood numeration, which helped to determine hyperleukocytosis in 159 patients, thrombocytosis in 68 patients, and an average rate of hemoglobin at 10.5 ± 8.7 g/dL. Only two patients benefitted from a bacteriological sampling, which enabled the isolation of some strep, whereas five patients benefitted from blood culture, which was positive in all the cases. The germs found were *Escherichia coli* in three cases and *Pseudomonas aeruginosa* in two cases.

Table 1: Comorbidities, seat, and general and local signs of necrotizing fasciitis.

	Number (n = 224)	%
Comorbidities		
<i>Use of NSAIDs</i>	73	32.6
<i>Obesity (BMI ≥ 30 kg/m²)</i>	65	29
<i>Use of decoctions/poultices</i>	48	21.4
<i>Hypertension</i>	48	21.4
<i>Diabetes</i>	37	16.5
<i>Nicotine addiction</i>	26	11.6
<i>Chronic alcohol intake</i>	18	8
<i>Cardiopathy</i>	18	8
<i>Voluntary cosmetic depigmentation</i>	15	6.7
<i>HIV infection</i>	8	3.6
Seat of necrotizing fasciitis		
<i>Lower limbs</i>	199	88.8
<i>Upper limbs</i>	16	7.1
<i>Perineum</i>	8	3.6
<i>Thoracoabdominal</i>	1	0.5
General signs		
<i>Hyperthermia</i>	114	50.9
<i>General state deterioration</i>	75	33.5
<i>Tachycardia</i>	42	18.8
<i>Agitation</i>	11	4.9
<i>Hypothermia</i>	5	2.2
<i>Confusion</i>	4	1.8
Local signs		
<i>Skin necrosis</i>	188	83.9
<i>Increasing pain</i>	170	75.9
<i>Hard edema</i>	88	39.3
<i>Bubbles/blisters</i>	82	36.6
<i>Foul odor</i>	59	26.3
<i>Hypoesthesia</i>	56	25
<i>Purpura</i>	16	7.1
<i>Crackles</i>	11	4.9

Therapeutically, all patients were on antibiotic treatment and benefitted from surgery (wound scouring and only a case of amputation). We recorded three cases of ulcer post-debridement and recorded 14.7% (n = 33) of deaths.

DISCUSSION

The multicenter aspect of our study helped to extrapolate the results at the scale of sub-Saharan Africa, wherein the population has, globally and quite comparably, the same sanitary level and social practices. Over a two-year period, we recruited 224 patients with NF equal to an average of 2.4 patients per month and per country. In the studies conducted in Cameroon [11] and Uganda [10], monthly frequencies of 5.5 and 8.8 patients, respectively, were noticed. This difference could be explained by the non-inclusion of patients less than fifteen years of age affected by NF in our study, yet confirms the frequency of such a disease in tropical Africa, while it is more and more

seldom in Europe [3]. The mean age of our patients was 51.88 years, with the male dominance the same as that found in African and European series [10-12]. It weighted the burden of this portion of the population, in which there were already comorbidities, such as arterial hypertension, diabetes, and venous insufficiency [13].

In our study and that by Magala et al. [10], the privileged center of NF was the lower limbs in 88.8% and 49% of cases, respectively. Bingöl-Koloğlu et al. [13] rather found the abdomen as the principal localization, yet their study was conducted in children. The perineum was affected in 3.6% of the cases in our study vs. 23% in Uganda [10]. We found no NF cases of the cephalic pole (cervical, craniofacial), which was contrariwise described by van Niekerk et al. [14]. The absence of this localization in our series could be explained by the fact that fasciitis in the cephalic regions is growing rapidly and, therefore, deadly with low socio-economic level, difficult geographic access to sanitary facilities, and delays in consultations [10,15].

Local symptoms, such as skin necrosis (83.9%), increasing pain (75.9%), indurated edema (39.3%), bubbles or blisters (36.6%), foul smell (26.3%), hypoesthesia (25%), found in our study had no particularities compared to what is already described in the literature [13,16].

More than 80% of the patients had one or several NF classic comorbidities [17]. Comorbidities such as obesity and diabetes were largely documented [11,12,18,19]. The increase in their rate in Africa could partially explain the increasing incidence of NF in our vicinities [20]. Brews/cataplasms and voluntary cosmetic depigmentation were also identified as associated with NF in Guinea [9] and as risk factors of leg erysipelas in Togo [8]. Depigmentation products cause skin atrophy, which concludes to a high level of susceptibility to penetration and colonization by NF pathogens [21]. Finally, in our study, 32.6% of the patients took NSAIDs at the onset of their symptoms. These drugs could have suppressed the deleting functions of the neutrophils and augmented the production of TNF-alpha, which intervenes in skeptic shocks [22]. Some authors suggest that NSAIDs could cover the serious bacterial dermohypodermis symptoms and, then, delay the diagnosis and treatment [17,23,24].

Morbidity associated with NF is high and mortality varies from 30% to 100% [22]. In our study, we recorded

14.7% of deaths. In Nepal [25] and Taiwan [26], mortality was 26.2% and 20.9%, respectively. In France [12], the factors associated independently with high NF mortality were advanced age, the female sex, and admissions to intensive care. Those with inferior mortality had been for admission to public teaching hospital handling more than three NF cases per year. Indeed, early diagnosis is difficult for less experienced doctors, leading to suboptimal treatment. Rapid acknowledgment and surgical care coupled with the use of appropriate antibiotics is the pillar of NF treatment. Despite that, mortality remains high, generally because of sepsis, diabetic complications, and hemodynamic collapse [10].

CONCLUSION

This study shows that NF of the lower extremities is the most often observed clinical form in sub-Saharan Africa. Some factors or comorbidities (diabetes, obesity, alcoholism, nicotine addiction) seem to be relatively frequent. The adequate management of these comorbidities will reduce the relatively high death rate in these conditions in sub-Saharan Africa.

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Statement of Human and Animal Rights

All the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the 2008 revision of the Declaration of Helsinki of 1975.

Statement of Informed Consent

Informed consent for participation in this study was obtained from all patients.

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