Scientific Research Publishing

Open Journal of Urology, 2024, 14, 197-206
https://www.scirp.org/journal/oju
ISSN Online: 2160-5629
ISSN Print: 2160-5440

Gangrene of the External Genitalia at Chu-Abeche

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How to cite this paper: Valentin, V., Mahamat, M.A., Chene, A., Barthelemy, V., Michael, T.O., Siyangar, M.A., Siyangar, N.A. and Kimassoum, R. (2024) Gangrene of the External Genitalia at Chu-Abeche. *Open Journal of Urology*, **14**, 197-206.
https://doi.org/10.4236/oju.2024.144020

Received: February 25, 2024
Accepted: April 19, 2024
Published: April 22, 2024

Abstract

Introduction: Gangrene of the external genitalia organs (EGO) is a medico-surgical emergency that is still very common in Third World countries. The main etiologies are urogenital, dermocutaneous and proctological. Mortality remains very high despite therapeutic advances. Our aim was to report on the epidemiological, diagnostic and therapeutic aspects of gangrene of the external genitalia, and to identify prognostic factors. **Patients and Method:** This was a 5-year retrospective descriptive study, from February 2016 to February 2021, of cases of gangrene of the external genitalia admitted to and treated in the Urology Department of Abeche University Hospital. **Results:** We collected 49 cases of gangrene of the external genitalia. The mean age of patients was 42 ± 16.81, with extremes of 20 and 81 years. The age group most concerned was between 20 and 29. The most frequent reasons for consultation were suppuration of the external genitalia and scrotal swelling. The average consultation time was 19.05 ± 16.02 days. The most common comorbidity was diabetes (35.9%). The most frequent pathological antecedents were urinary tract infections and endourethral maneuvers, reported in 40.5% and 38.7% respectively. Urogenital aetiology was predominant in 54.7%, and idiopathic in 35.9%. Lesions involved the scrotum in 60.6%, the scrotum and penis in 16.5%, and the penis alone in 5.7% of cases. Lesions extended to the perineum in 13.6% of cases, and to the abdomen in 3.6%. Vascular filling via the central venous line was performed in 58.6% of cases, and via the peripheral venous line in 41.4%. 3rd-generation cephalosporins and associated imidazoles were the most commonly used antibiotics. Necrosectomy was performed in 37 patients (73.4%), debridement combined with bypass cystostomy in 26.6% of cases. Colostomy was performed in 4% of cases. 90.8% of patients

were cured and 9.2% died. The average hospital stay was 30 ± 75 days. **Conclusion:** The gangrene of the external genitalia is a medical and surgical emergency which has become rare in Europe, but which is still very common in the context of our practice in Chad. The severity of the disease is linked to delayed consultation and co-morbidity factors. Mortality remains very high despite therapeutic advances.

Keywords

Gangrene, External Genitalia, Medical and Surgical Treatment

1. Introduction

External genital gangrene is a necrotizing fasciitis of the penoscrotal and perineal area caused by thrombosis of small subcutaneous vessels, leading to gangrene of the skin [1]. However, other authors have identified two distinct entities in this condition, namely primary gangrene of the external genitalia, known as Fournier's disease, with no identifiable locoregional cause and an unknown mechanism, and gangrene secondary to a locoregional urogenital, anorectal or cutaneous cause [1]. External genital gangrene is nowadays a rare pathology in Europe, but still very frequent in Africa.

It is still very common in Africa, where the largest clinical series originate, due in particular to delays in consultation [2] [3] [4].

In Chad, the frequency of this condition is estimated at 9.6% according to recent studies carried out in 2014 [2]. The diagnosis of external genital gangrene is essentially clinical. Several factors such as malnutrition, extreme age, morbid obesity, major immuno depression and chronic diabetes are involved in the development of the disease. The germs most frequently found are aerobes, anaerobes and *Escherichia coli* [2].

It constitutes a major medical and surgical emergency, because its spontaneous evolution is unpredictable and puts the patient's vital prognosis at risk, with a mortality rate of between 20% and 80% depending on the series [5] [6] [7].

The treatment of penoscrotal and perineal gangrene has been standardised, despite ongoing controversy about its pathophysiology. Management is based on medical resuscitation, broad-spectrum parenteral antibiotic therapy and surgical debridement with removal of necrotic tissue [3]. The aim of our study was to report on the epidemiological, diagnostic and therapeutic aspects, and to identify the prognostic factors of gangrene in external genitalalia.

2. Patients and Method

This was a 7-year retrospective descriptive study, from February 2016 to February 2021, of cases of gangrene of the external genitalia admitted to and treated in the Urology Department of the University Hospital of Abeche. Male patients admitted to the department and treated for gangrenous disease of the external

genitalia with complete medical records were included. Patients with incomplete records or patients admitted for other conditions such as superinfected hydroceles and abscessed orchiepididymitis were excluded.

Data were collected and analysed using SPSS 11.0 software.

Calculations were made using proportions and mean, and statistical significance was considered with $\alpha = 5\%$. Authorisation for the research was granted by the Faculty of Health Sciences of the UNABA and the University Hospital of Abeche.

The variables studied were: age, extent of lesions, paraclinical data, aetiological factors, associated comorbidities, medical and surgical treatment, mortality and prognostic factors.

3. Results

We recorded 49 cases of external genital gangrene in the department over a period of 5 years, *i.e.* a frequency of 9.8 cases per year and a prevalence of 3.2%. The average age of the patients was 42 ± 16.81, with extremes of 20 to 81 years.

The age group most affected was between 20 and 29 (Table 1).

The most frequent reasons for consultation were suppuration of the external genitalia and painful scrotal swelling in 32.6% and 49.8% of cases respectively. The average consultation time was 19.05 ± 16.02 days. The most common associated comorbidity was diabetes (Table 2).

Table 1. Distribution of patients by age group.

Age group	Number	Percentage (%)
20 - 29	14	28.6
30 - 39	8	16.3
40 - 49	9	18.4
50 - 59	5	10.2
60 - 69	7	14.3
≥70	6	12.2
Total	49	100

Table 2. Distribution of patients according to risk factors.

Risk factors	Number	Percentage (%)
Diabetes	16	32.6
HTA	9	18.4
HIV	3	6.1
Alcoholism	7	14.3
Smoking	10	20.4
No	4	8.2
Total	49	100

The most frequent pathological antecedents were urinary tract infections and endourethral manoeuvres, reported in 40.5% and 38.7% of cases respectively.

Urogenital aetiology was predominant in 26.8%, and idiopathic in 9% (Table 3).

The diagnosis was made on the basis of clinical signs: scrotal lesions in 60.6% of cases, the scrotum and penis in 16.5% of cases, and the penis alone in 5.7% of cases. Lesions extended to the perineum in 13.6% of cases and to the abdomen in 3.6% (Figure 1).

On laboratory examination, 68% of patients had hyper leukocytosis and 52% were anemic. The mean hemoglobin level was 9.5 ± 2.3 g/dl (range: 3.2 g/dl and 12.8 g/dl).

Cytobacteriological examination of pus samples was carried out in 13 cases (28.8%). The germs isolated were *Escherichia coli* (five cases), *Streptococcus* (three cases), *Proteus vulgaris* (two cases), *Proteus mirabilis* (one case) and *Candida albicans* tarda (one case).

Serology was positive in 9.2% for HIV, 18.5% for chlamydia, 7.2% for HBsAg and 1.5% for HCV.

In terms of treatment, vascular filling via the central venous line was used in 58.6% of cases and the peripheral venous line in 41.4%. Blood transfusion was used in 28.7% of cases and oxygen therapy in 38.3%.

All patients had received antibiotic treatment. Third-generation cephalosporins

Table 3. Distribution of patients by aetiology.

Aetiological factors	Number	Percentage (%)
Uro-genital	15	26.8
Dermocutaneous	10	17.8
Proctology	4	7.1
Idiopathic	5	9
Total	56	100

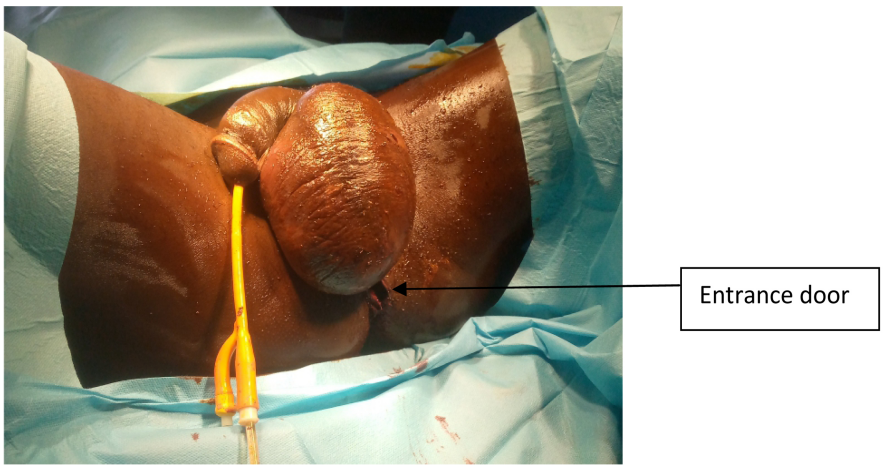

Figure 1. Gangrene of the external genitalia with an entry point at 5 o'clock.

(C3G) and associated imidazoles were the antibiotics most commonly used in 54.5% and 41.4% of patients respectively. All patients received local care. Necrosectomy was performed (Figure 2) in 37 patients (75.5%) with debridement combined with bypass cystostomy in 26.6% of cases. Secondary necrosectomy was performed in 20 patients (Figure 3). Once the infected site had been sterilised, an oscheoplasty was performed (Figure 4 and Figure 5). A colostomy was performed in 4% of cases. 90.8% of patients were cured and 9.2% died. The average hospital stay was 30 ± 75 days. The main poor prognostic factors in our patients were age, extent of lesions and association with a co-morbidity such as diabetes and/or hypertension.

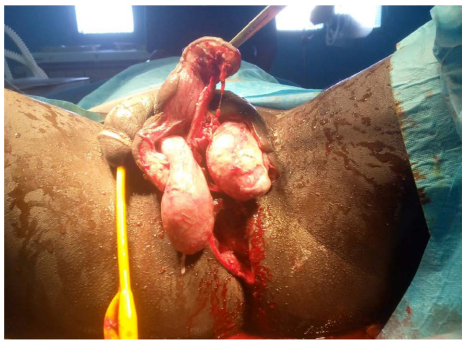

Figure 2. Image after necrosectomy.

Figure 3. EMB status after initial debridement.

Figure 4. Good progress for EMBs.

Figure 5. Good progress for EMBs.

4. Discussion

The prevalence of external genitalia in our series was 3.2% with a frequency of 9.8 cases per year. This frequency is higher than those reported by Dekou in Côte d'Ivoire in 2011, Owon'Abessolo in 2022 and Mekeme Junior in 2020 in Cameroon, who respectively obtained 1.5, 4.3 and 8.6 cases per year [8] [9] [10].

This high frequency could be linked to access to information on the disease, the disappearance of certain taboos relating to the external genitalia, which has prompted consultations, and the presence of surgical specialists in north-eastern Chad all based at the Abeche University Hospital.

The mean age was 42 ± 16.81 with extremes of 20 and 81 years and a predominance of the 20 - 29 age group. A review of the literature in 1996 found 56 paediatric cases, 66% of which were less than three months old [11]. Dje Koffi in Côte d'Ivoire in 2007 and Rimtebaye in Chad in 2014 reported a mean age of 45.4 and 38.33 years respectively [2] [12]. Fall B in Senegal in 2009 reported an average age of 50, with extremes of 20 and 97; the age groups most affected were 70 and 73 [5]. This wide variability in mean age in these different series is sufficient proof that the disease can occur at any age. The 20 - 49 age group accounted for 63.3% of the study population. This age group is similar to that reported by Mekeme, which is 59.6% [10]. The predominance in the young population could be explained by the fact that this age group is intensely sexually active, which exposes them to sexually transmitted infections.

Consultation was prompted by painful scrotal swelling in 49.8% of cases. This result is close to that obtained by Diallo SM in Mali, which was 52.2% [13]. The average consultation time was 19.05 ± 16.02 days. Our results are similar to those reported by Dje Koffi in 2006 (18 days) [12]. This delay in taking a decision is linked to the modesty and taboo of this pathology which is related to the genitals and which would constitute a brake for the patient to consult a doctor. In addition, the widespread practice of self-medication could be to blame. Our data are superior to those of Diallo MS in Mali, who observed an average consultation time of 11 days in a series of 23 patients [13]. Dekou A in Côte d'Ivoire reported an average consultation time of 7.4 days in a series of 14 patients [8].

This difference could be explained by the smaller sample size. Risk factors were found in 90.6% of patients. Our result is similar to that reported by Owon'Abessolo PF in Cameroon in 2020, which was 88.37% [9]. Diabetes was the most common comorbidity with 35.9%. Our result is close to that reported by Owon'Abessolo PF, who obtained 28% [9]. The occurrence of gangrene, particularly in diabetics, is thought to be linked to the micro-angiopathy responsible for local circulatory disorders favouring local bacterial infection and tissue necrosis. In addition, constant hyperglycaemia leads to a secondary immunity deficit.

Smoking and alcohol were risk factors in 37.5% of cases. Our results are similar to those of Mekeme, who observed 38.99 cases in his study series [10]. This finding shows that chronic alcoholism causes immune dysfunction and is associated with a poor prognosis, especially in patients with diabetes. Chronic smoking is a risk factor for atherosclerosis, with a deleterious effect on the vascular endothelium.

In 82.4% of cases, patients consulted late at a stage of necrosis. This result is identical to that of Owon'Abessolo PF in Cameroon in 2022, who reported that 81.4% of patients consulted at a stage of necrosis [9]. Urogenital etiologies were predominant in 54.7% of cases. Our results are similar to those of Fall B in Senegal, who found 68.6% [5].

No etiology was found in 9% of cases. Gangrene of the external genitalia is said to be idiopathic where the predisposing factors remain unknown, unacknowledged by the patient or unnoticed due to inadequate etiological research in relation to the limited technical resources.

Gangrene of the external genitalia is a pathology resulting from microbial polymorphism. In our series, *E. coli* was the germ most frequently found in 7.8% of cases, followed by Staphylococcus in 4.7%.

Rimtebaye K identified Streptococcus, Clostridium perfringens and anaerobic germs [2]. Borki K reports the presence of *E. coli*, Streptococci, Proteus and Staphylococci [14].

This diversity of microbial strains of cutaneous, urogenital and colorectal origin confirms the polymicrobial nature of this pathology.

All our patients received parenteral broad-spectrum probabilistic antibiotic therapy after bacteriological and biological sampling. A combination of C3G and imidazole antibiotics was used. When renal function was normal, aminoglycosides were systematically added to the treatment. This treatment is readapted according to the results of the sampling. Dekou A and Fall B adopted the same therapeutic strategy for probabilistic broad-spectrum antibiotic therapy [5] [8]. The treatment of this pathology is standardized despite the controversy that persists over its pathophysiology. Surgical management has consisted of total excision of necrotic and devitalized areas of scrotal and perineal skin, with collapse of cubicles at the fingers, under general anesthetic. In forms limited to the scrotum and perineum, necrosectomy was sparing in 73.4% of cases. For some authors, excision should be sparing and limited to frankly necrotic tissue to allow

subsequent regeneration of perineal skin islands without secondary grafting [15] [16]. Others, on the other hand, believe that skin lesions are merely a poorly defined reflection of very extensive and deep lesions. They advocate radical excision, extending to healthy, bleeding areas [15].

In order to avoid contamination of the lesion by faces, a colostomy was performed in 2 patients. Hubert J recommended a systematic colostomy [15]. We believe that colostomy is certainly necessary to prevent contamination of the wound by faces, facilitating comfort, healing and local care. However, it is indicated in cases of suspected colorectal causes [17]. It is also essential in cases of anal incontinence secondary to sphincter destruction due to the infectious process, rectal perforation, excessive gangrene or fragile immuno depressed patients [18]. Urinary drainage using a urertrovesical catheter or cystocatheter was systematic in all patients. Shunt cystostomy was performed in most patients with urethral stricture. Our results are similar to those reported by Rimtebaye and Dekou [2] [8]. Urinary drainage makes it possible to quantify diuresis during the period of medical resuscitation, to dry out perineal lesions and to protect unblocked areas.

The mortality rate was 9.8%. The mortality rate reported in the literature by various authors remains high, varying between 12% - 45% [19]. This rate is thought to be linked to the presence of poor prognostic factors such as advanced age, the presence of competing comorbidities, the extent of the lesions and the long delay in consultation [20]. Our result is lower than those reported by Hodonou, Borki K and Kuo, which are 21.8%, 20% and 22.7% respectively [13] [20] [21]. This difference could be explained by the predominance of the young population in our series, which would be a protective factor. Multidisciplinary collaboration helped to ensure adequate management, especially in the correction of hemodynamic, metabolic and ionic disorders. Necrosectomy followed by plasty in the form of secondary suturing was performed in 87.5% of cases, including 2 patients who underwent skin grafting. The retracted testicles were lowered in 66.7% of cases into bursae remodeled during secondary suturing with a satisfactory result. 13% of cases of burial of externalized testicles in the inner aspect of the thigh were reported by Borki K [13]. The difference between our procedure and that of Borki K may be linked to the fact that in our series the emphasis was placed on limited necrosectomy, with directed scarring allowing parietal sparing to facilitate remodeling of the bursae. This is in contrast to the more extensive necrosectomy performed in their series, which sometimes requires burial of the testicles, which may alter the quality of spermatogenesis.

The average hospital stay was 30 ± 3.75 days. Our results are similar to those reported by Edino and Hulnald F, which were 32.5 and 30 days respectively [22] [23].

On the other hand, the mean length of hospitalization in our series was short compared with that reported by Mbonicura JC, which was 93.6 days [24]. This difference could be explained by the fact that 90% of our patients were not eligi-

ble for skin grafting and that dressings were done on an outpatient basis in the event of good clinical and local evolution.

In this study, 91% of the aetiologies of this pathology are known, as are the factors that contribute to it. Raising public awareness is essential if the disease is to be avoided, and early consultation is essential for a good prognosis.

5. Conclusion

Gangrene of the external genitalia is now a rare condition in Europe, but still very common in Third World countries. Diagnosis is clinical. The severity of the disease is linked both to the delay in consultation and to co-morbidity factors, the main ones being advanced age, diabetes, arterial hypertension and smoking. The main etiologies are urogenital, dermocutaneous and proctological. Mortality is still very high despite advances in treatment. Treatment is medico-surgical and must be multidisciplinary.

Conflicts of Interest

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

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