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FOURNIER'S GANGRENE IN A TERTIARY HEALTH FACILITY IN NIGERIA

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Objective: To examine the outcome of the management of Fournier's gangrene in a tertiary health facility in Nigeria.

Patients and Methods: Twenty-four consecutive patients with Fournier's gangrene managed over a 20-month period formed the basis of this retrospective study.

Results: The mean age of the patients was 64.4 ± 11.5 years. Seventeen (70.8%) patients had identifiable etiological factors. The etiologies included urethral stricture in 13 (76.4%) patients and scrotal abscess, infected hydrocoele, hydrocoelectomy and urethral carcinoma in one patient (5.9%) each. A predisposing factor was found in one (4.1%) patient who had diabetic ketoacidosis. In 7 (29.2%) patients no precipitating cause was obvious. Twenty-three (95.3%) patients were subjected to debridement and 14 patients with urethral obstruction were treated by suprapubic cystostomy. One (4.7%) patient was not offered surgery because he was moribund. The mean hospital stay for the survivors was 32.5 ± 6.4 days. Three (12.5%) patients died from overwhelming sepsis.

Conclusion: Fournier's gangrene is rarely idiopathic, as an underlying cause is usually found in the majority of cases. Aggressive surgical and medical management can reduce mortality.

Key words: scrotal gangrene, urethral stricture, debridement, *Escherichia coli*, Nigeria.

INTRODUCTION

Fournier's gangrene is an eponymous disease, described by Alfred Jean Fournier in 1883 as a progressive, synergistic, necrotizing fascitis of the scrotum with systemic sepsis and shock.[1] Pathogenesis and optimal management of this condition remain controversial. It was originally described as gangrene of the scrotum without a definite cause, but has now been extended to encompass gangrene of the perineal, perianal and genital areas.[2] Current trends show that in the majority of cases there is a precipitating factor which may be urological, colo-rectal or dermatological in origin.[2-5] The infection is poly-microbial in nature with involvement of both erobic and anerobic organisms.[1-6]

Fournier's gangrene is a potentially fatal disease, and survival is dependent on adequate resuscitation with aggressive surgical and medical management.[1,3-6]

This study presents the authors' experience in the management of Fournier's gangrene in a tertiary health facility in Northeastern Nigeria.

PATIENTS AND METHODS

This was a retrospective study of 24 male patients with Fournier's gangrene managed at

Table 1: Etiological Factors

Underlying Causes	No. of Patients	%
Urethral stricture	13	76.4%
Urethral carcinoma	1	5.9%
Infected hydrocele	1	5.9%
Hydrocelectomy	1	5.9%
Scrotal abscess	1	5.9%
Total	17	100%

Table 2: Bacterial Isolates

Micro-Organisms*	No. of Patients	%
E. coli	16	66.7%
Pseudomonas spp.	10	41.7%
Staph. aureus	8	33.3%
Streptococcus spp.	6	25.0%
Proteus spp.	5	20.0%

* mixed infections were present

Table 3: Surgical Options

Surgical Option	No. of Patients	%
Excision only	2	8.7%
Excision + suturing	4	17.4%
Excision + skin grafting	17	73.9%
Total	23	100%

the Federal Medical Center, Azare in Bauchi State, Nigeria, carried out to determine the pattern of presentation and outcome of management over a 20-month period from September 2002 to April 2004.

The files of the patients were retrieved and analyzed for age, extent of scrotal involvement, etiological factors, microbial isolates, outcome of surgery and duration of hospital stay.

Investigations included urinalysis, urine microscopy culture and sensitivity, blood sugar, wound swab for microscopy, culture and sensithe Federal Medical Center, Azare in Bauchi State, Nigeria, carried out to determine the pattern of presentation and outcome of management over a 20-month period from September 2002 to April 2004.

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Investigations included urinalysis, urine microscopy culture and sensitivity, blood sugar, wound swab for microscopy, culture and sensitivity, packed cell volume and retroviral screening in some cases.

Treatment consisted of resuscitation, administration of broad spectrum antibiotic combinations, mainly intravenous ampicillin 500 mg six hourly, metronidazole 500 mg eight hourly, and gentamicin 80 mg eight hourly. Excision of gangrenous tissues with hydrogen peroxide irrigation was carried out on all the patients under general anesthesia. This was followed by wound dressing with natural honey and EUSOL until the wound was covered by clean granulation tissue. In some instances repeat debridement was done.

RESULTS

Twenty-four male patients, all peasant farmers, with FG were treated during the study period with their age ranging from 45 to 80 years, and a mean age of 64.4 ± 11.5 years. The mean duration of scrotal gangrene prior to presentation was 9 days (range 6-11 days). The gangrene was confined to the scrotum in all patients. Three (12.5%) patients had testicular involvement. Seventeen (70.8%) patients had an obvious underlying cause. The etiological factors were urethral stricture in 13 (76.4%) patients and scrotal abscess, infected hydrocele, post-hydrocelectomy and urethral carcinoma in one (5.9%) each (Table 1). The only predisposing factor was diabetes mellitus in one (4.1%) patient. Ten patients who were screened for HIV infection tested negative. There was no detectable underlying cause in 7 (29.2%) patients.

The bacterial isolates from wound swabs are shown in Table 2. Erobic cultures grew

mixed organisms in most of the cases with Escherichia coli being the most commonly isolated organism in 66.7%, followed by pseudomonas in 41.7%, staphylococcus aureus in 33.3%, streptococcus in 25.0%, and proteus spp. in 20.8%. Anerobic cultures were not done due to lack of facilities.

Twenty-three (95.8%) patients were subjected to surgery (Table 3) while one died before surgical intervention. Of the 23 patients who had surgery, 21 (91.3%) had total scrotectomy, while 2 (8.7%) had partial scrotectomy. Two out of three patients with associated testicular gangrene had orchidectomy. Fourteen patients with urethral obstruction had urinary diversion by suprapubic cystostomy. Skin closure was achieved by split thickness skin grafting in 17 (73.9%) patients and secondary suturing in 4 (17.4%), while in 2 (8.7%) patients the wound contracted and healed.

The mean hospital stay for 21 (87.5%) survivors was 32 days (range 29-52 days). Three (12.5%) patients died of overwhelming sepsis; one of them had diabetic ketoacidosis, and another one had associated testicular gangrene.

DISCUSSION

Fournier's gangrene is one of the common urological emergencies frequently seen in Africa. Earlier reports from West Africa and elsewhere confirmed the idiopathic nature of the disease.[1,5,7] Recent trends show a clear focus or origin in the majority of cases.[2,3,4,6,8] It is noteworthy that 70.8% of our patients had an underlying predisposing factor. Urethral stricture accounted for 76.4% of these. It was complicated by peri-urethral abscess and watering-can perineum. Extravasation of urine into the scrotum could initiate the scrotal cellulitis and subsequent gangrene. Most of the patients were too poor to afford the cost of urethroplasty in specialized centers, so they stayed at home until the onset of a major complication such as this one.

Fournier's gangrene has been described in association with conditions causing reduced cellular immunity such as diabetes mellitus, chronic alcoholism, malnutrition, chronic steroid use, tuberculosis, malignancies and retroviral diseases.[5,6,8] Diabetic ketoacidosis was encountered in one patient in this study. In some series it accounted for about 38% to 66% as reported by Ekwere.[9] The lethal effect of uncontrolled diabetes mellitus as seen in this study has been reported elsewhere[10], but in another study such patients survived.[11] The only 10 patients tested for HIV in this study were negative.

All the patients in this report were peasant farmers and rural dwellers. Low socioeconomic conditions have been associated with Fournier's gangrene.[12] This probably would have played a role in some of the patients in this series. The classical description of Fournier's gangrene is a sudden onset of scrotal gangrene, but may progress slowly over several days. In this report, involvement of the whole scrotum in 87.5% of the patients is a reflection of the extent of the disease at presentation. Many of the patients presented late, several days after the onset of scrotal cellulitis, being managed at home by administration of traditional remedies. These traditional concoctions can have a deleterious effect on the scrotum and aggravate the gangrene. Instances where patients presented when the whole scrotum had sloughed off spontaneously leaving the testes bare like the "clapper of a bell" have been reported in some series.[5,6,8] The testes may rarely become involved if treatment is delayed as seen in three patients in this study. The testicular arteries originate directly from the aorta and thus have a separate blood supply from the affected region.

The bacteriology of Fournier's gangrene is varied, involving gram negatives, gram positives and anaerobes, occurring as pure or mixed growth.[5,13,14] Escherichia coli and Bacteriodes fragilis are the predominant organisms. These organisms act synergistically via collagenases, hyaluronidases and other enzymes to invade and destroy fascial planes.[15] In this study, the microbial isolates were mixed. E. coli was the most commonly isolated organism in 66.7% of cases, followed by pseudomonas and staphylococcus aureus in 41.7% and 33.3%, respectively. The preponderance of coliform organisms could be attributable to the closeness of the affected region to the lower rectum. Anerobic cultures were not done in this study for logistic reasons.

Fournier's gangrene is a potentially fatal disease. Many of the patients were very ill at presentation requiring aggressive resuscitation and administration of broad-spectrum antibiotics before culture results were available. Survival can be improved by a combination of ag-

gressive surgical and medical management.[16] Early surgical intervention with excision of the gangrenous scrotal tissues is the mainstay of treatment.[5,15,16] Successful non-operative management has been reported.[7,18] However, this should be reserved for patients with early cellulitis and minimal necrosis, proceeding to surgical intervention when it fails.[14] Natural honey has been found useful as a wound dressing agent.[19] In our center, pure honey was used after initial scrotal debridement with copious hydrogen peroxide irrigation. The therapeutic impact of hyperbaric oxygen remains controversial[20], but this facility is not available in our region.

The scrotum has a good regenerative capacity. In 8.7% of the patients the wound contracted and healed after excision. Secondary suturing in 73.9% of cases and split thickness skin grafting in 17.4% achieved skin covering for the exposed testes. These procedures helped to reduce the hospital stay and save costs.

Fournier's gangrene tends to follow a less aggressive course in Africans.[4,5] The mortality rate of 12.5% in this study is comparable to the 2-4% in some African series.[5,6,8,9] In Caucasians, a mortality rate varying from 4% to 75% has been reported.[16] The reasons for these differences remain rather speculative.[8,9]

From the foregoing analysis we conclude that Fournier's gangrene in North Eastern Nigeria occurs in low-income earners, and an underlying cause, mainly urological, can be found in most cases. Prompt fluid replacement with maintenance of hemodynamic stability and administration of broad-spectrum antibiotics with early surgical intervention contribute greatly to an improved survival.

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Editorial Comment:

I wish to congratulate Dr. Edino and co-workers for the good work done in a remote geographical environment. I would like to remind readers that in the African set-up Penicillin G (effective against organisms such as Clostridia) could still be a cost-effective treatment both for erobic and anerobic bacteria.

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RESUME

La gangrène de Fournier dans un centre de la santé tertiaire au Nigéria

Objectifs: Examiner le résultat de la prise en charge de la gangrène de Fournier dans un centre de la santé tertiaire au Nigéria. **Patients et Méthodes:** Vingt-quatre patients successifs présentant une gangrène de Fournier éligés sur une période de 20 mois ont formé la population de cette étude rétrospective. **Résultats:** L'âge moyen des malades était de 64,4 ± 11,5 années. Dix-sept patients (70,8%) avaient des facteurs étiologiques identifiables. Les étiologies ont inclu la sténose de l'urèthre chez 13 patients (76.4%) et abcès scrotal, hydrocèle infectée, hydrocèléctomie et carcinome de l'urèthre chez 4 patients (5.9%). Un facteur prédisposant a été retrouvé chez un patient (4.1%) qui avait une acido-cétose diabétique. Chez 7 patients (29.2%) aucune cause prédisposante n'a été mise en évidence. Vingt-trois des patients (95.3%) ont été soumis à une excision des tissus nécrosés et 14 patients présentant une obstruction uréthrale ont été traités par cystostomie sus-pubienne. Chez un patient (4.7%) la chirurgie n'a pas été indiqué parce qu'il était agonisant. Le séjour hospitalier moyen pour les survivants était de 32,5 ± 6,4 jours. Trois des patients (12.5%) sont décédés de septicémie. **Conclusions:** La gangrène de Fournier est rarement idiopathique, une cause sous-jacente est retrouvée habituellement dans la majorité des cas. La prise en charge chirurgicale et médicale agressive peut réduire la mortalité.

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