Fournier's Gangrene: Irrua Teaching Hospital, Nigeria, Experience.

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Abstract

Fournier's gangrene can no longer be considered idiopathic or a disease of young adult males in apparent good health. This work aims to highlight the changes in the knowledge of the epidemiology vis-à-vis current management recommendations. This study is retrospective. Case files of seventeen patients seen within the ten-year period of 1997-2006 were retrieved, relevant information extracted. All were males who had easily identifiable aetiological factors. Peri-anal sepsis was the most common (23.53%) followed by diabetes mellitus (17.64%). The disease was fulminating in 2 (11.76%) with over all mortality of 2 (11.76%), one a diabetic and the other an HIV positive patient. Epidemiology of Fournier's gangrene is better understood now. There is an a etiology in most of the cases. All our patients were males, a finding similar to other authors from the region and casting doubt on the existence of female genital gangrene. The prognosis is worse when it is associated with immune suppression from diabetes mellitus and HIV infection.

Key words: Fournier's gangrene. Changing epidemiology. Female genital gangrene. eponym. Africans.

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Introduction

Fournier's gangrene was first described by Alfred Jean Fournier [1], a Paris based dermatologist and venereologist, in 1883 as a sudden fulminating gangrene of the genitalia in previously healthy young males. The criteria for diagnosis as first described by Fournier were:

1. Sudden onset of disease progressing to gangrene
2. Sudden onset of scrotal gangrene in previously healthy males
3. The absence of any previous predisposing factors

The original work by Fournier was based on five healthy young men with scrotal gangrene. Apart from the anonymous name, it was also called idiopathic scrotal gangrene as there were no known etiological factors then. The five young men upon whom the description was based were in apparent good health, the disease presenting as a sudden fulminating with a high mortality [2]. Remarkable changes in the knowledge of its epidemiology however took place in the last century following several research work.

Paty and Smith reported that the disease can no longer be considered idiopathic as the infection can usually be localized to a cutaneous, urethral or rectal source [3]. Other workers such as Aghaji [4], Edino [5], Monssaoni [6] and Okeke [7] agree with this opinion as their works indicate that in most of the instances an etiological factor can be identified depending on the facilities and expertise available.

Many diseases have been identified as predisposing to Fournier's gangrene. These include various medical conditions such as diabetes mellitus, chronic liver disease, chronic renal diseases, filarial infestation and immuno-suppression from any cause [4,5]. Fourniers gangrene is however more directly associated with urethral, anorectal, prostate and colonic diseases, such as anorectal sepsis and haemorrhoids. The prognosis is also to a large extent related to these predisposing factors.

Fournier's gangrene is no longer regarded as a disease of young male adults. A male to female ratio of 10:1 was documented by Yalamathi in his evidence based review [2]. He gave the factors which predispose to female genital gangrene as infected Bartholin cyst, episiotomy, hysterectomy, pudendal and cervical nerve block and septic abortion. In the same review, he indicated that fifty five cases of genital gangrene have been reported in pediatric literature. In 1984 Evbuonmwan reported genital gangrene in a one-month-old child [8], further corroborating Yalamathi's review.

The disease presentation was originally described as sudden and fulminating with high mortality. The clinical presentation is now known to vary from insidious to fulminating onset with variable mortality [2]. Work by many African authors rather depict the disease as often insidious with a low mortality [4,9]. A number of reasons have been advanced for this but these have not been verified [4]. A good number of the patients present with established ulcers at first hospital attendance for the disease [4,9].

Fournier's gangrene is a synergistic scrotal infection with polymicrobial involvement [5]. The infection is usually a mixed growth of gram negative rods, aerobic gram-positive cocci and strict anaerobes. Escherichia coli is the most commonly isolated organism.

The aim of this work is to use the Irrua Specialist Teaching Hospital, Irrua, Nigeria,

a semi-urban based university teaching hospital experience to highlight the changes in the knowledge of the epidemiology of the disease and examine the management strategies of the hospital vis-à-vis current management recommendations.

Materials/Methods

This is a retrospective case study. All the case records of patients who were diagnosed with genital gangrene within the study period of 1997-2006 were retrieved and studied. Information such as sex, age, mode of presentation, extent of soft tissue involvement, possible predisposing aetiological factors, the need for and extent and number of times each patient was debrided, use of antibiotics, duration of stay in the hospital, adjunct surgeries and outcome of both disease and treatment were extracted.

Specific laboratory results such as wound swab culture, white blood cell count, electrolyte, urea and creatinine, urinalysis, HIV test as well as blood sugar estimations were also extracted. The entire information obtained was analyzed using simple statistical methods.

Results

A total of seventeen patients were seen in this centre within the ten- year study period from 1997-2006. All the patients were males. The age ranged from twenty-one years to seventy years (Table 1). The mean and median ages were 49.67 and 54 respectively. All the patients had obvious predisposing etiological factors: peri-anal abscess (post drainage) 4 (23.53%), diabetes mellitus 3 (17.64%) and HIV/AIDS 2 patients (11.76%). Other less common predisposing etiological factors were: fissure in ano (one patient - 5.88%), intestinal obstruction (one patient), inguino-scrotal hernia (post operative) (one patient), chronic leg ulcer (one patient), benign prostatic hyperpalsia (one patient) and chronic renal failure with hydrocele (one patient), primary liver cell carcinoma (one patient), and tuberculosis (one patient). No patient was investigated for filariasis and of the five selectively tested for HIV infection, two were positive.

Of the seventeen patients, 12 (70.59%) presented with established ulcers of the involved area, 2 (11.76%) had established gangrene while the remaining 3 (17.65%) presented with cellulitis, which later progressed to scrotal gangrene or resolved with treatment.

Two patients (11.76%) had extensive disease involving the scrotum, perineum and anterior abdominal wall. Both presented with established gangrene, clinical jaundice and high white blood cell count of 17,000/m1 and 62,000/m1 receptively indicating a fulminating disease.

Table 1- Age distribution of patients in years

Age range (years)	No of Patients
0-10	0
14-12	0
21-30	3
31-40	1
41-50	3
51-60	3
61-70	4
Above 70	0
Age not indicated	3

Table 2: Distribution of patients according to etiological factors

Predisposing/etiological factors	No of Patients	Percentage
Peri-anal abscess	4	23.5
Diabetes	3	17.64
Hiv/Aids	2	11.76
Fissure in ano	1	5.88
Chronic renal failure/hydrocele	1	5.88
Iguinoscrotal hernia post operative	1	5.88
Intestinal obstruction	1	5.88
Chronic leg ulcer	1	5.88
Benign Prostatic Hyperplasia	1	5.88
Hepatocellular carcinoma	1	5.88
Pulmonary tuberculosis	1	5.88

The other patients had milder insidious onset disease involving mostly the scrotum with absence of jaundice and white blood cell count ranging from 2,300/m1 (in HIV positive patient) to 10,200/m1.

The two patients who presented with established gangrene were each debrided once, one within twenty-four hours and the other on the seventh day post admission. The latter was a diabetic and one of these who had extensive scrotal, perineal and anterior abdominal wall involvement. Five (29.41%) of the patients took their discharged against medical advise on financial grounds.

Adjunct surgeries were not done but scrotoplasty 2 (11.76%) skin grafting 3 (17.64%) and rotational flap 2 (11.76%) were variously used to close the wounds in order to reduce hospital stay. The mean duration of hospital stay was 27.64 days but this is all reliable due to early discharge before full closure of the ulcers either surgically or spontaneously. Duration of hospital stay however ranged from twenty-nine days to sixty-five days

Fourteen of the patients had their wound swab sent for culture and gram stain. Out

of these, gram stain was negative in four while the other 10 had gram negative bacilli and gram positive cocci. The cultures uniformly yielded Escherichia coli. The most commonly used antibiotic regimen were:

a) combination of metronidazole and ciprofloxacin
b) combination if metronidazole and cefurozime and
c) combination of metronidazole and ceftriazone.

There were two (11.76%) moralities, one a diabetic and the other was an HIV patient.

Table 3: Grading of disease Severity

Grade	Fulminating disease	Mild disease
Soft tissue involvement	Perineum, Anterior abdominal wall & scrotum	Perineum/ scrotum only
Range of WBC	17200-62000/ml	2300-10200/ml
Presence of jaundice	Yes	2
Total No Patients	No	15

Discussion

Fournier's gangrene is a urological emergency [5,10] with a presentation that is sometimes frightening because of the penchant for leaving the testes completely bare. The complex anatomy of the male genitalia influences the initiation and progression of Fournier's gangrene [10]. In this study, a total of seventeen patients were seen over a period of ten years, affirming that the disease is uncommon but not rare. This is comparable to Okeke's study in UCH Ibadan [7]. Inspite of the large size of UCH Ibadan and the high population density of the catchment area it subserves, he recorded 26 cases of Founier's gangrene over a period of 8 years. There is currently the fear that with the emergence of HIV/AIDS, a new group of patients at risk to be recognized both in Africa and the developed world after Fournier's gangrene has been reported as a presenting sign in HIV infection [2]. It is expected that as the population of AIDS patient increases Fournier's gangrene will become more common [11]. Of the five patients selectively (based on symptoms and signs) tested for HIV in this study, two were positive. It is probable that routine screening of these patients for HIV infection will yield a higher positive rate and would probably help diagnose HIV disease at an earlier stage. This however is in contrast with the study by Edino and co-workers in Azare, Nigeria [5], where of the ten tested patients, all were HIV negative. Aghaji recorded HIV positivity of 3 (6%) [4]. Outside Nigeria, other workers have recorded variable HIV positivity rate. For instance, in Ayumba's study, he documented a 2.2% HIV positivity rate though still lower than in this study [9]. The idiopathic nature of the diseases has been strongly and repeatedly disputed.

All the patients in this study had well known and documented predisposing aetiological factors. For instance the 4 (23.5%) patients who had peri anal abscess, like in Aghaji's study [5], developed Fournier's gangrene following either spontaneous or surgical drainage with effluent contaminating the scrotum.

In his study, there was no documented case of filariasis probably because of a low index of suspicion as the disease is known to be common in many parts of this country.

The predisposing etiological factors in this study were obvious and easily identifiable clinical entities which explains the 100% detection rate (Table 2). This is high though comparable with the study of Aghaji [4] where urethral stricture was predisposing etiological factor in 30%, chronic scrotal iching 26%, urethral catheterization 15%, post scrotal surgery 12%, fissure in ano 8%, ischorectal abscess post drainage 4% and urethral stone 2%. Similarily in the study of Edino there were predisposing factors in 70% of the cases [5]. Urethral stricture as a cause was not documented in this study unlike in the preceding two studies mentioned above.

The fulminating nature of the disease has been questioned by studies from Africa and many reasons have been advanced for the more common seemingly insidious onset in this region. In this study, the presence of jaundice, extent of elevation of white blood cell count and extent of skin involvement were used, though crudely, to determine the fulminating nature of the disease (Table 3). Like Okeke's study 58,8% of the patients presented with scrotal skin ulcer with minimal systemic features and elevation of white blood cell count [7]. The two (11.76%) who presented with gangrene ab-initio had extensive scrotal, perineal and anterior abdominal wall involvement with clinical jaundice and severe systemic response indicating a fulminating sepsis. We agree with other reports from other parts of Africa that the course of Fournier's gangrene in Africans is variable, most patients presenting with insidious onset disease. Aghaji in his study advanced some reasons, for this less fulminating nature of and low mortality from the disease and established scrotal ulcers [4,9]. Mortality was 11.76% in this study. This is similar to that quoted by other authors [11,16].

Diabetes mellitus has been well documented as an adverse prognostic factor. In the study by Unal *et al*, diabetes mellitus was associated with extensive anterior abdominal wall involvement especially in females [13]. Three of the patients in this study had diabetes mellitus one of whom developed extensive scrotal, perineal and anterior abdominal wall involvement with associated diabetic ketoacidosis and he constituted one of the two mortalities. This is similar to that of McGeehal and co-works [14]. Ekwere reported that the contribution from diabetes mellitus to Fournier's gangrene ranges from 38% to 66% as indicated by various series [15]. This study did not reflect this as the contribution from

diabetes mellitus to Fournier's gangrene was 17.65%. The variable lethal effect of uncontrolled diabetes mellitus in patients with Fournier's gangrene is well elucidated by this study [5].

Most of the patients in this study were low ranking police personnel, artisans and retired civil servants. Using their ability to pay for services promptly to assess their economic status, they were uniformly poor patients. This is further corroborated by the high rate of discharge against medical advice (29.41%) before closure of wound on financial grounds. This is in consonance with the rural setting of Edino's work in Azare, Northern Nigeria [5]. Fournier's gangrene is however not a disease of low socio-economic group and a high incidence of the disease is found both in the U. S. A and Canada [16]. Because of the high level of ignorance and poverty in this semi Urban setting, most of the patient presented late with established ulcers [4,9].

The patronage of traditional medicine practitioner in this part is high and is usual for them (the traditional practitioners) to advertise their prowess and products repeatedly in both the electronic and print media owned by even the state. It is therefore difficult to determine both the nature of, onset of, and the mortality from the disease in this setting as the patients often first patronize the "traditional healer".

There have been reports of female genital gangrene that has even been linked with extensive disease when associated with diabetes mellitus [12]. All the patients in this study like many other studies in Africa [4,5,7,9,14] were males casting doubts as to whether female genital gangrene occurs in Africans. Factors which are quoted as predisposing to female genital gangrene include episiotomy, Bartholin's cyst, hysterectomy, cervical and pudendal nerve block and septic abortion all of which are world wide phenomenon. There is no indication that there have been female genital gangrene which were misdiagnosed or unrecognized in this centre. There have been cases of episiotomy and infected Bartholin's cysts which resolved promptly with antibiotic therapy and wound dressing without degenerating to genital gangrene. Further research, particularly, prospective studies, are required to document or dispute the occurrence of female genital gangrene in Africans.

It is difficult to assess the role of debridement in this study, as most of the patients presented with established ulcer. Of the two patients who presented with established gangrene, one (diabetic) had debridement done on the seventh day after presentation because of waiting for demarcation of gangrene. Debridement in Fournier's gangrene is an emergency procedure and is often repeated [16]. There is no place for demarcation of gangrene before debridement even in the presence of potent parenteral combination antibiotics. In this study there was no indication that of the various antibiotic combination one was superior to the

other except based on sensitivity studies. The common approaches to wound dressing in this centre were the use of hydrogen peroxide, Eusol and pure honey. The qualities of honey as a dressing materials has been well documented by Efem [17] and Dumford [18].

The diagnosis of Fournier's gangrene when in doubt can be clarified with ultrasonography and CT scan so also is the extent of skin involvement. These radiological imaging may also be required for diagnosis of the underlying predisposing factors. Ultrasonography usually reveals soft tissue gas and areas of fluid collection. CT findings are similar to that of Ultrasonography but additionally may show fluid tracking along the deep fascia plains [19]. There was no indication that both modalities were used either because of issues of availability or cost. The place of *Escherichia coli* as the infective organism in combination with other organisms is well elucidated by this study. This centre has no facilities for anaerobic culture which probably accounted for the growth of only *Escherichia coli*.

The scrotum has an excellent regenerative capacity with resultant good cosmesis if allowed for long enough [5]. Skin grafting, rotational flap and scrotal reconstruction done for patients in this study were meant to reduce the duration of stay in hospital and therefore reduce cost. There were no adjunct surgeries such as suprapubic cystostomy, colostomy or penectomy. There has been a tendency towards more aggressive multidisciplinary approach to the management of patients with Fournier's gangrene in intensive care units. Corman et al [20] in their work had adjunct surgeries of one form or the other in 100% of their patients. These included suprapubic cystostomy (100%), colostomy (17%), and penectomy (4%). They had a survival rate of 96%, which they concluded depended on combining aggressive surgical and medical treatment. Penetomy is however a high price to pay for survival.

The role of hyperbaric oxygen and immuno-globulin has been well explored [20,21] but it is not available in our centre as in most parts of the developing tropical African countries.

Fournier's gangrene from the fore going has variable onset and course both in this study and others from Africa. Most of the patients were of low socio-economic status and the mortality in this study fall within the range reported by other authors. There was no case of female genital gangrene in this study, this also being similar to findings by many Africa authors, casting doubt on the existence of female genital gangrene in African. There is need for prospective study in this area both to confirm the existence and also document the factors that predispose to it in African females. It is also doubtful in our opinion whether female genital gangrenes and male genital gangrene with obvious predisposing

etiological factors should be referred to as Fournier's gangrene.
We are aware of the short-comings of this study. It is retrospective and our record keeping is less than perfect which was responsible for some of the less-than-perfect results recorded above. We however believe that despite of these set-back, some of the critical issues in Fournier's gangrene have been well expounded by this study.

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