

Fournier's gangrene in the HIV era

Peter Ngugi¹, George Magoha¹, Paul Nyaga²

1. University of Nairobi, Department of Surgery

2. Marsabit hospital, Department of Surgery

Abstract

Background: Fournier's gangrene is a devastating condition that affects mostly patients whose immunity has been reduced. There is increasing evidence for increasing incidence of the disease in those with HIV disease.

Objective: To evaluate the presentation, bacteriology and outcome of Fournier's gangrene in our area in recent times in view of the high prevalence in Nairobi and its environs.

Results: One hundred and forty six patients were treated for Fournier's gangrene during the study period; all were male. They had a mean age of 38.6 years (range 2 months – 86 years). HIV infection was the most common associated underlying illness (16.4 %), followed by diabetes mellitus and alcoholism (11%).

Conclusions: HIV infection is emerging as leading predisposing factor and has overtaken diabetes in predisposing for Fournier's gangrene in Kenyatta National Hospital.

Keywords: Fournier's gangrene, HIV.

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Introduction

Fournier's gangrene is an uncommon disease that is easy to diagnose and whose principles of treatment are clear but for which treatment outcome remains poor with high morbidity and mortality¹. In a review of publications in English literature from 1966 to 1999 Eke et al and noted that there was consensus on early recognition, urgent resuscitation, use of multiple anti microbial agents, and surgical debridement as the principles of its management. Controversy however, remains on the role of conservative treatment in the form of wound dressing, use of honey or the benefits of hyperbaric oxygen^{2,3,4}. Laor et al developed the Fournier's gangrene severity index score by studying the physiological and laboratory parameters in 30 patients and modifying the acute physiology and chronic health score APACHE, to generate a simple and objective measure for prognosis; the Fournier gangrene severity index score. FGSIS⁵. This has been validated by other studies^{6,7,8}. The strength of this score lies in its indication of physiological state and metabolic derangements at admission and during treatment; which ultimately contribute to outcome.

Ayumba et al studied Fournier's gangrene at Kenyatta National hospital Nairobi, highlighting some aspects of epidemiology and outlining the management of the condition in this setting^{9,10}. This was about a decade ago and it is likely that the situation has changed over the years. The purpose of this study was to evaluate the presentation, investigations, associated illnesses, management and outcome of Fournier's gangrene over the past decade in the same setting particularly in view of increased HIV infections.

Materials and methods

This was a retrospective review of all patients treated for Fournier's gangrene at Kenyatta National Hospital between 1st January 1998 and 31st December 2007. Ethical approval was sought and granted by the Kenyatta National Hospital Ethical Review Committee. The files were identified after listing all the names of patients listed as having been treated for Fournier's gangrene at the Kenyatta National hospital during the study period. A questionnaire was used to extract data from all patients listed in the medical records department as having been treated for Fournier's gangrene during the study period. This questionnaire was different from the one used by the previous group but no internal validity for the questionnaire had been done. Only patients whose files could be traced were used in the study. One hundred and forty six patients were listed as having been treated for Fournier's gangrene during the period under review. The questionnaire sought information on patients demographic data, the presenting symptoms, primary source and anatomical

Corresponding author:

Peter Ngugi

University of Nairobi, Department of Surgery

mungaingugi@uhmc.co.ke

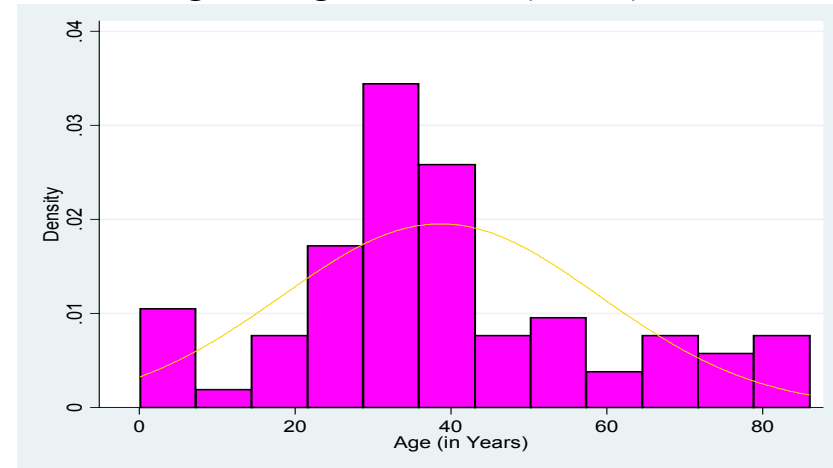
distribution of the disease were recorded. It also had questions on the investigations done, the treatment given, the procedures done and antibiotics used. Outcome data on morbidity and mortality was also recorded. The extracted data was checked for inconsistencies and validated after which the data was then entered into a Microsoft Excel™ spreadsheet and analyzed using the Statistical Package for Social Sciences (SPSS ver. 15, SPSS Inc.). Data was cleaned and exploratory data analysis undertaken to identify the nature of the distributions for informing the right statistical procedures. Descriptive statistics was conducted for the following socio-demographic variables: the presenting symptoms, anatomic distribution of the disease, the primary sources, predisposing condition, and duration of hospital stay. Spearman correlation analysis was conducted between hospital stay and the continuous variables. An independent sample t-test was for normally distribution variable and the complications. Since hospital stay was

skewed to the right (not normally distributed), Mann-Whitney U- statistics for Median (Non-parametric) was used. The hospital stay was later re- grouped and independence test was done using chi-square techniques. P-value of less than 0.05 was considered statistically significant. For categorical variables the hospital stay was re-grouped and independence test was done. P-value of less than 0.05 was considered statistically significant.

Results

A total of 146 patients were treated for Fournier's gangrene in the study period. The mean age was 38.6 years, median age of 35.0 years, with a range of 86 years (0-86) (Figure I). All the patients were male. All files of patients recorded as Fournier's gangrene were traced. It is probable that some patients might have been missed because of their not having been labeled as Fournier's gangrene but this was not quantifiable.

Figure 1: Age distribution (n = 146)



The distribution according to area of residence showed that 61% (90 patients) were from the city of Nairobi and the rest from rural areas. 74% (109 patients) had re-

ceived only primary school education or less with only 1.4% (2 patients) having completed university education. 53% (78 patients) were unemployed. (Table I)

Table I: Socio-demographic factors

	frequency	percent
Residence		
urban	90	61.6
rural	55	37.7
forighner	1	0.7
level of education		
none	50	34.2
primary	59	40.4
secondary school	26	17.8
college	9	6.2
university	2	1.4
occupation		
business	27	34.2
civil servant	6	4.1
employed	13	8.9
unemployed	78	53.4
other	22	15.1
presenting symptoms		
swelling	140	95
pain	116	79.5
fever	116	79.5
ulceration	77	52.7
other	17	11.6

The commonest presenting symptom was a perineal swelling in 95% (140 patients), followed by pain and fever in 79.5% (116 patients) and ulceration in the perineum in 52.2% (77 patients). Other symptoms were found in 11.6% (17) of the patients. (Table II)

The perineum was listed as the only site involved in 56.2% (82 patients) the scrotum and penis in 26.7% (39 patients) and the groin in 17.1% (25 patients). A minority of patients had more extensive disease with involvement of the lower abdominal wall in 6.8% (10 patients) and chest wall involvement in 0.7% (1 patient) (Table II)

Table II Anatomic distribution primary source predisposing factors, and hospital stay

Anatomic distroibution	n	%
perineum	82	56.2
scrotal	39	26.7
penile	39	26.7
groin	25	17.1
low abdominal wall	10	6.8
chest	1	0.7
other	12	8.2
primary source		
skin	68	46.6
genitourinary	42	28.8
colorectal	20	13.7
not indicated	16	11
predisposing condition		
Perineal abscess	68	28.1
perineal TB	43	1.4
inguinal hernia with or without HIV	20	29.5
skin sepsis	1	0.7
none found	59	40.4
hospital stay		
<1 week	34	23.3
1-2 weeks	59	40.4
3-4 weeks	18	12.3
>4 weeks	35	24

Perineal skin was the commonest origin of the infection and was found in 46.6% (68 patients) followed by the genitourinary tract in 28.8% (42 patients) and the ano-rectal region in 13.7% (20 patients). The source of infection could not be determined in 11% (16 patients). (Table II)

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The associated underlying illnesses included Human Immunodeficiency Virus infection in 16.4% (24 patients), diabetes mellitus in 11% (16 patients), and alcoholism in 11% (16 patients), and malignancy in 2.7% (4 patients), and steroid use in 0.7% (1 patient).

Empirical broad-spectrum antibiotic cover was initiated in all the patients. The drugs used included metronidazole in 119(81.5%), crystalline penicillin in 65(44.8%) gentamycin in 45(30.8%), ceftriaxone in 30(21%), amoxicillin/clavulanic acid in 23(16%) and ampicillin/cloxacillin in 29(20%) patients Others antibiotics were less frequently used. The antibiotics were then revised based on culture and sensitivity test results.

Predisposing conditions included perineal abscesses 28.1% (41 patients), complicated inguinal hernia 28.1% (41 patients), perineal abscess with tuberculosis 1.4% (2 patients), and inguinal hernia with HIV 1.4% (2 patients).

The majority, 40.4% (59 patients) stayed in the hospital for two weeks, 23.3% (34 patients) stayed for one week and 36.3% (53 patients) for 3 or more weeks. Thirty five patients 24% (35 patients) stayed for more than 4 weeks. (TableIII)

Table III: Relationship between hospital stay with other factors

	Complications		P-value
	Yes, n (%)	No, n (%)	
Duration (weeks)			
< 1	7 (13.2)	27 (29.0)	<0.001
1-2	16 (30.2)	43 (46.2)	
3-4	6 (11.3)	12 (12.9)	
> 4	24 (45.3)	11 (11.8)	
Outcome			
Discharged on FUP	50 (94.3)	66 (71.0)	0.001
Dead	3 (5.7)	27 (29.0)	
Primary Source			
Skin	24 (45.3)	44 (47.3)	0.322
genital-urinary	18 (34.0)	24 (25.8)	
colo-rectal	4 (7.5)	16 (17.2)	
Anatomical distribution			
Perineum	31 (58.5)	51 (54.8)	0.669
Scrotal	49 (92.5)	76 (81.7)	0.076
Penile	16 (30.2)	23 (24.7)	0.474
Groin	12 (22.6)	13 (14.0)	0.181
Lower abdomen. wall	2 (3.8)	8 (8.6)	0.267
Chest_axilla	0	1 (1.1)	0.449

There was positive correlation between the hospital stay and the age of the patients with 0.06 coefficient of correlation though not statistically significant (p-value=0.487). The mean age for the patients with complications was 36.9 years compared to 39.6 years those without complications (P-value=0.448). Age was therefore not a significant factor in the development of complications. The median hospital stay for patients with complications was 21 days Inter Quintile Range IQR=10-30) while those without had a median of 7 days (IQR=3.5-17.5) (p-value<0.001, $\chi^2 = 14.8$). The presence of complications almost doubled the duration of Hospital stay. The mean stay for the patients with complication was 23.2 days compare to 12.9 days for those without complications (P-value<0.001) (Table III) Complications recorded as having occurred included skin defects 47 patients, testicular loss in nine patients and urethral fistulae eight patients. The primary source of infection did not affect the presence or absence of complications (table III). Thus the severity of the disease depended on other factors other than source. Similarly there was no relationship between the anatomical distribution of the disease and the possibility of complications. However the duration of hospital stay and whether patients survived had a significant relationship with the presence of complications.

Discussion

This condition was first described by Prof Jean Alfred Fournier (1832-1914) who in 1883 described a fulminant gangrene of the scrotum that was of sudden onset in five otherwise healthy young men without any apparent reason. It is a rare but devastating disease with a high morbidity and mortality. In this study 30 of the 146 patients died (20.5%). The most common cause of death was overwhelming sepsis (90%). Other causes of death included coagulopathy (3.3%), acute renal failure (3.3%) and multiple organ dysfunction (3.3%). The classic Fournier's gangrene is characterized by yield of polymicrobial cultures. Most of the organisms grown are the commensals in the perineum and genitalia including streptococcus spp, klebsiella, coliforms and corynebacteria among others. Others include clostridia perfringens, anaerobic streptococci pseudomonas aeruginosa and even Clostridium tetani was reported. In this study blood culture were commonly done. Blood cultures usually give less satisfying yields even in presence of clinical sepsis.⁴

In our study the commonest site of origin as previously reported^{2,6} remains the perineal skin (46%) followed by the genitourinary tract (28%), and the colorectal canal (20%). In 11 % the source could not be determined (idiopathic).

The age distribution of the patients in this study as in contemporary literature^{2,9,15} shows the majority of patients were in the 30-60 year age bracket. The mean age of diagnosis has been rising since Fournier described the condition, with recent reports indicating mean age of diagnosis rising from 40s to 60s. The most notable characteristic is association of Fournier's gangrene with an underlying systemic disease more so immuno-compromising diseases such as malignancy, steroid use, and recently HIV. The prevalence of these diseases increases the incidence of Fournier's gangrene.^{2,9,15}

Over the years this eponym Fournier's gangrene has been used for fulminant gangrene in other regions of the body such as the perineum, anterior abdominal and chest wall sometimes in the axilla^{11,12}. Wilson described the underlying pathology as necrotizing fasciitis of deep fascia with subsequent loss of all the overlying skin and subcutaneous tissues.¹³ Fournier's gangrene has been reported from all parts of the world. It is relatively a rare disease with an estimated incidence of 1:7500.¹⁴ It remains predominantly a male disease with a male to female ratio of 10:1^{2,14} and it has been described in all age groups including children^{2,9}. The male predominance of the condition in this study and only 146 patients having been treated over in 10 years agrees with these earlier findings.

A dedicated search for the primary source will trace the portal of entry. In many cases, the source of sepsis is traced to local skin lesions, urogenital or colo-rectal region.¹⁶ A fraction of the patients still yield no identifiable source and were deemed idiopathic. Systemic illnesses are common in Fournier's gangrene; the most reported being diabetes mellitus. Others include advanced malignancies especially in colorectal region, use of cytotoxics, or steroids, and lately the HIV-AIDS among others. Ayumba et al showed 60% association with diabetes mellitus, 4.0% with HIV AIDS.

There is a fear that HIV pandemic might lead to a rise of Fournier's gangrene in Africa. Whereas diabetes mellitus is found to be the main comorbidity in western literature^{2,9,15} occurring in as many as 60% of patients, we found that HIV infection was the main associated illness in our set up with diabetes and alcoholism being the second most common. This could be due to the higher sero-prevalence of HIV in

our source population. Whereas in the Ayumba series¹⁰ only four percent of the patients had HIV in our series 10 years later 16 % had HIV However, Efem¹⁸ reported a series of 20 Nigerian patients with none of them having HIV infection. Thus the main consideration is the hosts lowered immunity rather than the cause of the lowered immunity.

Alcoholism was found to be a major contributing factor (11%). Alcoholism lowers host immunity by inducing a state of malnutrition and also encourages perineal sepsis due to the associated poor hygiene. There is also a delay in seeking intervention due to masking of symptoms such as pain because of altered mental state

The mortality of 20.5% and long hospital stay concur with earlier literature¹⁹. In the study by Ayumba⁹ two of the 46 patients died 4% whereas in our study 30 of the 146 patients died (20.5%) indicating an increased severity of the disease in the study period. It affects the uneducated and unemployed more with level of education affecting outcome. This could also be a reflection of lower socio-economic status being a marker for poorer outcomes.

The presence of complications increases the length of hospital stay as well as mortality. The disease affects primarily the perineum and our study shows that in 50 % of the time only the perineum was involved. Thirty of the 146 patients died (20.5%). The most common cause of death was overwhelming sepsis (90%). Other causes of death included coagulopathy (3.3%), acute renal failure (3.3%) and multiple organ dysfunction (3.3%). Overwhelming sepsis thus remains a main contributor to mortality in these patients.

Conclusion

HIV may be emerging as an important predisposing factor for Fournier's gangrene in our setting and may have overtaken diabetes. The incidence and severity of Fournier's gangrene appears to be increasing in this era of HIV disease, causing a lot of morbidity and mortality. Further research is needed on this relationship between HIV infection and Fournier's gangrene.

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