



## Aetiopathological Study of Fournier's Gangrene and Its Management

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### Abstract

**Introduction:** Fournier's Gangrene is an acute fulminating cellulitis of the scrotum which develops suddenly and often without any apparent cause. Fournier's Gangrene is a surgical emergency and can be managed by prompt diagnosis along with immediate debridement of involved necrotic tissue and institution of appropriate antibiotics therapy.

**Materials & Method:** A Observational Prospective study done in VIMSAR, Burla, from nov. 2017 to oct. 2019. Total number of patient taken was 40.

**Discussion:** Aggressive surgical debridement following initial resuscitation with IV fluids, Proper antibiotics, analgesic can decrease the mortality of the disease.

**Conclusion:** Early diagnosis and prompt and better management of this emergency condition was undertaken so as to reduce the mortality and morbidity of this serious condition to a minimum.

**Keywords:** Fournier's Gangrene, Debridement.

### Introduction

Fournier's Gangrene is an acute fulminating cellulitis of the scrotum which develops suddenly and often without any apparent cause. This idiopathic gangrene is an unusual condition in a healthy person- it is a surgical emergency and needs to be managed accordingly. Scrotum is an unlikely site of gangrene because this area of the human body is richly supplied with blood from different sources and free anastomosis occurs between those arteries. Since the areolar tissue of scrotum is lax there is a chance that due to this, spread of infection is facilitated which causes severe edema of scrotum, thus further occluding the vascular supply of the region. The

epidemiology has changed from the original description in that the disease is no longer restricted to young men but it may affect a wide age range, from neonates to the very elderly. Various Predisposing factors have been identified, e.g., diabetes mellitus, steroids, immunosuppression, alcohol abuse, etc. There are certain risk factors which are of prognostic significance, e.g. the presence or absence of associated underlying disease delay in the initiation of treatment, the treatment modality, etc. In spite of extensive work on the subject and advances in anti-microbial therapy and aggressive surgical approach, the condition still carries a high mortality and should be considered a potentially

lethal condition. Prompt diagnosis of this condition is critical along with immediate debridement of involved necrotic tissue and institution of appropriate antibiotic therapy. Despite aggressive modern management, the mortality rate in Fournier’s gangrene may be as high as 16% to 40 %.

In spite of the identification and initial description of this disease by Fournier more than a hundred years ago, its various aspects like predisposing factors, causative organisms, clinical presentation, management, outcomes, etc. need further Study.

**Materials and Method**

Institutional ethical committee clearance and informed consent of the patients was taken before the study. 40 patients of Fournier’s gangrene were studied at VSS Institute of Medical Sciences and Research, Burla, Odisha, India during Nov.2017 to Oct. 2019. Study design was Observational Prospective study

**Inclusion Criteria:** All the patients presenting with clinical features of Fournier’s gangrene admitted to department of General surgery from November 2017 to October 2019.

**Exclusion Criteria:** Patient with- filarial scrotum, -infected sebaceous cyst of scrotum -gonococcal balanitis with edema

**Observation**

**Table 1** Age Incidence

Age Group (yrs)	No. of Patients	Percentage % of total (n=40)
00-10	1	2.5
11-20	2	5.0
21-30	4	10.0
31-40	8	20.0
51-60	10	25.0
41-50	9	22.5
61-70	6	15.0
=>71	0	0.0

Mean= 44.86875 yrs      Median=48 yrs

This study consisted of 40 (forty) patients of clinically diagnosed Fournier’s Gangrene admitted in the Indoor Wards of Dept. of General Surgery, VIMSAR, Burla, Sambalpur, during the

period Nov. 2017 to Oct. 2019. The total number of patients admitted in the Surgery during the above period was 9030; therefore, the incidence rate of Fournier’s gangrene in our hospital being 4.4297 per thousand patients admissions. Most of the patients were in the age group of 31 o 60 years, with a mean=44.86875 yrs (+\_15.72714 yrs)

**Table 2** Distribution of Cases by Socio-Economic Status

Socio-Economic Group	No. of Patients	Percentage of Total (n=40) %	Habitat	Number (% of total)
Low	31	77.5	Rural	27 (67.5)
			Urban	4 (10.0)
Middle	9	22.5	Rural	1 (2.5)
			Urban	8 (20)
High	0	0	Rural	0
			Urban	0

Out of the 40 patients in our study, 28 were from rural areas (70%), whereas, 12 were from urban areas (30%). Thirty one patients belonged to Low Socio-Economic (77.5%), and 9 to Middle Socio-Economic Group (22.5%). None of the patients were from High Socio-Economic Group. This table shows that persons of Low SE strata are predominantly affected with Fournier’s gangrene.

**Table 3(a)** Predisposing Factors and Associated Conditions

Predisposing Condition	Number of Patients	Percentage of Total (n=40)%
Boil	12	30.0
Abscess / Boil (large)	6	15.0
Minor Trauma / Scratch	9	22.5
Infections (nearby)	5	12.5
Operative Procedures	1	2.5
Unknown	7	17.5

**Table-3 (b)**

Associated Condition	Number of Patients	Percentage of Total (n=40)%
Poor Personal Hygiene	18	45.0
Smoker	12	30.0
Diabetes Mellitus	11	27.5
Alcoholic	10	25
Hypertension	9	22.5
Infections	3	7.5

In 18 cases, boil / abscess were the initiating factor; minor trauma / scratch ware implicated in 9 cases and no cause could be determined in 7 cases.

**Table- 4** Clinical Features and Lab Work-up Results Association

	Parameter	Number of Patients (n=40)	Percentage %
Clinical Features	Fever with Tachycardia	24	60.0
	Septicaemia at Presentation	10	25.0
	Foul / Fetid Odour from wound	21	52.5
Lab Results	↓ Hb %	18	45.0
	↑ PMN%	31	77.5
	↑ FBS / RBS	17	42.5
	↑ Sr. Cr / BI Urea	19	47.5

Majority of the cases had systematic manifestations of infection, namely, fever, malaise, tachycardia, prostration. Fever being the commonest, it was present in 24 out of 40 patients, all patients with fever also complained of malaise and body ache. General feeling of ill health was present in all the cases. Ten of patients admitted were in septicemic / hypovolemic shock at the time of presentation, and needed vigorous resuscitation with IV fluids, antibiotics and blood

transfusion. Most of the patients (29 of 40 = 72.5%) had Leucocytosis, i.e., a total leukocyte count greater than 9060 per cu.mm. raised PMN count (N= 40-70%) was present in all patients including 2 with normal leukocyte counts (31 of 40 patients= 75%). Eighteen of the patients were anemic at time of admission and most of them required blood transfusions during course of their management. Foul smelling fetid odor was noted in 21 of the 40 patients.

**Table 5** Organisms Isolated / Cultured from Pus in wounds

Group	Organism Isolated	Number of cases (n=40)	Percentage %	
Gram Positive	Staphylococcus (alone)	5	12.5	8 (20.0%)
	Streptococcus (alone)	3	7.5	
Gram Negative	E coli (alone)	5	12.5	19 (47.5%)
	Pseudomonas	3	7.5	
	Proteus	4	10.0	
	Klebsiella	2	5.0	
	Citrobacter	3	7.5	
	Acinetobacter	2	5.0	
Mixed Growth	Staphylococcus & Streptococcus	1	2.5	3 (7.5%)
	E coli & Staph / Strep	2	5.0	
None	No Growth	10	25.0	10 (25.0%)

Most common isolates from patients in our study were Staphylococcus (alone) or E coli (alone). Predominant were other Gram Negative organisms, especially of Enterobacteriaceae

family. No growth occurred in 10 samples on culture. Clostridium group was not isolated in any case because of lack of facilities for anaerobic culture.

**Table-6(a)** Management & Time Relationship of various Events

Event	Mean Duration (days)	Median (Days)	Std. Dev.
Appearance of gangrene after onset of illness	5.325	3	6.844004
Duration of systemic symptoms after debridement	3.5	3.5	1.132277
Duration of Hospital Stay	12.875	12	6.58743

**Table-6(b)** Treatment offered

Mode of treatment	Number of Patients (n=40)	Percentage %
Debridement only (wide)	7	17.5
Secondary Suturing	26	65.0
Secondary Suturing + Skin Grafting	7	17.5

**Table-6(C)** Duration of Hospital Stay and Outcome

Days of Hospital Stay	Number of Patients (n=40)(%)	Improved	Referred/ LAMA	Died
<=7	7 (17.5)	1	0	6
8 to 14	22 (55.0)	19	3	0
15 to 21	7 (17.5)	7	0	0
22 to 27	2 (5.0)	2	0	0
=>28	2 (5.0)	2	0	0
Total	40	31 (77.5%)	3 (7.5%)	6 (15%)

Average duration of systematic toxic symptoms after primary wound excision and debridement was 3.5 days ( $\pm 1.132277$ ) in two cases with extensive scrotal skin loss, their testes could not be placed in the scrotal sac – hence, their testes were transpositioned in the subcutaneous plane on either side of the upper thigh and skin sutured in the midline in the perineum.

### Discussion

Fournier's gangrene was recognized as a separate disease entity more than 100 years ago, but exact aetiology of the disease is still unknown. As time and technology have progressed, various predisposing factors and aetiological factors have begun to emerge to explain this rather serious surgical emergency. The epidemiology has changed from the original description in that the disease is no longer restricted to young men, but may affect individuals of a wide age-range. In our study of 40 (forty) patients of Fournier's gangrene, the age range was between 9 months and 70 years. Most of the patients (27- 67.5%) were between the age-group of 31 to 60 years. In our study, 31 out of 40 patients belonged to low socio-economic group, 9 were of middle and none from high socio-economic group. In our study, we found that in about 22.5% (9) of cases, minor trauma or scratch was responsible for the

development of the disease condition. In about 45% of the cases, boil/ abscess were responsible and no cause was found in 17.5% (7) of the cases. In Fournier's original description too, the disease was of Idiopathic origin. In our series, we found 11 out of 40 patients of Fournier's gangrene having Diabetes Mellitus as a co-morbid condition. In our study bacteriological analysis of pus sample from wounds showed the predominance of Gram negative organisms (E Coli, Citrobacter, Proteus, Pseudomonas, etc.) in the wound (19 cases of 40 – 47.5%), as compared to Gram positive organisms (Staphylococcus, Streptococcus) (8 cases- 20.0%); whereas, 10 (25.0%) samples failed to show up any organisms in the pus specimen. Although anaerobic culture could not be done in our study, the clinical presentation of none of our cases showed features of gas gangrene. Neither were toxic symptoms as severe in gas gangrene, nor were there any presence of gas in the scrotum. Systemic symptoms, e.g.; fever with chills, tachycardia and dehydration were also present in 24 to 40 cases (60%). General feeling of ill health was present in almost all the cases. In our study, the involvement with Fournier's gangrene of whole or most part of the scrotum was most commonly seen (26 of 40 cases - 65%), partial involvement seen in 12 of 40 cases (30%). In our series, we have seen complete

recovery in most of the cases (31 of 40- 77.5%), without excessive morbidity or mortality; 6 of the 40 patients (15%) died during course of management in the hospital, due to various reasons and 3 were referred to higher center or left against medical advice (LAMA). In many of the earlier cases reports, a typical mortality range of 25 to 40% was depicted, but in our study, it was 15% (6 of 40 patients died). The lower mortality rate was due to aggressive and prompt management of this emergency condition with high grade antibiotics and wide debridement, coupled with daily dressings

### Conclusion

The diagnosis of Fournier's gangrene is mainly based upon clinical grounds and there should be high index of suspicion. The basic treatment of this disease involves early debridement of all non-viable tissues after aggressive resuscitation, early antibiotic treatment, limitation and / or abolition of any local / general infective / immune-suppressive processes present in the patient and occasional anatomic reconstruction.

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