Research Article

Fournier's gangrene: a review of 38 cases in a tertiary hospital

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Abstract

Background: Fournier's gangrene is an infective necrotizing fasciitis of the perineal, genital or perianal regions. It is caused by polymicrobial infection. The infective process leads to thrombosis of subcutaneous blood vessels, resulting in gangrene of the overlying skin. It has high morbidity and mortality. **Study design**: Case series. **Aim of the study:** To study the incidence, age distribution, mode of presentation, abnormalities in biochemical parameters, to lay down parameters for prognostication and study the outcome of fournier's gangrene. **Methodology:** This prospective study was conducted upon 38 patients diagnosed with Fournier's gangrene in surgical unit of our institute from November 2007 – October 2009. **Results:** Total number of surgical admissions in our institution during the period from November 2007 – October 2009 were 11,507. Of which, the number of cases of Fournier's Gangrene were 38 (Incidence - 0.33%). The highest incidence of Fournier's gangrene is seen to occur in 4th and 5th decades. The main features at the time of presentation were scrotal pain, fever, scrotal edema and scrotal skin necrosis. Commonest source of infection is found to be genitourinary. The extensive lesions often tended to be of anorectal origin and in diabetic patients. E. coli was the commonest organism isolated followed by Klebsiella and Staphylococcus. Anaerobes were identified by gram stain. On an average in patients stay was around 16 days. **Conclusion:** Fournier's gangrene is associated with high mortality. Early recognition, aggressive debridement, broad-spectrum antibiotics and intensive supportive care helps in reduction of mortality.

Key words: Fournier's gangrene, Necrotizing fasciitis, infective necrotizing fasciitis.

Introduction

Fournier's gangrene was first described by Baurienne in 1764 [1]. Jean Alfred Fournier gave the condition its eponymous name in 1883 [2].

Fournier's gangrene is defined as necrotizing fasciitis resulting from a rapidly progressive polymicrobial infection involving aerobes and anaerobes gram-positive and gram-negative organisms acting synergistically. It is of infective origin characterised by sudden scrotal inflammation with rapid onset of gangrene leading to exposure of the scrotal contents. The condition can spread rapidly to involve the fascia and skin of the penis, perineum and abdominal wall. Although it can occur in conjunction with sepsis of the testis, epididymis or perianal region, an obvious cause is absent in over half the cases. It can arise following minor injuries or procedures in the perineal area, such as a bruise, scratch etc.

Progression results from thrombosis of small subcutaneous vessels secondary to endarteritis obliterans, causing tissue hypoxia and ischemia, thus facilitating overgrowth of anaerobic microorganisms and making it difficult for antibiotics to reach these areas. [3,4] Many patients have underlying systemic diseases (e.g., diabetes mellitus, H. I. V. infection, chronic alcoholism etc.), which are responsible for the vascular and immune disorders that increase susceptibility to polymicrobial infection. [5]

Necrotizing soft tissue infections of the genitalia, as in other anatomic regions, require aggressive broad-spectrum antibiotic treatment, supportive care and

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urgent surgical drainage with aggressive débridement of the necrotic tissue. It is rare for the process to involve the testicles or deep tissues of the penis, so these structures should be preserved, if possible.

If the penile skin is necrotic, it can be débrided down to but not through the Buck's fascial layer. It is uncommon for the urethra to be involved [6].

Before doing debridement routinely catheterisation should be done to prevent accidental damage to urethra during debridement.

Sometimes toxicity is so severe that they may go for renal failure and other complications. Sometimes the condition may worsen rapidly leading to death.

Methadology

Inclusion criteria: Male patients with Fournier's gangrene.

Exclusion criteria: Female and paediatric patients with Fournier's gangrene.

All patients (N=38) selected as per criteria from November 2007 – October 2009 and admitted in surgical unit of Mahatma Gandhi Memorial Hospital, Kakatiya medical College, Warangal, Telangana, India, after ethical committee approval and patient consent were enrolled in the study.

Clinical diagnosis was based on patient's medical history and physical examination, which included as diagnostic criteria the presence of foul-smelling necrotic slough in the anogenital area associated with crepitus in the background of sepsis.

The study includes age, clinical presentation, biochemical parameters, bacteriology, predisposing factors, associated co-morbid conditions, time interval between admission and first surgical intervention, number of debridements, duration of hospitalisation and outcome were documented and analysed.

Results

In our hospital, 94,570 patients were admitted between the study period i.e. November 2007 – October 2009. Among them, the number of cases of Fournier's Gangrene was 38. Thus the incidence of Fournier's gangrene among the total hospital admissions was found to be 0.04 %.

Total number of surgical admissions during the same period was 11,507 and hence, the incidence of Fournier's Gangrene among total admissions under General Surgery at MGM Hospital was found to be 0.33%. Age ranged from 21 to 80 years with highest incidence of Fournier's gangrene noted in the 4^{th} and 5^{th} decades. Most common clinical features at the time of presentation were scrotal pain, fever, scrotal edema and scrotal skin necrosis.

The commonest source of infection is found to be genitourinary. Diabetes is most common co-morbid condition. The extent of the lesion was localized in majority of the cases. The extensive lesions often tended to be of anorectal origin and in patients with diabetes.

Table-1: Time interval between onset of symptoms and presentation at the hospital

Time Interval	No. of Patients	Percentage
< 48 hrs	0	0
48 hrs – 1 week	22	57.90
> 1 week	16	42.10
Total	38	100

None of our patients presented within 2 days. Most of them came around 1 week with a mean presentation at 6.6 days from the onset of the disease

In our experience, Diabetes was the commonest abnormality. Alterations in the normal biochemical values were found in significant number of patients. But bleeding and clotting times remained within normal limits in all except 1 patient. Our study shows a tendency towards polymicrobial infection pattern.

Table-2: Biochemical Abnormalities In Fournier's Gangrene.

Investigation	No. of Patients	Percentage
Anemia	20	52.63
Leucocytosis	12	31.58
Hyponatremia	13	34.21
Increased Serum Creatinine	13	34.21
Hyperglycemia	25	65.79
Glycosuria	16	42.10
Decreased Serum Albumin	6	15.79
Increased BT and CT	1	2.63
Hypocalcemia	12	31.58

Table-3: Bacteriology of Fournier's Gangrene.

Organism	No. of Patients	Percentage
Staphylococci	9	23.68
Streptococci	4	10.53
E. coli	22	57.90
Klebsiella	9	23.68
Proteus	5	13.16
Pseudomonas	6	15.79
Bacteroides	5	13.16
Clostridium	5	13.16

In our study, E.coli was the commonest organism found followed by Klebsiella and Staphylococcus. Anaerobes did not undergo culture and sensitivity testing but were identified by gram stain alone. Stains of smears were made on clinical suspicion or if pus culture for aerobes was negative. In our study, each patient underwent an average of 2.51 debridements.

Table-4: Procedures done for control of gangrene and reconstruction.

Procedures	No. of Patients	Percentage
Debridement with healing by secondary intention	16	42.10
Debridement with secondary suturing	10	26.32
Debridement with split skin grafting	3	7.90
Debridement with Orchidectomy	4	10.53
Debridement with thigh pouch implantation	1	2.62
Debridement with diversion	4	10.53

Duration of hospital stay: On an average, our patients stayed in hospital for 16 days as inpatients. 4 patients expired and were not included in the study.

In our study patients with diabetes were found to stay in the hospital for a longer duration and also to undergo more procedures than non – diabetics. A total of 4 (10.53%) patients with Fournier's gangrene died during the study period.

Table-5: Source of infection and effect on mortality.

Source	Total No.	No. of Deaths	Percentage of death of cases
Anorectal	6	2	33.33
Genitourinary	16	0	0
Both	9	1	11.11
Not identified	7	1	14.29
Dermal	0	0	0

33.33% of patients with an anorectal source of infection died in contrast with those who had a genitourinary source. One patient died with an idiopathic cause of infection. One among the nine patients with both anorectal and genitourinary sources of infection died. Further, the four patients who died were diabetics highlighting the bad prognostic effect that hyperglycemia has on the disease process.

Table-6: Correlation of mortality with clinical features and biochemical abnormalities at the time of presentation.

Sign / Biochemical abnormality	No. of Patients with the finding	No. of Patients expired with the findings	Percentage
Crepitus	12	4	33.33
Shock	5	4	80
Anemia	20	4	20
Increased BT and CT	1	1	100
Hyperglycemia	25	4	16
Hypoalbuminemia	6	4	66.67
Hyponatremia	13	3	23.08
Increased serum creatinine	13	4	30.77
Hypocalcaemia	12	4	33.33

It is apparent that shock at the time of presentation, increased bleeding and clotting time constitute bad rognostic signs. Also, 33.33 % patients with crepitus and 66.66 % patients with hypoalbuminemia expired.

Discussion

The incidence of fournier's gangrene in our study is 0.04%. The age incidence of Fournier's gangrene is similar to the incidence reported in the Western literature [7]. In our study scrotal pain is present in almost all patients but shock and alterd sensorium are found in a few patients reflecting indolent course of the disease in this population.

The fact that ulcer (sequelae of skin necrosis) is found in all patients in our study is likely to be because of delayed presentation and non usage of scrotal ultrasound routinely for painful conditions of the scrotum which may pick up the disease early. In our study, a genitourinary source is twice as common as an anorectal one while in the West, some studies (Clayton [8] implicate the latter as being more common while in others [9] the differences between the two is less pronounced. A higher percentage of patients have no identifiable source in our study. This may be idiopathic but a more likely explanation is inadequate culture methods to find the source of infection. The most commonly isolated organisms are enterobacteria, particularly *Escherichia coli*, followed by Bacteroides, streptococci, Staphylococci, Peptostreptococci and *Clostridia*. These organisms are part of normal flora of the lower gastrointestinal tract and perineum.

Our patients required lesser number of debridements compared to west [10] probably due to indolent course of the disease in Indians.

In the West a definitive procedure for closure of the wound was offered in all cases. This may be because of the more aggressive nature of the disease at presentation which warranted a more extensive debridement with a resultant larger area of skin loss. Diversion procedures were also significantly more common than our experience showing that the disease pursued a more fulminant course that required all possible measures to decrease local contamination. A greater awareness of patients in West probably accounts for a trend to preserve the testis as the age incidence in both the studies is approximately the same and younger to that of our patients. As none of our cases went for flap closure, no meaningful comparison could be done.

Mortality was higher in diabetics than in non – diabetics and also in people who had an anorectal source of infection [11], [10]. As reported by Clayton et al [8], hypoalbuminemia appears to have a strong association with mortality in Fournier's Gangrene but whether it is contributory is not clear. Hypocalcaemia does not appear to be as significant in our study as reported by Blanchard RJ [12].

The average hospital stay was 19 days among survivors which is less than the stay of 40 days reported by Baskin et al [10]. The discrepancy probably can be attributed to the indolent course of the disease in India, a tendency for more radical procedures abroad.

Conclusion

Fournier gangrene is associated with high mortality. Early recognition, aggressive debridement, broad-spectrum antibiotics and intensive supportive care helps in reduction of mortality.

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