

Pattern of Presentations and Etiological Factors of Fournier's Gangrene

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ABSTRACT

Objective: The purpose of current study is to outline the pattern of presentation and etiological factors of Fournier's gangrene (FG) at Pakistan Railway Hospital, Rawalpindi, Pakistan.

Study Design: A Prospective observational study

Place and Duration of Study: This study was conducted at the Pakistan Railway Hospital, Rawalpindi from Jan 2024 to June 2024.

Methods: This study included patients above the age of 13. Data collected and analyzed on predesigned proformas. 30 adult patients of FG were included in this study. The inciting event, predisposing conditions, site of involvement, microbiology and outcome were studied in these patients.

Results: The mean age for 30 patients was 54.8 ± 15.19 years. 29 (96.6%) were males and only one (3.3%) was a female. A cause could be traced back in the history of only 18 patients, 3 had urethral stone with a history of manipulation, one had paraphimosis, one had insect bite, 4 (13.3%) had of perineal abscess, 4 (13.3%) had a perirectal abscess, 5 (16.7%) had a urethral stricture. Predisposing factors were present in all of them; 20 (66.6%) were diabetic. One (3.3%) had a history of pelvic irradiation for malignancy, extremes of age (age > 70 years were present in 5 (16.6%) patients, 3 (10%) were immuno-compromised, 1 (3.3%) had a history of malignancy i.e. colonic carcinoma, 2 (6.7%) were on chronic steroid use and none had alcoholism or chemotherapy. The commonest organism isolated was *E. coli*. All patients were managed with surgical debridement and antibiotics. 6 (20%) patients expired.

Conclusion: FG has high mortality. In most patients the scrotum is involved, urethral strictures and stones are the commonest causes and diabetes is the commonest predisposing condition. Polymicrobial infections mostly containing *E. coli* and *Klebsiella* are the commonest.

Key Words: Fournier's Gangrene; necrotizing fasciitis; Etiological factors

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INTRODUCTION

Fournier's gangrene (FG) is a severe condition caused by a combination of bacteria that work together. This infection starts in the perineum and scrotum and spreads through different layers of tissue, causing the death of soft tissue and needs immediate medical attention. It first described a condition in 1883 that was initially believed to be an unexplained gangrene of the scrotum. Unfortunately, the outlook has been grim since then.¹

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Most infections come from areas such as the rectum, urinary tract, and skin with pain, swelling, or redness. Sometimes crackling sensation or blisters on the skin. Tissue death may also occur in some cases.² Certain medical conditions like diabetes, alcoholism, paralysis, neurological problems, cancer, and weakened immune systems can make people more vulnerable to this condition.³ Bacteria such as staphylococcus, streptococcus, coliforms, pseudomonas, bacteroides, and clostridia are commonly found in tissues. The first step in treating the condition is to have surgery without delay. While additional methods like ultrasound, biopsy, or imaging tests may be used, the diagnosis mainly relies on a clinical assessment.⁴ FG can be fatal, with a mortality rate of up to 45%. This is due to complications such as disseminated intravascular coagulopathy or severe sepsis. These complications may cause multi-organ failure.⁵ In 1883, Jean Alfred Fournier reported on a case where five young men suddenly developed gangrene in their penis and scrotum, despite having been healthy before. The cause was unknown.⁶ Fournier discovered three main characteristics of the syndrome: it appears

suddenly in a young, healthy man, it progresses quickly, and its cause is unknown⁷.

In the decade following 1996, only 600 cases of FG were reported in global literature. The majority of those affected were in their 60s or 70s and had additional underlying medical conditions.⁸ Occasional reports have mentioned a similar infection occurring in females.⁹ The mortality rate is 40%, and it can go up to 78% if the person is already suffering from sepsis when they are admitted to the hospital.¹⁰

Managing patients with certain conditions is important to prevent sepsis. After controlling sepsis, different medical fields work together to achieve better results.

METHODS

Pakistan Railway Hospital in Rawalpindi conducted this prospective observational study, from Jan 2024 to June 2024, for six months. This study included 30 patients with Fournier's gangrene. The Institutional Review Committee approved the study protocol. Data was collected from patients after obtaining informed consent through a standardized proforma. The study's eligibility criteria required participants to be thirteen years old, of either gender, suffering from FG. The exclusion criteria included all the patients below the age of thirteen years, and those with maleneys gangrene. All patients were admitted through the Outpatient department in urology and referrals. In the data collection procedure, every patient who came in with FG was hospitalized. They underwent a history and physical examination. History was targeted at identifying any risk factors. Physical examination was done to see the involvement of perineum, scrotum, penis, and suprapubic area. Full blood count, urine examination, urine culture, blood glucose monitoring, and assessments of kidney and liver functions was conducted. All patients underwent debridement and were put on board spectrum antibiotics, fluids and daily dressings. We used SPSS version 14 to analyze the data. For age, we calculated both the mean and standard deviation. For gender, diabetes, hypertension, renal failure, and liver failure, we calculated the frequency and percentage. Results were compiled in a Performa and compared with national and international studies.

RESULTS

Demographics: The study involved 30 patients diagnosed with Fournier's gangrene through history and clinical examination. The age range of the participants varied from 25 to 80 years old, with an average age of 54.8 ± 15.19 years. Out of all the participants, 5 individuals (16.6%) were younger than 40 years old, 15 (50%) were between 40-60 years and 10 (33.3%) were from 60-80 years. 29 (96.6%) were males and only one (3.3%) was a female.

Aetiology (Inciting event): A cause could be traced back in history of only 18 patients.

- 3 had a history of urethral stone with history of manipulation,
- One had paraphimosis
- One had a history of insect bite.
- 4 (13.3%) had history of perineal abscess
- 4 (13.3%) had perirectal abscess
- 5 (16.7%) had a urethral stricture
- Hernia and hemorrhoids were present in none.
- Predisposing conditions

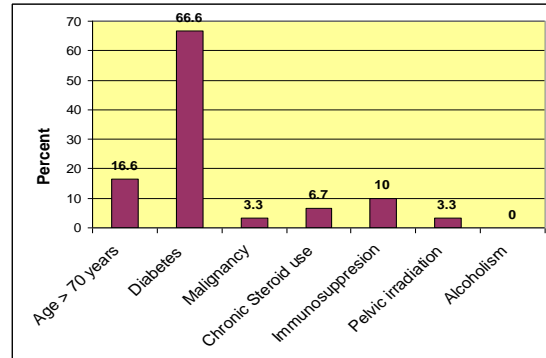


Figure No.1: Predisposing conditions

Predisposing conditions (Figure: 1) of the patients included and are described as under.

- 20 (66.6%) were diabetic.
- One (3.3%) had history of pelvic irradiation for malignancy,
- Extremes of age (age > 70 years was present in 5 (16.6%) patients
- 3 (10%) were immunocompromised as one was post renal transplant and the other two were on DMARDS for rheumatoid arthritis,
- 1 (3.3%) had history of malignancy ie colonic carcinoma,
- 2 (6.7%) were on chronic steroid use for bronchial asthma,
- Alcoholism, chemotherapy, dermatological source

Microbiology: E Coli alone was isolated in 9 (30%), Klebsiella alone in 3 (10%), Enterobacter and Proteus in 1 (3.3%), E Coli and Klebsiella in 6 (20%), E Coli and Klebsiella and Pseudomonas in 1 (3.3%), E Coli & Acinetobacter in 1 (3.3%), Klebsiella and Pseudomonas in 2 (6.6%) and no organism was isolated in 7 (23.3%).

Hence, 12 (40%) had single organism isolated either E Coli or Klebsiella. 11 (36.6%) had polymicrobial infection containing a mixture of E Coli, Klebsiella, Proteus, Pseudomonas, Acinetobacter or Enterobacter species.

Site of Fournier's Gangrene: The commonest site of involvement was the scrotum alone in 23 (76.6%) patients. Description of other sites of involvement are as follows; perineum and scrotum in 2 (6.7%), perineum and scrotum & penis in one (3.3%), perineum and scrotum and penis and suprapubic area in one (3.3%), perineum & scrotum and suprapubic area in one

(3.3%), scrotum and suprapubic area in one (3.3%) and vulva in one (3.3%).

Laboratory investigations: The duration of necrotizing infection ranged from 1 to 15 days with a mean duration of 5.29±4.4 days as can be seen in Table 1. The hemoglobin ranged from 5.5 to 14 gm/dl with mean hemoglobin of 10.6±2.1 gm/dl. The TLC (total leucocyte count) ranged from 12.7 to 32000 × 10⁹/ml with mean TLC of 20880±7764 × 10⁹/ml.

Table No.1: Laboratory investigations

Investigation type	Minimum	Maximum	Mean	Std. Deviation
Hemoglobin (gm/dl)	5.5	14.0	10.6	2.16096
TLC (× 10 ⁹ /ml)	12.7	32000.0	20880.5	7764.15
BSR (mg/dl)	84.0	514.0	282.5	131.91
Urea (mg/dl)	18.00	118.00	49.0	27.25
Creatinine (mg/dl)	.50	2.40	1.3	.54

The blood sugar levels ranged from 84 to 514 mg/dl. On average, the blood sugar level was 282±131 mg/dl. The urea levels varied between 18 and 118 mg/dl. The average urea level was 49±27.2 gm/dl. Additionally, the creatinine levels ranged from 0.50 to 2.4 mg/dl. The average creatinine level was 1.3±0.54 mg/dl.

Outcome: All patients were managed with surgical debridement and antibiotics. 6 (20%) Patients expired; all were > 60 years age. One was 64 years, one was 67 years, 3 were 75 years old and one was 80 years old. All had more than one area of involvement and yielded either Klebsiella or E Coli. 66.7% of those who survived and 66.7% of those who did not survive had diabetes mellitus.

Table No.2: Area of involvement of Fourniers Gangrene

Area involved	Number of patients	Percent
Scrotum alone	23	76.6%
Perineum & scrotum	2	6.7%
Perineum & scrotum & penis	1	3.3%
Perineum & scrotum & penis & suprapubic area	1	3.3%
Perineum & scrotum & suprapubic area	1	3.3%
Scrotum & suprapubic area	1	3.3%
Vulva	1	3.3%

DISCUSSION

FG is a rapidly spreading bacterial infection that affects the areas surrounding the genitals, anus, and

perineum¹¹. Primarily impacts males, yet can also manifest in females and children¹². When there is an infection in the genital area, bacteria can spread through different layers of tissue. These layers include Buck's fascia of the penis, Dartos fascia of the penis and scrotum, Colles' fascia of the perineum, and Scarpa's fascia of the front abdominal wall. Fatality rate remains high, ranging from 0% to 67%¹³.

In our research, the average age was recorded to be 54.8 years with a standard deviation of 15.19 years. 29 (96.6%) were males and only one (3.3%) was a female. A cause could be traced back in history of only 18 patients, 3 had urethral stone with history of manipulation, one had paraphimosis, one had an insect bite, 4 (13.3%) had perineal abscess, 4 (13.3%) had perirectal abscess, 5 (16.7%) had a urethral stricture. Predisposing factors were present in all of them; 20 (66.6%) were diabetic. One (3.3%) had pelvic irradiation for malignancy, extremes of age (age > 70 years was present in 5 (16.6%) patients, 3 (10%) were immunocompromised, 1 (3.3%) had malignancy ie colonic carcinoma, 2 (6.7%) were on chronic steroid use. 12 (40%) had single organism isolated band 11 (36.6%) had polymicrobial infection. The commonest organism isolated was E Coli. The commonest site of involvement was the scrotum alone in 23 (76.6%) patients as shown in Table 2. All patients were managed with surgical debridement and antibiotics. 6 (20%) patients expired.

Similar results were seen in most local studies.

A local study reported 19 male patients, whose average age was 54.7 years with a range of 39 to 68 years, were examined. The causes of the condition were identified between Anus and rectum in 21%, between urinary and genital system in 26.3%, skin in 31.6%, and undetermined in 21% of cases. Comorbidities were present in 57.9% of cases, including conditions like diabetes, chronic kidney disease, undernutrition, liver scarring, and prolonged steroid use. Cultures showed Bacteroides fragilis, E. coli, Streptococci, and Staph aureus.

The treatment strategy involved resuscitating the patient, giving them broad-spectrum antibiotics through an intravenous route, and performing multiple sessions of damaged tissue removal during a hospital stay that lasted for an average of 26 days, with a range of 10 to 52 days. Some patients also received diversion surgeries such as cystostomy (15.8%) and colostomy (5.3%). Reconstruction were done in two cases. The mortality rate was 10.5%, and two patients died due to severe sepsis¹⁴.

Certain underlying health conditions, such as aging, diabetes, excessive drinking, paralysis, or nerve impairment, cancer, weakness, and weakened immune systems contribute to the development of this condition¹⁵. Injuries to the anorectal, urogenital, and

perineal areas, as well as trauma to the pelvis and perineum or interventions in the pelvic region, are additional factors leading to FG.¹⁶

Diabetes is reported to be present in 20%–70% of patients with FG¹⁷ and excessive drinking in 25%–50% patients.¹⁸ Similar results were seen our research found that diabetes was the most commonly occurring predisposing condition and urethral stones and strictures were the commonest inciting events. In our study, Diabetes and perianal involvement were the most common involving factors, two out of every three people who survived and two out of every three people who didn't survive had a medical condition called DM. The spread of Human immunodeficiency virus to epidemic levels has put a large population at risk of having FG.¹⁹

Patients diagnosed with FG in research publications are typically between 46.5 to 63.5 years old.²⁰ In our research, we determined the average age to be 54.8 years. High mortality rates were observed in older patients in our research; similarly noted by Clayton and colleagues²¹.

Our research reveals that there is a mortality rate of 20% associated with FG. Despite advancements in intensive care methods, aggressive wound cleaning, Wound caring has been enhanced, and prolonged course of antibiotics, documented mortality rates for FG vary significantly from 0% to 67%.

CONCLUSION

FG has high mortality. In most patients the scrotum is involved, urethral strictures and stones are the commonest causes and diabetes is the commonest predisposing condition. Polymicrobial infection mostly containing *E. Coli* and *Klebsiella* are the commonest.

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