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‘FOURNIER’S GANGRENE’ - PROMPTNESS AND PERSEVERANCE ALONE CAN COUNTER IT!

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ABSTRACT:

Background: Fournier’s gangrene is a rapidly spreading fulminant form of infective necrotizing fasciitis of the perineal, genital, and perianal regions. Even though it commonly affects men, but women may also be affected rarely.

Material/Methods: This study is a retrospective analysis of the management of 16 cases of Fournier’s gangrene, diagnosed from among the general surgery patients over a period of two years from June 2021 to June 2023. All patients with Fournier’s gangrene underwent a thorough surgical debridement of the necrotic tissues. A few required serial debridements. They were started on high grade antibiotics with coverage for anaerobes.

Results: All 16 patients were males, with a median age of 61.2 years. There was one mortality in the study where the Fournier’s gangrene had spread to the testes, penis and lower anterior abdominal wall causing severe sepsis and MODS (Multiple Organ Dysfunction). Cultures from the wounds showed polymicrobial flora, including Escherichia, Proteus, Klebsiella, Moraxella, Enterococcus, Streptococcus, Staphylococcus, Bacteroides, Peptostreptococcus, Pseudomonas and Anaerobes were also found even though it was technically difficult to isolate them.

Conclusions: To have a favourable outcome of Fournier’s Gangrene we need early detection, emergency surgical debridement of all necrotic tissues, and broad-spectrum empirical antimicrobial therapy, usually with combined antibiotics, against aerobic and anaerobic bacteria. But the problem with our Indian population is poor genital hygiene, poor control of predisposing factors and presenting late to the health care set up due to ignorance which has to be addressed to stem this.

Keywords: Fournier’s Gangrene, Necrotising Fasciitis, Sepsis, Polymicrobial, Debridement

INTRODUCTION:

Fournier's gangrene (FG) is a rampant infection of the of the perineal, genital, or perianal regions, which commonly affects men. Commonly it affects the scrotum involving multiple organisms that spread rapidly if unchecked producing toxic fluid. If this copious toxic fluid gets absorbed into the systemic circulation it causes sepsis. Fournier's Gangrene is not uncommon in South India. Even in this 21st century it is very appalling to see patients showing up with the entire scrotum gangrenous and patient in severe septic shock. Thorough surgical debridement coupled with higher antibiotics is the only solution. Fournier's gangrene is common in the tropical region due to the climate, we being in the coastal region with humidity always on the upwards of ninety, large number of uncontrolled diabetics, all form a potpourri for the bacteria to invade and cause Fournier's gangrene. Fournier Gangrene (FG) got its name from the French venereologist Jean Alfred Fournier (1832–1914) who described it in a case series of patients in 1883 (1). FG is part of a group of infections that are called as necrotizing soft tissue infections (NSTIs). It involves multiple layers of the soft tissue, including cellulitis, fasciitis, and myositis (2).

FG is quite rare (representing <0.02% of all hospital admissions), and is often underdiagnosed prior to development of severe symptoms (3). The analysis of FG cases in a developed nation like the United States (US), the incidence of FG is approximately 1.6 per 100,000 males, which attains a peak between the ages of 50 and 79 years (3.3 per 100,000). This is Western data and we opine that the incidence of FG in India will be high and we need to pool in data from multiple institutions to arrive at a concrete figure. Despite advanced management methods and ICU care mortality is still high averaging 20%–30% (4). The most significant modifiable risk factor for Fournier's gangrene mortality is time to first surgical intervention (5). Studies have shown that early intervention has the potential to decrease mortality by nearly 50 percent (6).

MATERIALS AND METHODS:

We collected the data of male patients who reported to our hospital from June 2021 to June 2023 prospectively and analysed the data. We encountered 16 cases over a period of two years.

INCLUSION CRITERIA:

Patients attending surgical emergency or ward

1. 18 years or more
2. Consenting for study

EXCLUSION CRITERIA:

1. Below 18 years
2. Not Consenting for study
3. Unable to consent for study like poor orientation and consciousness
4. Previously treated at another centre.

Fournier's Gangrene is purely a clinical diagnosis. There are no specific laboratory or imaging studies that can specifically rule out the disease. Standard examination was carried out by an expert surgeon. During the entire period patients were properly evaluated and recorded by photography systematically for comparison in future. In total there were 16 patients who were identified as having Fournier's gangrene. Prior to surgery, all patients underwent intensive intravenous fluid replacement and were treated with parenteral broad-spectrum triple antimicrobial therapy, using a third-generation cephalosporin combined with metronidazole.

Empirical antibiotics were necessary until definitive antibiotics could be given based on sensitivity. The patients were subjected to surgery as an emergent operation. It always required serial debridement and the wound needed inspection and dressing at least twice a day. But the single most important factor in determining the outcome of the patient is the standard of the first debridement. It should remove all the nonviable tissues and drain the toxic fluid which is often so foul smelling. The patients had a postoperative hospital stay on case-to-case basis which varied. After the infection settled depending on the size of the defects, either they were sutured together, healing by secondary intention or reconstruction using skin grafts were performed. All the patients were followed up regularly for a minimum of 6 months post intervention.

RESULTS:

Total cases: 16

Age Distribution: (Figure 1)

Predisposing factors of FG in our study: (Figure 2)

Symptoms in FG in our study:

Swelling -14

Discharge Present - 9

Foul smell -13

Pain -7

This goes to show that almost all the patients had swelling of the scrotum with a foul smell, that means they presented late.

Signs of FG in our study: (Figure 3)

Bacteria isolated on culture from the wound: (Figure 4)

Wound closure after debridement in FG: (Figure 5)

Flaps -none.

We encountered 16 cases over a period of two years. We want to discuss the two most difficult of them where we could salvage the patient. Our first patient was a 70 years old man a known diabetic and hypertensive for 15 years, known coronary artery disease patient with Ejection fraction 25% and anteroinferior wall motion abnormality, he was admitted in MICU for Congestive cardiac failure by physicians and surgeons were called for scrotal swelling. When we examined, he was on nasal oxygen, tachypneic, had pulmonary edema, bilateral pedal edema. On examining the perineum, the whole scrotum was swollen 20x20cms with extensive gangrene of the scrotal skin but the patient still had scrotal pain at the root (Figure 4). Any regional anaesthesia was considered too risky for him. He had elevated WBC accounts, fever and was in early septicemia. So, we proceeded with debridement under cord block by bedside. We had to debride leaving the testes and a small portion of scrotum (Figure 5). We started him on 3rd generation cephalosporins and metronidazole dose adjusted as renal function tests (serum creatinine-4.2) were impaired due to sepsis. We did daily wash and thorough dressing. Meanwhile physicians worked on him and he slowly recovered from congestive heart failure and was weaned off from oxygen. The thorough debridement and antibiotics got the sepsis under control in five days' time. Patients general condition and blood parameters improved gradually. The foul smell emanating from the perineal region stopped and edges were bleeding at dressing time. The most dangerous complication of Fournier's gangrene spreading to abdominal wall was averted at the right time. Patient became ambulant and we started sitz bath. We discharged him with the plan of secondary cover at a later date.

The second case is a 42 years male patient who presented us with scrotal swelling. He too was a diabetic for 8 years on oral hypoglycaemic agents but on irregular treatment and

follow-up. His general condition was poor as he was malnourished and had fever. Perineal examination revealed blackish discolouration of a part of scrotum (Figure 6). A diagnosis of FG was made, his random sugar was 463 mg%, urine ketone bodies were positive, total counts were elevated but renal parameters were within normal. FG with diabetic ketoacidosis (DKA) was diagnosed. Intravenous fluids and insulin infusion were started. Patient was given regional anaesthesia and a thorough debridement of scrotal wall done till bleeding occurred from the edges. The best chance is the first time to debride and we opine we have to be aggressive to control this otherwise notorious infection which has a high mortality. This patient's sugar was controlled and the infection was controlled by higher antibiotics, the wound started to granulate over a period of time and we closed the scrotum secondarily (Figure 7).

Sometimes the necrotising fasciitis of FG spreads to the penis, testis and lower abdominal wall. In one case of our study, the tunica albuginea also turned gangrenous and the patient was in sepsis, so after explaining and getting a written consent we performed a bilateral orchidectomy. But the infection had started to spread to penis and also to involve the perineal skin towards the anus (Figure 8 and 9). The patient developed severe septicemia and the patient succumbed to it.

DISCUSSION:

Perineum generally has lot of sweat, and comparatively higher bacterial load on the skin than elsewhere on the body. In tropical climates the effects are compounded by the above factors and also poor genital hygiene due to lack of awareness and insensitivity to seriousness of perineal infections. All the more India has become the 'Diabetes Capital' of the world, so uncontrolled sugars, immunocompromised state, neglected genital hygiene which lead to pruritus in scrotum forming a milieu for bacteria to invade the scrotum. Depending on the source of infection, it first involves the layers of scrotum, sometimes spreading along the fascial

planes to other regions of perineum, penis and sometimes to anterior abdominal wall. The source of infection mostly is either perineal and genital skin infections. Anorectal or urogenital and perineal trauma, including interventions are other causes of FG (7). Most patients are men in their 60s or 70s and often suffer from several comorbidities. According to the majority of studies, the most important predisposing factors are: diabetes mellitus, alcoholism, trauma, malnutrition, iatrogenic immunosuppression like chemotherapy, steroids, and in transplanted patients, malignancy, leukemia, liver diseases, and HIV infection (8-10). Diabetes mellitus is found to be associated in 40%–70% of patients with FG (8) and chronic alcoholism in 25%–50% patients (11). With the rising trend of HIV it has increased the risk for developing FG by many folds raise concerns (12). Multiple predisposing factors often coexist leading to a poor prognosis and mortality is directly proportional to it. Even though the mortality rate is around 20–40% in few studies, but it can be as high as 70–80%, particularly if sepsis is present at the time of admission even in advanced centres (13).

Inflammation starts with the appearance of a black spot, called Brodie's sign (14). suppurative bacterial infection results in micro-thrombosis of the small subcutaneous vessels leading to the development of gangrene of the overlying skin. This rapidly spreading fulminant synergistic bacterial infection causes quick swelling of the scrotum and gangrene of the scrotum. It is often accompanied by such foul-smelling discharge causing severe morbidity. From this moment, the inflammation spreads like wild fire consuming tissues and spreading along the fascial planes. If unchecked from scrotum it can spread to perineum, perianal regions, thigh and sometimes to anterior abdominal wall. causing rapid deterioration of the patient's condition (10,15). The toxins rapidly can get absorbed into the system causing septicemia within hours. The differential diagnosis of Fournier's gangrene includes many conditions, such as cellulitis, acute epididymo-orchitis, strangulated hernia, scrotal abscess, pyoderma gangrenosum, necrolytic migratory erythema and streptococcal necrotizing fasciitis.

Cultures usually show poly microbial infections by aerobes and anaerobes, which include *Escherichia coli*, *Clostridia*, *Bacteroids*, *Klebsiella*, *Streptococci* and *Proteus*. Most of these are commensals in the perineum which, due to immunocompromised state of the host, turn virulent and act synergistically to cause extensive damage (16). Anaerobes are less frequently isolated than expected, because of the difficulties of culture techniques (17). The mechanism behind this treacherous infection is due to the synergistic activity of aerobes and anaerobes that produce various toxins and enzymes like hyaluronidase, streptokinase, collagenase and heparinase which cause tissue destruction and easy spread of infection. Blood cultures in Fournier's Gangrene patients are usually negative. If not treated, the toxins get absorbed systemically and coupled with the host inflammatory reaction it can lead to multi-organ failure and death (18).

So, the most effective weapon we have against Fournier's gangrene is early aggressive debridement combined with higher antibiotics. It often requires serial debridement but the first debridement sets the tone and is crucial in the outcome of the patient. Usually, the tunica albuginea is often resistant to this infection leaving the testis hanging from the cords after debridement. We should not hesitate in opening the perineum extensively, sometimes if needed even the thigh and anterior abdominal wall. When the wound heals, the patient had come out of sepsis then we can plan closure, either by secondary suturing, skin grafting or healing by secondary intention. The two patients we described were on the luckier side to come out of this dreaded condition even though they presented late also compounded by many other factors. We promptly acted and persevered with them and we opine that was crucial in saving them.

CONCLUSION:

Fournier's gangrene still takes its toll even in the 21st century especially in the underdeveloped and developing nations. Awareness about good perineal hygiene, control of diabetes, early reporting to hospital, early detection in an already admitted patient especially by the paramedics to alert the treating physician. Only a multidimensional approach alone can stem this potentially life-threatening condition.

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Conflict of interest: None declared

Figure 1: Age distribution of FG in our study

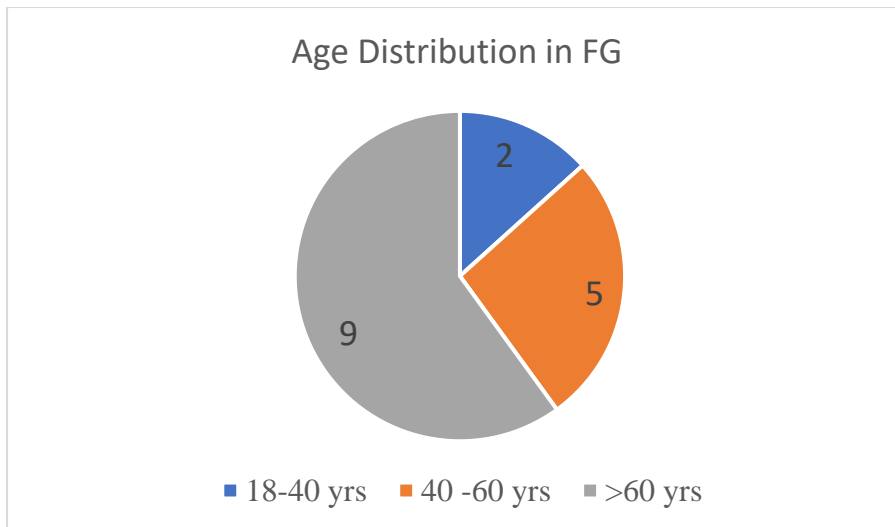
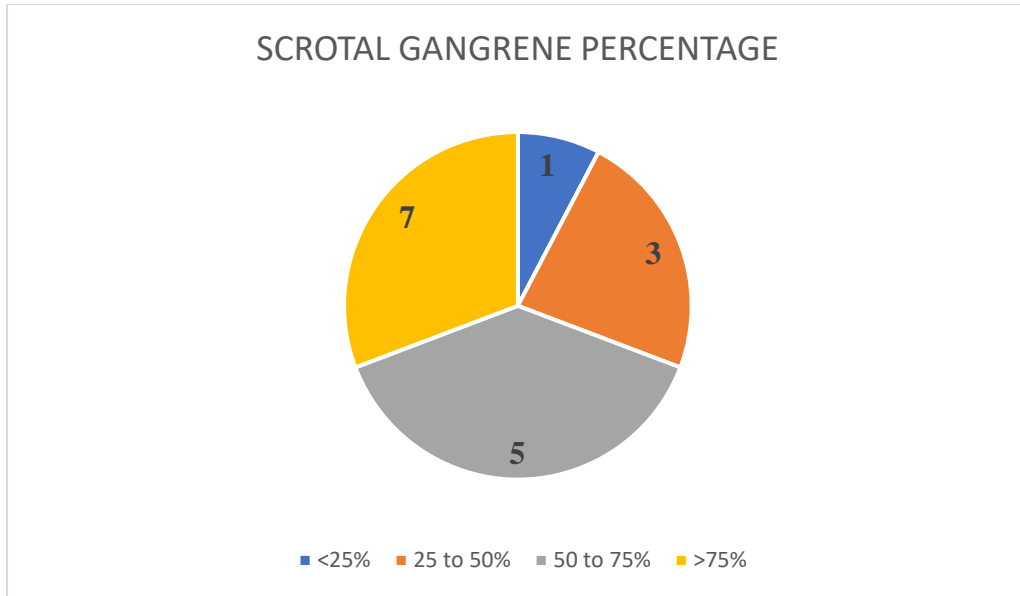


Figure 2: A table showing the predisposing factors

S.No.	Comorbidities	No. Of Cases
1	Diabetics controlled	2
2	Diabetics uncontrolled	8
3	Renal failure (also had uncontrolled diabetes)	6
4	Cardiac patient (also had uncontrolled diabetes)	3
5	Liver cell failure	2
6	Hypoproteinemia	1
7	No comorbids	1

Figure 3: Gangrene – percentage of scrotum involved



(Figure 4): A table showing various Bacteria and their percentage in wound culture

S.No.	Bacteria	No. Of Cases
1	Escherichia Coli	11
2	Enterobacter	9
3	Proteus	7
4	Pseudomonas	6
5	Streptococcus	6
6	Klebsiella	4
7	Bacteroids	6
8	Clostridium	5

(Figure 5): Type of wound closure

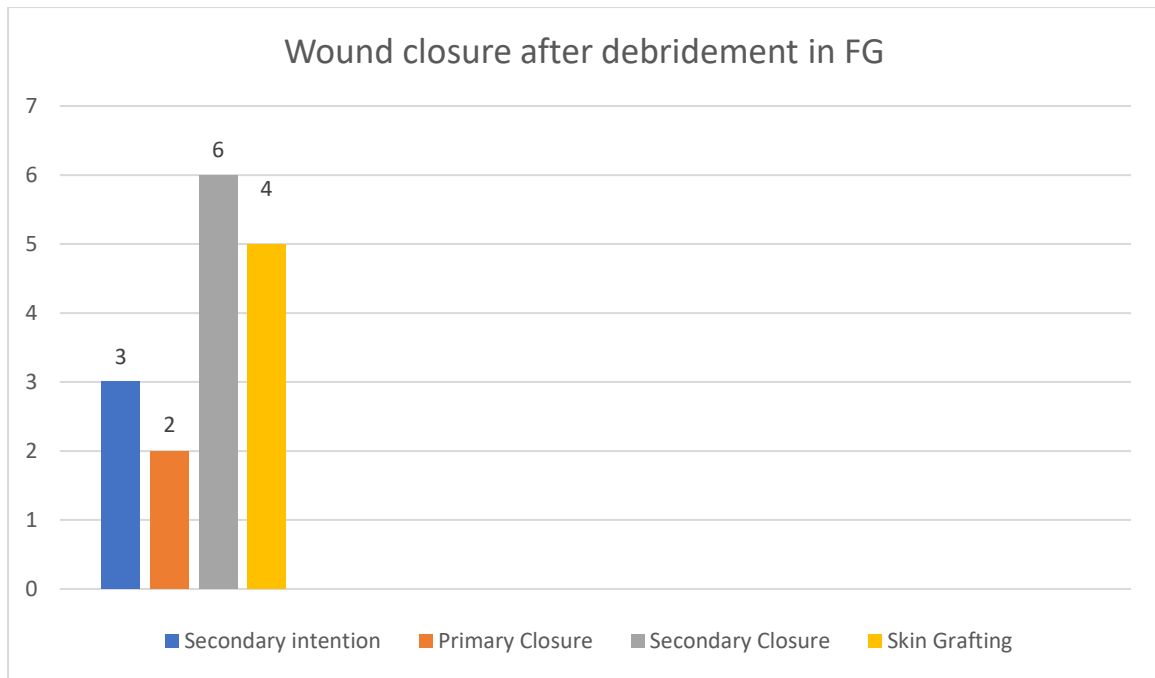


Figure 6: Fournier's Gangrene almost involving three- fourths of the scrotum – He had DM/CAD



Figure 7: After Thorough debridement the testes are exposed and good bleeding is a sign of adequate slough excision.



Figure 8: Fournier's gangrene involving less than 50 percent of scrotum – he was in Diabetic Ketoacidosis



Figure 9: A well granulated wound in the scrotum planned for secondary suturing



Figure 10: Fournier's Gangrene in severe form – Necrotising fasciitis spreading to Penis and lower abdominal wall



Figure 11: Fournier's Gangrene in severe form – The entire penis and tunica albugenia seemed to have necrosed



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