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Case Study

A CASE STUDY ON FOURNIER'S GANGRENE IN AN EPILEPTIC PATIENT WITH THE EMERGENCE OF ANTIBIOTIC RESISTANCE IN BACTERIA

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ABSTRACT

Fournier's gangrene is rare necrotizing soft tissue infection affecting the perianal, perineal, and genital areas. The mean age of the reported cases was found to be at 55 y, predominantly in men. It occurs due to insufficient blood supply to the affected areas, along with the presence of an infection. Delay in the treatment is associated with a higher mortality rate, up to 90%, as the condition might progress to septic shock and other complications. Treatment requires urgent surgical debridement of all the necrotic tissue along with high doses of broad-spectrum antibiotics. Empirical broad-spectrum antibiotic therapy is to be initiated as soon as possible until the results of the culture cause modifications in the therapy.

Keywords: Fournier's gangrene, Epilepsy, Antibiotic resistance, Extensive debridement

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INTRODUCTION

Fournier's gangrene (FG) is a rapidly progressive form of necrotizing fasciitis, occurring in the perineal, genital, or perianal regions. It commonly affects men but is also known to affect women and children. It was described by Jean-Alfred Fournier as fulminant gangrene of the penis and scrotum in young men [1]. Initially, it was thought to have been idiopathic but was later discovered to have sourced from either perineal or genital skin infections. It can also occur due to urogenital (anorectal) and perineal traumas occurring due to pelvic or perineal injuries [2]. Gangrene usually occurs in men of the 60-70 y age group, due to insufficient blood supply to the affected area and concomitant infection. Predisposing factors for FG include diabetes mellitus, alcoholism, atherosclerosis, peripheral arterial disease, trauma, malnutrition, immunosuppression due to chemotherapy, steroid use or malignancy, HIV, leukemia, and other debilitating disorders [3]. Infections in the genital areas can be caused by the passage of bacteria through Buck's fascia of the penis, spreading along the Dartos fascia of the scrotum and penis, Colle's fascia of the perineum, and Scarpa's fascia in the anterior abdominal wall. Culture reports obtained from the wound of the patient revealed multiple organisms, indicative of an anaerobic-aerobic synergy [4].

Prognosis of the disease depends upon the timing of medical care. Delay in the treatment is associated with a higher mortality rate, up to 90%, as the condition might progress to septic shock and other complications [5]. The diagnosis of FG is based on the clinical findings of flatulence, localized tenderness, and wounds of the genitalia. Laboratory findings of a patient may include anemia, leucocytosis, thrombocytopenia, electrolyte abnormalities, hyperglycemia, elevated serum creatinine levels, hypoalbuminemia, etc. Radiography is useful in the detection of the presence of soft tissue air in the area overlying the scrotum and perineum before clinical crepitus is detected. Ultrasound findings include thickened, the edematous scrotal wall containing hyperechoic foci. This causes a 'dirty' shadowing representing gas within the scrotal wall [6]. Treatment requires urgent surgical debridement of all the necrotic tissue along with high doses of broad-spectrum antibiotics. Empirical broad-spectrum antibiotic therapy is to be initiated as soon as possible until the results of the culture cause modifications in the therapy [2]. Reconstructive surgeries may be necessary for the wider genital, perineal, and abdominal wall defects. The goals of the surgery are to provide protective coverage of the testes, preserve testicular function, and minimize morbidity and mortality [7].

CASE REPORT

A 45 y old male patient presented to the Male Surgical ward with the symptoms of pain in the inguinal region for a day. On examination, he was revealed to have diffuse swelling in the scrotum and the inguinal region, along with black discoloration at the bottom of the scrotum. The patient had a history of head injury, hairline hip fracture, and epilepsy. He takes 100 mg of Phenytoin TID to manage his seizures. The seizures were recorded to last for a total of 5 min. He is also known to be consuming about 1 bottle of toddy and 5 beedis per day, for the past 10 y. The patient was also found to be anemic with a hemoglobin value of 12 gm% and has had a history of blood transfusion 3 y ago.

The vitals of the patient was found to be stable upon admission. The pus from the affected region of the patient was extracted for culture, which reported the presence of *Klebsiella pneumoniae.* This organism was also found to be resistant to the Fluoroquinolones class of antibiotics (Ofloxacin, Levofloxacin, etc). The throat swab was also cultured to reveal the presence of Coliform bacteria, which were resistant to Levofloxacin, Ofloxacin, Amoxicillin+Clavulanic acid, and Cefoperazone. Considering these resistance patterns of the isolated organisms, the patient was started on the following antibiotic therapy (table 1).

Table 1: Pre-operative drug therapy

Piperacillin+Tazobactam	2.25 gm IV BD
Clindamycin	1.25 gm IV BD
Paracetamol	1 gm IV TD
Tramadol	100 mg IV SOS
Ondansetron	2 mg IV TD
Potassium Chloride	2 amp in 500 ml NS IV
Diclofenac	75 mg IV BD
Phenytoin	100 mg oral BD

Ultrasound of the scrotum was performed, which revealed an edematous scrotal wall with multiple hyperechoic foci (air foci), predominantly on the left side, extending into the inguinal region and the anterior abdominal wall.

An extensive debridement procedure was scheduled to be performed on the patient. During surgery, under spinal anesthesia:

1. The infected regions were cleaned and draped

2. Subcutaneous thigh flaps were raised on either side of the penis

3. Right testis was placed into the anteromedial pouch created, with the refashioning of skin margins

4. Primary closure of the surgical site was done

5. The aseptic dressing was done, and the patient was shifted to post-operative care in hemodynamically stable conditions.

Table 2: Post-operative drug therapy

Clindamycin	30 mg IV BD
Amoxicillin+Clavulanic acid	1.5 mg IV BD
Paracetamol	1 gm in 100 ml NS IV
Pantoprazole	40 mg IV OD
Phenytoin	100 mg oral BD

The patient was started on the following medications in the post-operative care (table 2). He was discharged following recovery, after 51 d from the date of admission.

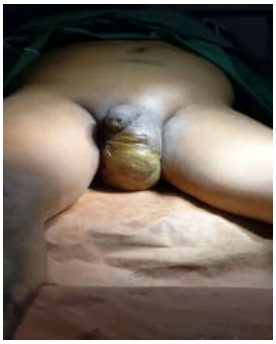

Fig. 1: Depicts the pre-operative condition of the affected region

Fig. 2: depicts the operative procedure on the patient

Fig. 3: depicts the post-operative condition of the affected region following suturing

DISCUSSION

Fournier's gangrene is a rare necrotizing soft tissue infection in the perineal, perianal, and genital areas. It was considered to be an idiopathic disease earlier, but, currently, only a quarter of the cases are classified as idiopathic. Predisposing factors like immunodeficiency, diabetes, and alcoholism render a favorable micro-environment that promotes the spread of the infection [8]. It is usually caused by facultative anaerobic bacteria like *Escherichia coli*, *Klebsiella pneumoniae, Staphylococcus aureus,* anaerobes like *Clostridium* and *Bacteroides fragilis* other microorganisms include, *Streptococcus, Enterococcus, Clostridium, Pseudomonas,* and *Proteus spp* [9]. The etiology of this disease is not completely understood and was thought to occur only in younger men. However, with the emerging cases, it is not only restricted to younger men but can be observed in both males and females of different ages, from neonates to the elderly. Most of the cases were reported at the mean age of 55 y, with the majority of them being males [10].

Fournier's gangrene is commonly associated with co-morbidities like diabetes mellitus, obesity, chronic alcoholism, renal failure, malignancy, and HIV infection.[11] In the present study, the patient is a 45 y old male and a chronic alcoholic according to his history. He is also an epileptic on medication. These factors, along with the anemic state, could have rendered suppression of the immune reactions and imposed the risk for acquisition of the disease in the patient. In a study conducted by Bjurlin MA *et al.*, 2013, antibiotic resistance was exhibited by the isolated organisms in a case of Fournier's gangrene. These patterns of resistance highlight the importance of the use of recommended antibiotic agents for empiric broad-spectrum therapy, regardless of the suspected organism or the Gram stain findings [12].

The treatment of the condition includes the hemodynamic resuscitation, aggressive surgical debridement, and broad-spectrum antibiotic use. Surgical debridement is the primary option in the management of the condition as aggressive debridement can result in a remarkable reduction of mortality [13]. The patient in the study was started on broad-spectrum antibiotics before the scheduling of an extensive debridement procedure. The anteromedial pouch was used to place the right testis. The patient was shifted to the post-operative care after surgery, where he was monitored for potential drug-drug or drug-food interactions and side effects. After the healing of the post debridement wound, the patient was discharged after 2 w from the scheduled surgery.

CONCLUSION

The case highlights the condition of Fournier gangrene in an epileptic patient with immunosuppression rendered by chronic alcohol consumption. Culture of the pus extracted from the affected region revealed the presence of *Klebsiella pneumoniae*, which is one of the common organisms to cause this condition, and it was found to be resistant to the Fluoroquinolones class of antibiotics. Throat

swab culture also revealed the presence of coliform bacteria, resistant to Levofloxacin, Ofloxacin, Amoxicillin+Clavulanic acid, and Cefoperazone. Hence, the patient was started on a broad spectrum and combinations of antibiotics to overcome these limitations. Extensive surgical debridement is necessary to obtain desired outcomes and improved mortality rates in the patient.

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AUTHORS CONTRIBUTIONS

The first author (Sowjanya Mendem) drafted the manuscript, second author (Md Aqib Ali Faraz) collected the case and references for the manuscript, and the third author (K Lankeswar Rao) reviewed the manuscript.

CONFLICTS OF INTERESTS

The authors declare no conflicts of interest.

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