



# Challenges in Management of Fournier's Gangrene after the Perianal Abscess- A Case Report and Review of Literature

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## Abstract

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**BACKGROUND:** Fournier's Gangrene (FG) is a rare and potentially fatal form of necrotizing fasciitis that affects the perineal, perianal, or genital regions. The condition often originates from an infection in the anorectal or genitourinary area and is exacerbated by comorbidities, such as diabetes mellitus, chronic alcoholism, and immunosuppression. The rapid progression and high mortality associated with FG necessitate immediate diagnosis and prompt surgical intervention.

**CASE PRESENTATION:** We present a case of a 52-year-old male with poorly controlled diabetes mellitus who developed FG following the drainage of a perianal abscess. Despite early surgical intervention, the infection progressed, leading to extensive necrosis of the perineum, scrotum, and lower abdominal wall. The patient required multiple debridement, broad-spectrum antibiotics, and intensive care management. Over a prolonged hospital stay, the patient recovered with significant wound care, including skin grafting, in large defect. This case illustrates the complexity of managing FG, mainly arising from a perianal abscess. The presence of diabetes mellitus complicates the clinical course and increases the risk of severe outcomes. A comprehensive multidisciplinary approach involving surgical, medical, and supportive care teams is essential for successful management. A review of the current literature highlights the critical importance of early and aggressive treatment to improve patient outcomes in FG cases.

**CONCLUSION:** FG following a perianal abscess presents significant management challenges, especially in patients with underlying comorbidities. This case emphasizes the necessity of early diagnosis, prompt surgical intervention, and a multidisciplinary approach to care. Despite the severity of the condition, timely and comprehensive management can lead to favorable outcomes.

## Introduction

Fournier's Gangrene (FG) is a rare but devastating form of necrotizing fasciitis that predominantly affects the perineum, scrotum, and genital regions [1]. First described by Jean Alfred Fournier in 1883 [2], it is a rapidly progressing infection that poses a significant challenge to clinicians due to its high mortality rate, often exceeding 20–40%, despite medical and surgical management advances [3].

FG has a strong preference for males, with a male-to-female ratio of 10:1 and an incidence in males of 1.6 cases/100,000 men [4]. The most common sources of FG are from the gastrointestinal tract (30–50%), genitourinary tract (20–40%), and skin injuries (20%) [5], [6], [7].

The condition typically presents in individuals with underlying comorbidities, such as diabetes mellitus, chronic alcoholism, and immunosuppression, which exacerbate the severity of the infection [8]. FG is often associated with septic conditions, rapid tissue destruction, and a high mortality rate of up to 40% [9].

The severity of FG stems from the synergy of multiple bacteria that are not very aggressive

when encountered alone, although 80% of cases are polymicrobial [10]. The organisms most commonly found in FG generally exist under the pelvic diaphragm in the perineum and genitalia. These include aerobic microorganisms (e.g., *Escherichia coli*, *Klebsiella pneumoniae*, and *Staphylococcus aureus*), as well as anaerobic microorganisms (e.g., *Bacteroides fragilis*, *Clostridium* species) [11], [12], [13].

High fever and tachycardia are present in 40% and 61% of these patients [14].

The presence of hypotension and septic shock is a late and ominous sign, occurring in approximately 21% of patients with NSTI (Necrotizing Soft Tissue Infections) but associated with high specificity (93.3%) [15].

While cellulitis and erysipelas may present with symptoms of generalized infection, including fever, FG may result in severe systemic toxicity with associated multiorgan failure.

Furthermore, since FG can spread rapidly along fascial planes, areas of tenderness and erythema may extend to the clavicle [16].

The presence of subcutaneous gas and crepitus are clear for clostridial infections [17].

The affected area may also appear swollen and dark and have a characteristic purulent “dishwater” discharge with an associated fecal odor attributed to anaerobes [18].

This has a strong correlation with mortality and, together with associated multiorgan failure; a condition where multiple organs in the body fail to function is the leading cause of death in patients with NSTI [19].

This article presents a challenging case of FG after drainage of a perianal abscess, highlighting the complexities of management and reviewing the current literature to provide insights into optimizing care for this life-threatening condition.

## Case Presentation

We present a case: a 52-year-old male with a history of uncontrolled diabetes mellitus and alcohol abuse presented with severe perineal pain, fever, and swelling, which began 3 days ago, for which he had undergone drainage of a perianal abscess in a regional hospital, where after the drainage he brought out a significant amount of pus with a heavy smell, thick and dark in color, for which he also left a drain at the level of the incision, (at the level of 5 p.m.). After drainage, the antibiotic and analgesic are immediately started.

The patient’s condition deteriorated rapidly, with the development of extensive necrosis involving the perineum and scrotum, accompanied by a change in the general condition with high temperature and difficulty in breathing.

At the time of presentation to our hospital, in his primary evaluation, we have the following data:

- Vital signs: tachycardic (120 bpm) and hypotensive (BP 90/60 mmHg), SatO<sub>2</sub> 80% with masked O<sub>2</sub>, temperature up to 39.5°C with chills
- In the physical examination, extensive edema, erythema, and crepitus on the perineum and scrotum are found, accompanied by foul-smelling secretions, indicating tissue necrosis.
- Laboratory data show; white blood cell 20,000/ $\mu$ L, red blood cell  $3.82 \times 10^6$ / $\mu$ L, hemoglobin 9.8 g/dL; elevated C-reactive protein (CRP = 312 mg/L) and hyperglycemia (blood glucose 450 mg/dL); Urea 146 mg/dL; Creatinine 1.84 mg/dL; Bilirubin 1.2 mg/dL; ALT-SGPT 68 U/L, AST-SGOT 132 U/L.
- Imaging: A magnetic resonance imaging (MRI) of the abdomen and pelvis revealed extensive gas formation in the soft tissues of the perineum and scrotum, consistent with necrotizing fasciitis (Figure 1).

## Management

The patient was immediately admitted to the intensive care unit (ICU), where aggressive resuscitation was initiated with intravenous fluids and three broad-spectrum antibiotics (including coverage for gram-positive, gram-negative, and anaerobic organisms).

Given the rapid progress of the infection, the wound was reevaluated. Extensive necrosis in the perineum and scrotum, including Darto’s fascia in the posterior part of the scrotum, was found in close relation and continuity with the first perianal drainage incision but without touching the tests.

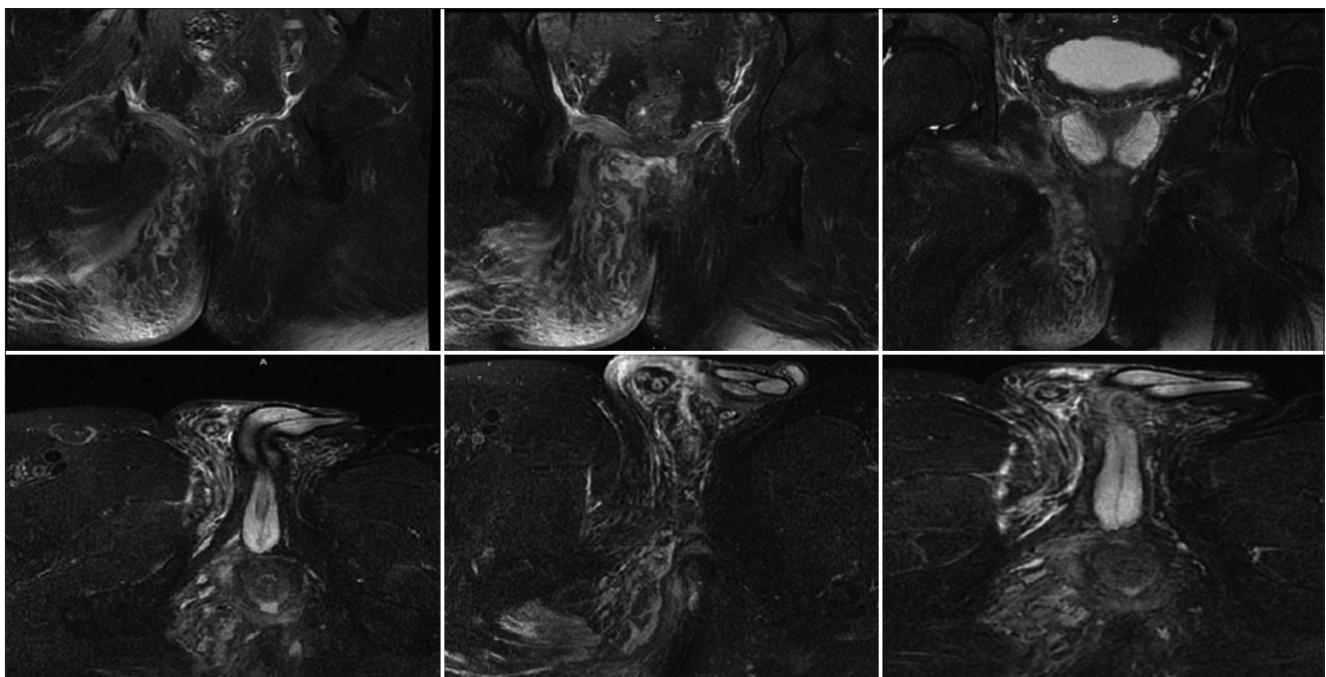


Figure 1: Magnetic resonance imaging of the abdomen and pelvis finding

Abundant lavage is performed, and wide-releasing incisions are made to the depth by removing necrotic tissue (debridement) and using the relevant counter-openings with permanent lavage with diluted betadine solution (Figure 2). The wound was left open and packed with sterile dressings.

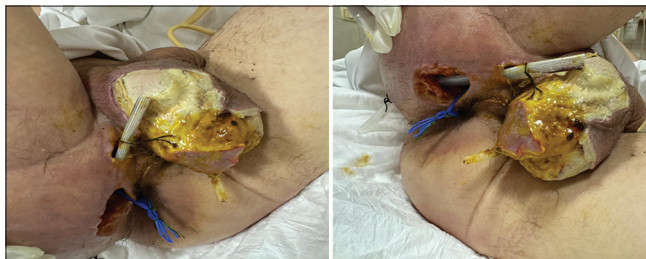


Figure 2: Expanded drainage of perianal abscess with contra-aperture

The patient required four additional debridements over the next week to control the spread of infection and remove all necrotic tissue.

### Supportive care

The patient received intensive wound care, nutritional support, and glycemic control. Hyperbaric oxygen therapy (HBOT) was considered but unavailable in the treating facility.

### Outcome

The patient's condition gradually stabilized, and the infection was controlled. After 3 weeks of intensive care and wound management, the patient underwent skin grafting to cover the significant defect left by the debridement. He was eventually discharged with a plan for continued wound care and follow-up (Figure 3).



Figure 3: Local condition of the wound, 3 and 4 weeks later after treatment

## Discussion

FG is an aggressive Necrotizing fasciitis of the perineum that occurs most frequently in males aged 50–70 years. Associated comorbidities are expected, with diabetes mellitus found in 40–60% of patients [20].

The infectious and inflammatory process spreads quickly along the Dartos, Colles, and Scarpa's

fascias, allowing for the early involvement of the abdominal wall [21].

The superficial skin is often spared during the initial stages of infection. In contrast, the necrotizing process spreads along the fascial planes at a rate reaching 2–3cm/h, masking the true extent of the disease [22].

It is important to note, however, that Colles fascia remains continuous with other surrounding fascial planes, facilitating rapid spread towards the abdomen and thorax (through Scarpa's fascia), as well as the scrotum (through Buck's and Dartos fascia) (Figure 4). Deeper infection extending below the fascial plane involving myonecrosis is not classically considered a feature of FG, although it has been described [23].

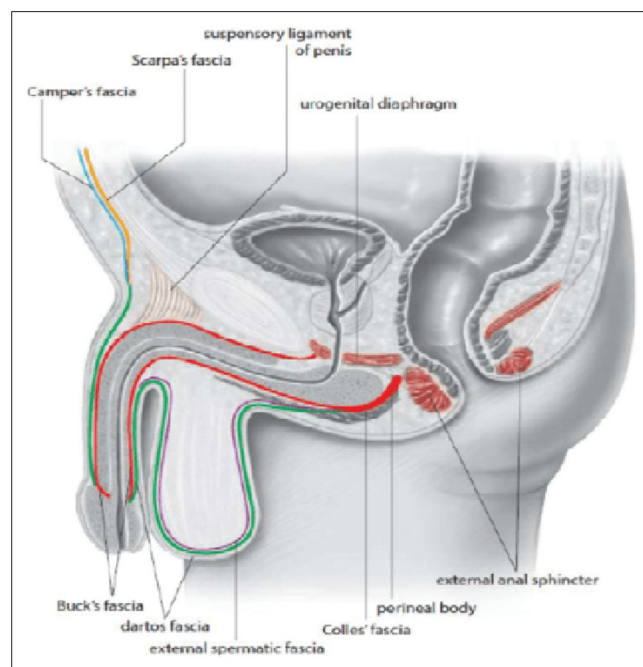


Figure 4: Anatomy of the fascial planes of the lower abdomen and pelvis [22]

The condition typically arises from infections in the urogenital or anorectal regions, such as perianal abscesses, that spread through fascial planes, leading to widespread tissue necrosis [24].

Although historically, women were rarely affected, the incidence appears to be increasing and is particularly associated with morbid obesity [25].

FG is a rapidly progressing, life-threatening necrotizing fasciitis primarily affecting the perineal, genital, and perianal regions. The condition typically results from polymicrobial infections, with aerobic and anaerobic bacteria contributing to the rapid tissue necrosis.

The underlying etiologies of most hospitals rarely care for FG patients. Sorensen *et al.*, in their study in the USA, found that the population-based mortality rate (7.5%) was substantially lower than the case series from tertiary care centers. Hospitals that

treated more number of FG patients had lower mortality rates, thereby supporting the rationale that regionalized care worked well for patients with this rare disease [26].

Goh *et al.*, in their study, showed that a high index of suspicion of necrotizing fasciitis is needed in a patient presenting with cutaneous infection causing swelling, pain, and erythema, with comorbidity of diabetes or liver disease [15].

Thwaini *et al.* showed that FG is a synergistic infection caused by a mix of aerobic and anaerobic bacteria. It leads to widespread necrosis of the fascial planes. The rich vascular supply and loose connective tissue in the perineal and genital regions facilitate the rapid spread of the infection [27].

Fernando *et al.* showed that the presence of hypotension and septic shock is a late and ominous sign, occurring in roughly 21% of patients with NSTIs but associated with high specificity (93.3%). This has a strong correlation with mortality and, along with associated multiorgan failure, is the principal cause of death in patients with NSTIs [28].

Tang *et al.*, in their study, evidenced that FG is a devastating disease that affects the perineum and genitourinary region and is commonly a result of poly-microbial infection. Older patients with genital or perineal pain should be examined for crepitus dermis. When a patient is diagnosed with FG, swift consultation with surgeons and administration of broad-spectrum antibiotics are required to save the patient's life [10].

Risk Factors for FG are Age, diabetes mellitus, the most common predisposing factor, present in up to 70% of cases due to impaired immune response and microvascular disease, immunosuppression, conditions, such as HIV, malignancy, and chronic steroid use, and alcoholism and Malnutrition. These factors contribute to weakened host defenses [29].

According to Gebrie *et al.* in their study found, the prevalence of diabetes was notably high in patients living with HIV/AIDS. Factors, such as increased age, educational status, and higher levels of serum triglyceride were found to contribute to this high prevalence of diabetes [30].

Vyas *et al.* [31] reported that increased age was a significant mortality predictor.

According to Vyas *et al.*, it was reported that advanced age, smoking, malignancy, and hypopotassemia are independent risk factors for mortality in FG [31].

Misiakos *et al.* [7] reported that the clinical condition is the most important clue for diagnosis. However, in equivocal cases, the diagnosis and severity of the infection can be secured with laboratory-based scoring systems, such as the laboratory risk indicator for necrotizing fasciitis score or FG severity index score (FGSI), especially concerning FG.

### **Diagnostic challenges**

The non-specific initial presentation of FG, often mimicking benign conditions, such as cellulitis, can lead to delayed diagnosis.

Singh *et al.* [32] reported that FG has an insidious onset, with 40% of patients presenting with no symptoms, which makes early detection crucial.

Lewis *et al.* [33] reported that pain in the genital or perianal regions, with little to no visible cutaneous damage, is one of the early symptoms.

More noticeable features of infection emerge as FG progresses through the deep facial planes. The skin tones of erythematous patients become dusky and darker. Subcutaneous crepitus with a putrid odor (due to anaerobic microbial activity) may appear toward the end of the infection.

In a study by Ballard *et al.* [25], scrotal swelling was the most common symptom in 79% of cases, followed by tachycardia (61%), purulent "dishwater" exudate from the perineal region (60%), crepitus (54%), and fever (41%) [25].

Various imaging techniques can be used to visualize the presence of air and the spread of infection; because 90% of FG patients have subcutaneous emphysema, standard radiography is a quick and valuable tool [23].

Bullae, or gas, on a plain X-ray, can be diagnostic. Early surgical exploration is the best approach in uncertain cases [21].

A high index of suspicion is required, especially in patients with known risk factors. Imaging modalities such as CT and MRI are crucial in confirming the diagnosis and delineating the extent of tissue involvement [34].

### **Management strategies**

The cornerstone of treatment for FG is prompt surgical debridement of necrotic tissue. Mallikarjuna *et al.* [14] reported that the role of early and aggressive surgery could not be overstated, as delays are associated with increased mortality, emphasizing the necessity of immediate action in managing FG.

Misiakos *et al.* [7] reported that the management of the infection begins with broad-spectrum antibiotics, but early and aggressive drainage and meticulous debridement constitute the mainstay of treatment. Post-operative surgical wound management and proper nutrition are also necessary for the patient's survival. The vacuum-assisted closure system has proved helpful in wound management, with its combined benefits of continuous cleansing of the wound and the formation of granulation tissue [9].

Martinschek *et al.* [6] reported that patients with FG do not differ in all aspects from those with

other NSTIs. Successful treatment includes immediate surgical debridement, broad-spectrum antibiotic treatment, and critical care management. Supportive hyperbaric oxygen therapy should be considered [6].

### Antibiotic Therapy

Broad-spectrum antibiotics covering gram-positive, gram-negative, and anaerobic organisms are essential. Standard regimens include combinations of piperacillin-tazobactam, vancomycin, and clindamycin.

Hakkarainen *et al.* [17] reported that the standard treatment consists of broad-spectrum antibiotics, wide surgical debridement, and supportive care. Most patients require multiple surgical debridements, and survivors often have large and complex wounds requiring soft tissue coverage and prolonged hospitalizations.

Mallikarjuna *et al.* [14] show that the triple antibiotic combined with radical debridement is the mainstay of treatment.

Chennamsetty *et al.* [20] show that open wounds are generally managed with sterile dressings and negative-pressure wound therapy after initial radical debridement. In cases of severe perineal involvement, colostomy has been used for fecal diversion or alternatively,

### Multidisciplinary care

Effective management requires a coordinated approach involving surgeons, intensivists, infectious disease specialists, and wound care teams. The early involvement of plastic surgeons in reconstruction and wound closure is also essential, underscoring the importance of a multidisciplinary approach in managing FG.

Multiple predisposing factors predict a poor prognosis and correlate significantly with mortality. Extension of the disease and the FGSI score were not predictive of outcome [23].

The essential interventions for stopping FG's rapidly progressing infectious process include early disease recognition, proper management of the predisposing factors, and aggressive surgical debridement. Such an intervention can improve clinical outcomes [23].

## Conclusion

FG following a perianal abscess represents a formidable clinical challenge. The case presented here underscores the importance of early recognition, prompt surgical intervention, and a multidisciplinary approach in

managing this life-threatening condition. While medical and surgical care advances have improved outcomes, early diagnosis, and aggressive management remain the most critical factors in reducing morbidity and mortality.

## COI Statement

This paper has yet to be submitted in parallel, presented fully or partially at a meeting, podium, or congress, published, or submitted for consideration beforehand.

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