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OLGU SUNUMU **CASE REPORT**

Polymicrobial Infections in Fournier's Gangrene: A Case Report and Review of Management Strategies

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Abstract

Fournier's gangrene is a rapidly progressing necrotizing fasciitis affecting the perineal, perianal, and genital regions. It is a life-threatening condition that requires prompt diagnosis and aggressive treatment. This case report describes an 82-year-old male with multiple comorbidities, including inoperable colon cancer, COPD, hypertension, and diabetes, who presented with severe testicular pain and systemic symptoms. Initial treatment included broad-spectrum antibiotics and extensive surgical debridement. The patient underwent multiple debridement and skin grafting for scrotal reconstruction. Perioperative cultures identified polymicrobial infection, including Pseudomonas aeruginosa and Escherichia coli. The patient's condition improved with tailored antibiotic therapy and supportive care, leading to discharge after 38 days. Early recognition and a multidisciplinary approach are crucial for managing Fournier's gangrene, given its high mortality rate. This case highlights the importance of comprehensive care in improving patient outcomes.

Keywords: *Fournier's gangrene, Necrotizing fasciitis, Multidisciplinary management, Polymicrobial infection, Surgical debridement*

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INTRODUCTION

Fournier's gangrene is a rapidly progressing, necrotizing fasciitis of the perineal, perianal, and genital regions. Named after the French venereologist Jean Alfred Fournier, who described it in 1883, this condition predominantly affects males but can also occur in females. It is a rare but life-threatening condition that requires prompt diagnosis and aggressive treatment to improve patient outcomes (1).

The pathophysiology of Fournier's gangrene involves a polymicrobial infection that includes both aerobic and anaerobic bacteria. Common pathogens isolated include Escherichia coli, Klebsiella species, Streptococcus species, and various anaerobes such as Bacteroides and Clostridium. These bacteria synergistically produce toxins and enzymes that lead to tissue necrosis and systemic toxicity. The infection typically begins in the anorectal or urogenital regions and spreads rapidly through fascial planes, causing extensive tissue destruction (2). The aim of this case report is to highlight the clinical presentation, diagnostic challenges, and multidisciplinary management approach of Fournier's gangrene in an elderly patient with multiple comorbidities, emphasizing the importance of early recognition and prompt intervention to improve patient outcomes.

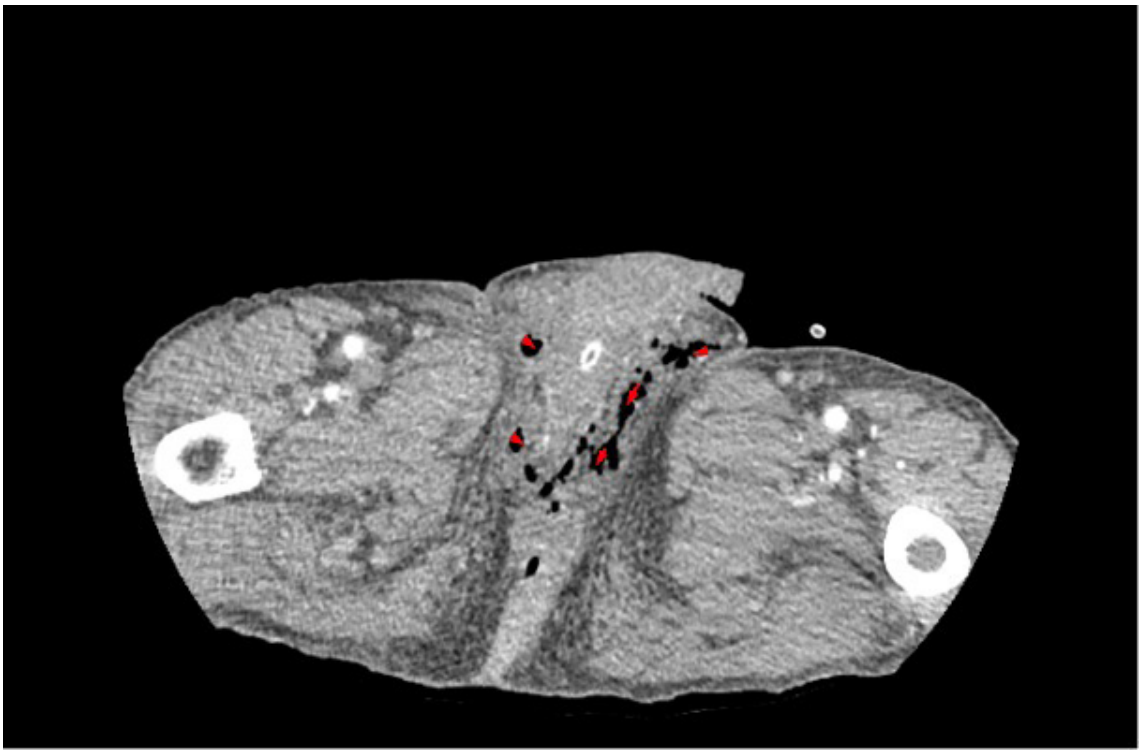
Case report

An 82-year-old male with known diagnoses of inoperable colon cancer (last radiotherapy session 8 months ago), chronic obstructive pulmonary disease, hypertension, and diabetes mellitus presented with symptoms of chills and shivering that started 3-4 days prior. He initially sought care at an external center, where he was prescribed cefazolin and advised to follow up. Despite antibiotic therapy, his general condition deteriorated, and he developed severe testicular pain, discharge, and edema. Consequently, he presented to our emergency department. During this period, he experienced fever and chills. He reported long-standing diarrhea but no dysuria. Additionally, he had a chronic cough and sputum production due to COPD. There were no reported lesions on his body other than in the testicular region. He had no foreign bodies or prostheses in his body and had not been hospitalized or used antibiotics in the past 3 months.

Vital signs on admission included a heart rate of 110 bpm, blood pressure of 127/55 mmHg, and an oxygen saturation of 96% on oxygen therapy. The temperature was 38.3°C on admission. On physical examination, his general condition was poor; he was conscious, cooperative, and oriented to person and place. Genital examination revealed that the testes were shiny, edematous, with increased warmth and severe tenderness on palpation. No signs of cellulitis were found elsewhere on the body.

Laboratory findings included a CRP of 181 mg/L, WBC of 14,000/μL, neutrophils at 87%, and GFR of 86 mL/min/1.73m². Scrotal ultrasound showed increased echogenicity and presence of air pockets in the scrotal skin and subcutaneous tissue, suggestive of Fournier's gangrene. Pathological fluid collections with septations were noted, with the deepest measurements being 10 mm on the left and 26 mm on the right. Abdominal CT scan revealed free air in the perineal region figure 1.

Figure 1. Abdominal CT scan revealed free air in the perineal region (red arrows)



Initial treatment included taking two sets of blood cultures and starting empiric antibiotic therapy with vancomycin (2 g IV over 2 hours, twice daily), meropenem (1 g IV, three times daily), and clindamycin (900 mg IV, three times daily). Surgical debridement was performed from the anal canal to the inguinal canal level. Intraoperative soft tissue cultures revealed growth of Pseudomonas aeruginosa, Enterococcus faecalis, Streptococcus anginous, and Escherichia coli. Initially treated with meropenem, vancomycin, and clindamycin (with clindamycin being completed and discontinued after 7 days), his antibiotic regimen was narrowed to piperacillin/tazobactam. On the nineteenth day of hospitalization, split debridement of the tunica albuginea was performed. Partial scrotal flap coverage of the testes was achieved, and two 10 cm² split-thickness skin grafts from the left thigh were used for scrotal reconstruction.

On the eighteenth day of hospitalization, the patient was re-evaluated for medical treatment. Perioperative cultures revealed Pseudomonas aeruginosa (ciprofloxacin-susceptible), Enterococcus faecalis (ampicillin-susceptible), Streptococcus anginous, and Escherichia coli (non-ESBL-producing). Laboratory results showed a CRP of 23 mg/L, no left shift in white blood cell count, creatinine of 0.64 mg/dL, and normal GFR. The patient's general condition was good, he was conscious, oriented, and cooperative, with stable vital signs. Minimal discharge and no fluctuance were noted in the anal region, with no hyperemia or increased temperature in the anal and scrotal areas.

Recommendations included prescribing Augmentin (1 g twice daily) and ciprofloxacin (750 mg twice daily) for one week. The patient was advised to follow up in the urology outpatient clinic for wound care. If the wound was clean after one-week, antibiotic treatment would be discontinued. The patient was discharged after 38 days of hospitalization in good condition.

DISCUSSION

Several risk factors predispose individuals to Fournier's gangrene. These include diabetes mellitus, immunosuppression (such as in HIV/AIDS or from immunosuppressive therapy),

chronic alcoholism, malignancies, and local trauma or infections. Diabetes mellitus is a significant risk factor due to its association with vascular disease and impaired immune response, which facilitates the rapid spread of infection (3). In immunosuppressed patients, the capacity for wound healing is significantly diminished. Factors such as poor nutritional status, impaired collagen synthesis, and reduced cellular proliferation hinder the body's ability to repair damaged tissues. As a result, the necrotizing process in Fournier's gangrene progresses more rapidly, and the affected areas become more extensive, leading to increased morbidity and mortality.

It is a life-threatening condition characterized by polymicrobial infections, involving key pathogens such as Escherichia coli, Klebsiella species, Streptococcus species, Bacteroides species, Clostridium species, and Pseudomonas aeruginosa. These bacteria synergistically produce toxins and enzymes, leading to tissue necrosis and systemic toxicity. Escherichia coli and Klebsiella species are common gram-negative bacteria that contribute to severe inflammation and tissue damage. Streptococcus species produce potent exotoxins, while Bacteroides and Clostridium species are anaerobes known for their virulence factors, including beta-lactamase production and toxin formation. Pseudomonas aeruginosa is an opportunistic pathogen resistant to many antibiotics and forms biofilms that complicate treatment. The polymicrobial nature of the infection necessitates broad-spectrum antibiotic therapy and aggressive surgical debridement. In current case, cultures identified Pseudomonas aeruginosa (ciprofloxacin-susceptible), Enterococcus faecalis (ampicillin-susceptible), Streptococcus anginous, and Escherichia coli (non-ESBL-producing). Early recognition and intervention are crucial for patient survival. Effective management involves a multidisciplinary approach, including tailored antibiotic therapy based on culture results and supportive care. Understanding the roles of these key bacterial pathogens and their interactions is essential for improving outcomes in patients with Fournier's gangrene.

The clinical presentation of Fournier's gangrene often begins with nonspecific symptoms such as fever, malaise, and severe pain in the genital or perineal area. Physical examination may reveal erythema, swelling, and crepitus due to subcutaneous gas formation. As the disease progresses, the affected tissue becomes gangrenous, and systemic signs of sepsis, such as tachycardia, hypotension, and altered mental status, may develop (2,3).

Early recognition and treatment of Fournier's gangrene are crucial for patient survival (4,5). The mainstay of treatment includes broad-spectrum intravenous antibiotics, aggressive surgical debridement of necrotic tissue, and supportive care in an intensive care unit. Empiric antibiotic therapy typically covers a wide range of potential pathogens, including gram-positive, gram-negative, and anaerobic bacteria. In this case, the initial empiric therapy included vancomycin (2 g IV over 2 hours, twice daily), meropenem (1 g IV, three times daily), and clindamycin (900 mg IV, three times daily). Clindamycin was discontinued after 7 days due to the negative culture results for clostridium species and a clinical decision based on the patient's improving condition. Clindamycin was discontinued due to negative culture results for clostridium species and the patient's clinical improvement, which indicated that the remaining pathogens were adequately covered by piperacillin/tazobactam. Piperacillin/tazobactam was then administered based on culture sensitivities. Surgical intervention often requires multiple debridement and, in some cases, reconstructive procedures such as skin grafts as this case (3,6).

The prognosis of Fournier's gangrene depends on several factors, including the patient's underlying health, the extent of infection at the time of diagnosis, and the promptness of treatment. The mortality rates (20%-40%) are based on studies by Singh et al. and Chen et al., which cover diverse patient groups with Fournier's gangrene, including those with significant comorbidities. Early diagnosis and a multidisciplinary approach to management are essential in reducing mortality and morbidity associated with this condition (6,7).

In conclusion, Fournier's gangrene is a severe, life-threatening infection that necessitates immediate medical and surgical intervention. Understanding the risk factors, clinical presentation, and treatment modalities is essential for healthcare professionals to improve outcomes for affected patients. Given its high mortality rate, continued research and awareness are critical in the early detection and effective management of Fournier's gangrene.

Yazar Katkıları: Fikir ve tasarımı – SÖ; Veri toplama – AA; Veri analizi/yorumlama – SÖ, AA; Makalenin yazımı – SÖ; Son onay ve sorumluluk – SÖ, AA.

Çıkar Çatışması: Çıkar çatışması bulunmamaktadır.

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