



FOURNIER'S GANGRENE- CURRENT CONCEPTS IN MANAGEMENT AND LITERATURE REVIEW

Dr. P Balaji¹, Dr. Vidya Lakshmi², Dr. Siddharth D³, Dr. Nitish R Jayaharan⁴

¹MS, PhD, FRCS, FCLS, Director of General Surgery and Minimal invasive surgery, SRM Institute of Medical Science, Vadapalani, Chennai.

²MS, Consultant, General Surgery and Minimal invasive surgery, SRM Institute of Medical Science, Vadapalani, Chennai.

³MS, FRCS, Senior Consultant, General Surgery and Minimal invasive surgery, SRM Institute of Medical Science, Vadapalani, Chennai.

⁴MBBS, Junior Resident, General Surgery and Minimal invasive surgery, SRM Institute of Medical Science, Vadapalani, Chennai.

Email: ¹drpbalaji15@gmail.com

ABSTRACT

Background: Fournier's gangrene is a rapidly progressive necrotizing soft tissue infection involving the perineal, genital, and perianal regions. It predominantly affects middle-aged men with comorbidities such as diabetes mellitus and is associated with significant morbidity and mortality.

Methods: The publication presents a review supplemented by current literature, highlighting evolving clinical presentations, diagnostic scoring systems and multidisciplinary management strategy.

Results: Early diagnosis, aggressive resuscitation, prompt surgical debridement, and broad-spectrum antibiotic therapy remain the cornerstones of management. Adjunctive modalities such as negative pressure wound therapy, hyperbaric oxygen therapy and reconstructive procedures contribute to improved outcomes.

Conclusion: Fournier's gangrene remains a life-threatening surgical emergency. Timely intervention and a multidisciplinary approach are critical in reducing mortality and improving functional recovery.

INTRODUCTION

Fournier's gangrene is a fulminant necrotizing infection of the superficial and deep fascial planes of the perineal and genital regions. It was first described in 1883 by Jean-Alfred Fournier.

The condition is typically polymicrobial, involving both aerobic and anaerobic organisms such as *Escherichia coli*, *Klebsiella* spp., *Streptococcus* spp., and *Bacteroides fragilis*. These organisms act synergistically to produce enzymes such as collagenases and hyaluronidases, leading to fascial necrosis, microvascular thrombosis and rapid spread of infection. The rate of spread is variable but can be extremely rapid, necessitating urgent intervention.

Risk Factors: The risk factors of Fournier's Gangrene include Diabetes mellitus which accounts for 50–70% cases), chronic alcoholism, immunosuppression (HIV, malignancy), chronic kidney disease, peripheral vascular disease and perianal or urogenital infections

Clinical Features: The early presentation of Fournier's Gangrene are localized pain which is often disproportionate to findings), swelling and erythema and low-grade fever. Advanced disease presents with skin discoloration progressing to necrosis, foul smelling discharge and signs of sepsis like tachycardia, hypotension and leucocytosis.

Evaluation and Scoring Systems

Various scoring systems are implemented to evaluate the severity of the disease.

LRINEC Scoring system includes CRP, WBC, haemoglobin, sodium, citrate and glucose. A score of more than 6 suggests necrotizing infection.

Fournier's Gangrene Severity Index (FGSI) is based on physiological and biochemical parameters. Score more than 9 is associated with high mortality (up to 75 %)

Case Presentation: A 51-year-old male presented with complaints of perianal pain and swelling since 10 days. He also gave a history of fever and foul smelling discharge. The patient developed hemodynamic instability preoperatively and required noradrenaline infusion.

Local Examination: Clinical findings include diffuse swelling involving perineum, scrotum, and abdominal wall with skin discoloration and erythema. Tenderness on palpation and foul-smelling purulent discharge.



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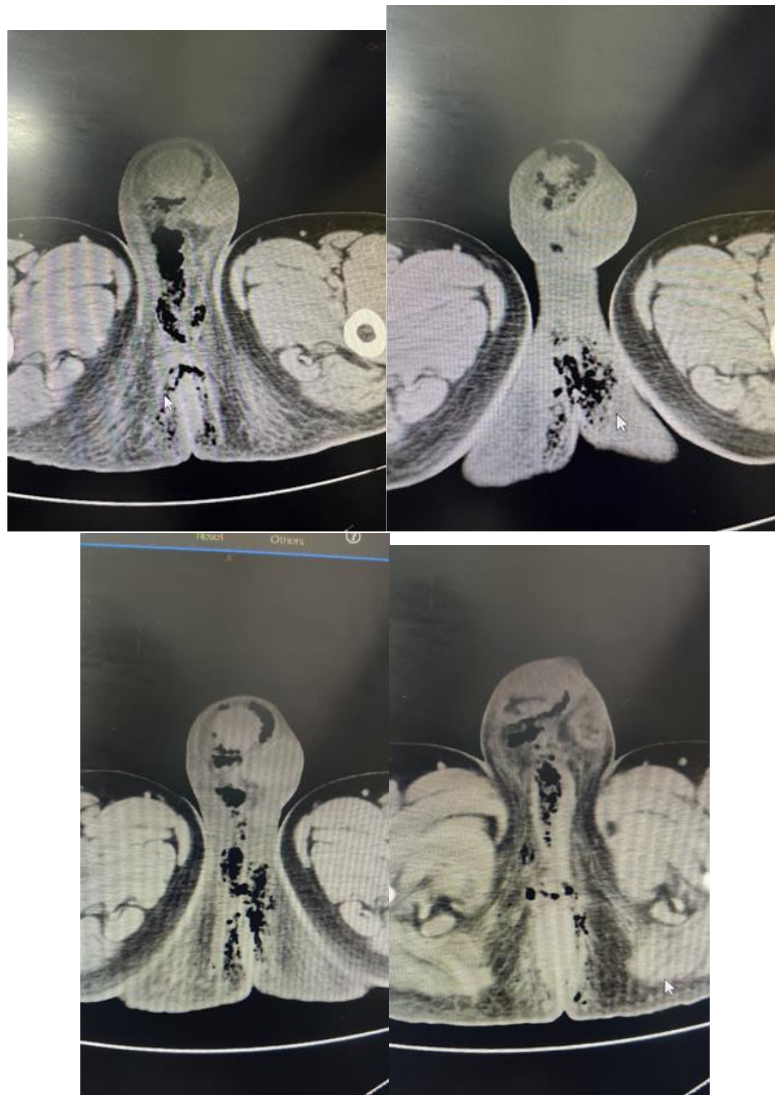
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Radiological Findings

CT Abdomen: CT scan abdomen gave an impression of Necrotizing fasciitis involving perineum and abdominal wall with Air pockets in

ischio-rectal and periprostatic regions and subcutaneous emphysema with fascial plane tracking.





CT Chest

Basal atelectasis and Interlobular septal thickening

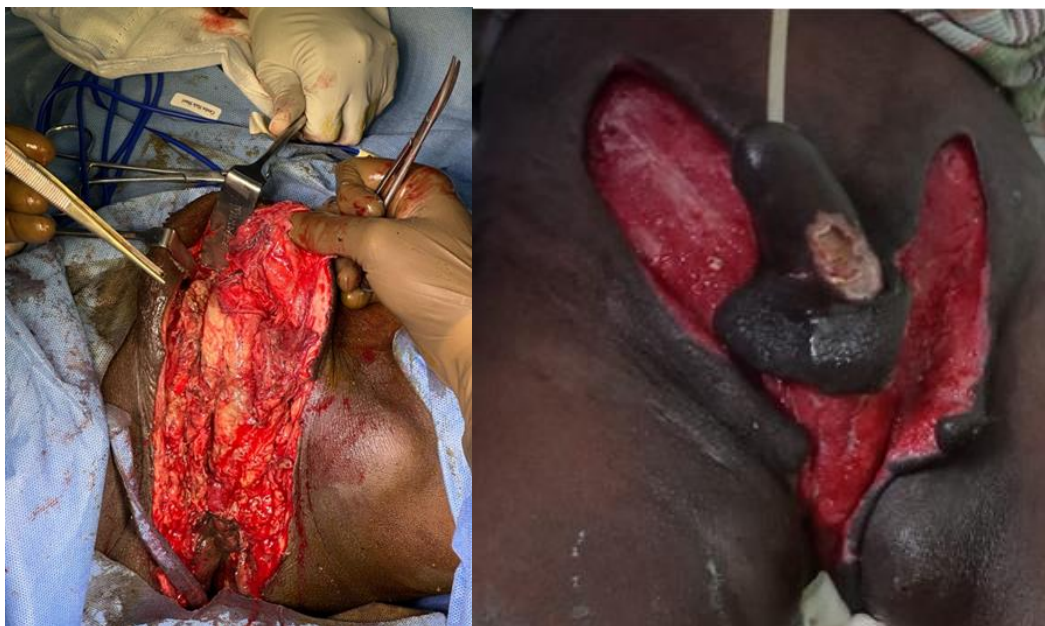
Management

Initial Resuscitation involves aggressive fluid resuscitation, hemodynamic stabilization and early ICU admission.

Antibiotic Therapy (Empirical broad-spectrum antibiotics) covering Gram-positive organisms, Gram-negative organisms and Anaerobes. Typical

regimens include Carbapenem or beta-lactam/beta-lactamase inhibitor, Clindamycin (to inhibit toxin production) and MRSA coverage when indicated

Surgical Debridement should be immediate and aggressive with complete removal of necrotic tissue until viable margins. Serial wound debridement is required in most cases. Delay in debridement (>24 hours) is strongly associated with increased mortality.



Adjunctive Therapies

Negative Pressure Wound Therapy (VAC) enhances granulation tissue formation reduces edema and bacterial load. It also decreases frequency of dressing changes

Hyperbaric Oxygen Therapy (HBOT) improves tissue oxygenation and inhibits anaerobic bacterial growth. Its role remains controversial due to limited availability and lack of high-quality randomized trials

Reconstruction includes split-thickness skin

grafting and flap reconstruction in extensive defects.

Case Outcome: Serial wound debridement with VAC therapy was performed. After 1 month

healthy granulation tissue was observed following successful split-thickness skin grafting of the perineal wound and primary closure of the abdominal wound was done.



DISCUSSION

Fournier's gangrene remains a rare but devastating surgical emergency characterized by rapid progression and high mortality. Despite advances in critical care and surgical techniques, outcomes continue to depend largely on early diagnosis and timely intervention.

One of the major challenges in managing Fournier's gangrene is its variable and often subtle early presentation. Patients may initially present with nonspecific symptoms such as localized pain and erythema, which can delay diagnosis. A key clinical feature described in literature is pain out of proportion to physical findings, which should raise suspicion for necrotizing soft tissue infection. In our case, the delay of approximately 10 days before

presentation likely contributed to the extensive spread of infection involving the anterior abdominal wall.

The role of imaging, particularly contrast-enhanced CT, has become increasingly important in modern practice. CT findings such as fascial thickening, fat stranding, fluid collections, and subcutaneous emphysema help delineate the extent of disease and guide surgical planning. However, it is important to emphasize that imaging should not delay surgical intervention, as Fournier's gangrene remains primarily a clinical diagnosis.

Scoring systems such as the LRINEC score and Fournier's Gangrene Severity Index (FGSI) are useful adjuncts in risk stratification. While LRINEC aids in early diagnosis of necrotizing

infections, FGSi has prognostic value, with higher scores correlating with increased mortality. However, recent literature suggests that these scoring systems should be interpreted cautiously and should not replace clinical judgment, as their sensitivity and specificity may vary across populations.

The cornerstone of management remains early and aggressive surgical debridement. Multiple studies have demonstrated that delay in surgical intervention beyond 24 hours significantly increases mortality. In most cases, repeated debridements are required due to ongoing tissue necrosis. Our patient underwent serial debridement, which is consistent with current best practices and likely contributed to the favorable outcome.

Broad-spectrum antibiotic therapy plays a crucial supportive role. The polymicrobial nature of Fournier's gangrene necessitates coverage against Gram-positive, Gram-negative, and anaerobic organisms. The use of agents such as carbapenems, beta-lactam/beta-lactamase inhibitors, and clindamycin is well supported. Clindamycin, in particular, has an added benefit of suppressing toxin production in streptococcal infections.

Adjunctive therapies such as negative pressure wound therapy (VAC) have gained widespread acceptance. VAC therapy promotes wound healing by improving local perfusion, reducing edema, and facilitating removal of exudates and infectious material. In addition, it reduces the frequency of dressing changes and improves patient comfort. In our case, VAC therapy resulted in satisfactory granulation tissue formation, enabling definitive reconstruction.

The role of hyperbaric oxygen therapy (HBOT) remains controversial. While it theoretically improves tissue oxygenation and inhibits anaerobic bacterial growth, evidence from clinical studies is inconclusive. Some reports suggest improved survival, whereas others indicate no significant benefit. Importantly, reliance on HBOT should never delay surgical debridement, which remains the primary life-saving intervention.

Reconstructive surgery is often required following infection control due to extensive soft tissue loss. Options include split-thickness skin grafts and various flap techniques depending on the defect size and location. Early involvement of plastic surgeons facilitates optimal functional and cosmetic outcomes. In our patient, successful split-thickness skin grafting was performed after adequate wound bed preparation.

Mortality in Fournier's gangrene ranges from 20% to 40%, with higher rates observed in patients with advanced age, diabetes mellitus, renal failure, and delayed presentation. Sepsis and multi-organ dysfunction remain the leading causes of death. Recent studies emphasize the importance of a multidisciplinary team approach, involving

surgeons, intensivists, infectious disease specialists, and plastic surgeons, in improving survival outcomes.

Finally, increasing attention is being given to long-term outcomes and quality of life in survivors. Patients often experience physical, psychological, and sexual dysfunction following recovery. Therefore, comprehensive care should extend beyond acute management to include rehabilitation and psychosocial support.

CONCLUSION

Fournier's gangrene is a rapidly progressive, life-threatening surgical emergency. Early recognition, aggressive surgical debridement, broad-spectrum antibiotic therapy, and multidisciplinary care are essential for improving survival. Advances in wound care and reconstructive techniques have enhanced recovery, but timely intervention remains the cornerstone of management.

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