



Fournier's Gangrene of the Penis: A Rare Case Report and Review of the Literature

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ABSTRACT

Fournier's gangrene is a rare, fulminant, usually a localized disease of the external genitalia, anorectal and perineal region, with an occasional extension up to the abdominal wall. Mainly associated with men and those over the age of 50, Fournier's gangrene has been shown to have a predilection for patients with diabetes as well as people who are long-term alcohol misusers. The usual organism is an anaerobic streptococcus synergistic with other organisms. Although considerable progress has been made in the treatment of this disease, it remains a serious and debilitating condition with a high mortality rate. Early therapy is the key, including hospitalization, debridement of the entire shaft of the penis distal to the devastated area, without excising the normal skin, parenteral broad-spectrum antibiotics, and skin grafting. We here-in present two clinical cases of Fournier's gangrene of the external genitalia. Our case was unusual in that only the penis was involved, which is very rare.

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Introduction

Fournier's gangrene is a rare and often fulminant necrotizing fasciitis of the perineum and genital region frequently due to a synergistic polymicrobial infection [1–3]. It commonly occurs in older men, but it can also occur in women and children. Early diagnosis remains imperative as rapid progression of the gangrene can lead to multi-organ failure and death. Fournier's gangrene was initially defined as an idiopathic entity, however recent studies shows that it is more likely to occur in diabetics, alcoholics, or those who are immune compromised. Diabetes though not initially taken into account has been considered as the leading predisposing systemic factor [4]. Alcohol overindulgence is reported to be present in 20–50% of patients. Trauma to the genitalia too continues to be a frequently recognized vector for the introduction of bacteria that initiate the infectious process [5]. Surgical debridement is the mainstay of treatment, along with early use of broad-spectrum antibiotics. Nonetheless, the mortality rate continues to be high [6, 7].

We present two clinical cases of Fournier's gangrene involving the penis, which is a rare entity since this infection affects majorly the whole perineum region.

Case Reports

Case 1

A.M. aged 60 presented with fever and pain, with brownish black discoloration of the penis (Figure 1) for four days. There was no history of trauma or any sepsis in the genito-perineal area, but rather urethral stricture and severally treated urinary tract infections. On general physical examination, the patient was febrile. Local examination revealed brownish-black discoloration of the penile skin. The penile skin was swollen with purulent discharge. A large malodorous eschar was noted to the ventral surface of the

penis. There was associated erythema of the scrotum. There were no other foci of infection in the genito-perineal area.



Figure 1. Brownish-black discoloration of the penis with erythema of the scrotum.

The prostate gland was normal on rectal examination. Routine haematological examination revealed leucocytosis and neutrophilia. Urine microscopy revealed no abnormality. Random blood sugar, blood urea, and serum creatinine were within normal limits. Discharge sent for culture isolated a mixed growth of *Bacteroides fragilis*, *Staphylococcus aureus* and anaerobic *Streptococcus* sensitive to cefotaxime, ceftriaxone, amoxicillin/ clavulanic acid and amikacin. Aggressive intravenous resuscitation fluid and broad spectrum antibiotics were administered such as cefotaxime, metronidazole and gentamicin with a provisional clinical diagnosis of Fournier's gangrene. Debridement incisions were done over the gangrenous penile skin and the purulent fluid was drained (Figure 2). Suprapubic cystostomy was performed. The open wound was managed with daily sterile dressings for 15 days resulting to a clean non purulent wound (Figure 3). Since no much skin was lost, reconstruction was achieved using secondary sutures to cover the wound (Figure 4) with acceptable cosmetic results.

Urethral stricture was managed by endoscopic urethrotomy 4 months after satisfied cicatrisation. The patient is satisfied with postoperative erection and micturition on follow-up 6 months later.



Figure 2. Debridement incisions the purulent fluid was drained.



Figure 3. a clean wound within 15 days with healthy granulation.



Figure 4. Secondary sutures to cover the wound with acceptable cosmetic results.

Case 2

M.J aged 45, diabetic, presented to the emergency room with fever, dysuria, inflamed, swelling and malodorous penile shaft (Image 1).



Image 1. swelling and malodorous penile shaft.

On clinical examination the penis had well-delineated black necrotic areas, his scrotum was oedematous and erythematous (Image 2).



Image 2. malodorous penile shaft with well-delineated black necrotic areas.

Findings of a digital rectal examination were negative for any palpable masses. Baseline laboratory investigations were performed, including a complete blood count, blood cultures, and measurement of electrolyte, creatinine, and lactate levels. The white blood cell count was elevated at $16.9 \times 10^9/L$ (neutrophils $13.9 \times 10^9/L$), the lactate level was 1.0 mmol/L, and the rest of the results were unremarkable. Pus culture identified strains of *Streptococcus pyogenes* and *E coli*. The patient was given broad-spectrum antibiotics and IV fluids and urgently referred to Urology department. He was taken to the theatre for debridement incisions done over the gangrenous penile skin, excision of all necrotic tissues. Suprapubic cystostomy was performed. The open wound was managed with daily sterile dressings resulting in a clean wound within ten days with healthy granulation within two weeks. Penile skin reconstruction was achieved by secondary sutures. On hospital day 27, he was discharged home.

Discussion

Penile gangrene is seen infrequently, but is associated with significant morbidity and mortality [8]. Fournier's gangrene is rare and often fulminant necrotizing fasciitis of the perineum and genital region and is known to be frequently due to a synergistic polymicrobial infection [1–3].

The typical patient would be an elderly male in his sixth or seventh decade of life with comorbid diseases, diabetic, or otherwise immune-compromised individuals. Subjects of both genders and all ages may be affected [9]; however, Fournier's gangrene has a predilection for those over the age of 50 with a male to female ratio of 10 to 1 [10,3]. Though there is a male predominance, this condition has been described in children too [11, 12].

Similar to other necrotizing soft tissue infections, the inflammation and edema from the polymicrobial infection lead to an obliterative endarteritis of the subcutaneous arteries [13]. This impaired blood supply furthers perifascial dissection with spread of bacteria and progression to gangrene of the overlying subcutaneous tissue and skin.

Ischemia of the penis commences progressively since the penis is well vascularised with deep arteries; cavernosal arteries branches of internal pudendal artery [14].

The relatively high incidence of Fournier's gangrene in patients with diabetes has been attributed to their small vessel disease, defective phagocytosis, diabetic neuropathy and immunosuppression, all of which can be exacerbated by poor hygiene when present [15].

The disease process can involve an entry point for microorganisms (rupture of skin) with the synergistic polymicrobial infection leading to obliterative endarteritis of subcutaneous arteries, necrosis of skin, subcutaneous tissues, fat, muscles, fasciae with suppuration and gas formation. However, it is interesting to note that in almost 30% to 50% cases no definite predisposing factor is found [15].

In our clinical cases, the first patient had severally treated urinary infection and urethral stricture, the second was diabetic with urinary infection.

Initially defined as an idiopathic entity, recent research has shown that less than a quarter of Fournier's gangrene cases are now considered idiopathic. Colorectal sources (30–50% of cases), urogenital sources (20–40% of cases), cutaneous infections (20% of cases) and local trauma are frequently identified as the cause of FG [3].

The diagnosis of Fournier's gangrene is primarily clinical, and in most cases imaging is neither necessary nor desirable.

The clinical features of Fournier's gangrene include sudden pain and swelling in the scrotum, purulence or wound discharge, crepitation, fluctuance, prostration, pallor and fever greater than 38°C [16].

An early diagnosis including evaluation of predisposing and etiological factors, metabolic and physiological parameters with prompt resuscitation, aggressive surgical debridement, broad-spectrum antibiotic coverage, and continuous monitoring of all the parameters is essential for a good outcome, therefore reducing the high mortality and morbidity of this condition.

Under no circumstances should surgery be delayed significantly for imaging of any kind. However, imaging modalities may be useful in cases when the presentation is atypical or when there is concern regarding the true extent of the disease.

In our two cases, no imaging was required since the affection involved the penis and appeared to be superficial.

The antibiotic spectrum should cover *Staphylococci*, *Streptococci*, *Enterobacteriaceae* family of organisms and anaerobes. A reasonable empiric regimen might consist of ciprofloxacin and clindamycin. Clindamycin is particularly useful in the treatment of necrotizing soft tissue infections, due to its gram-positive and anaerobic spectrum of activity.

Treatment of Fournier's gangrene entails treating sepsis, stabilizing medical parameters and urgent surgical debridement. Despite timely and aggressive management, the condition is life threatening as most studies report mortality rates of between 20% and 40% with a range of 4–88% [2, 9].

Multiple surgical debridements are often required (2 to 4 on average) to remove all necrotic tissue [17,18]. Initial treatment should also involve aggressive resuscitation with IV fluids for any hemodynamic instability and early administration of broad-spectrum antibiotics (piperacillin-tazobactam; clindamycin for antitoxin effects against toxin-elaborating strains of streptococci and staphylococci; and vancomycin for methicillin-resistant *Staphylococcus aureus* coverage [19,20,21].

Hyperbaric oxygen treatment might also be considered as an adjunct if available [19,20,21].

With proper surgical debridement, local wound care, and antibiotic therapy, healthy granulation tissue appears, and most of the time primary wound closure can be done, as seen in both of our cases. However, in significant tissue loss, any of the reconstructive procedure including various flap covers may be considered depending on the case. A significant tissue loss in genitalia and perineum causing a large defect can lead to high morbidity, which can be salvaged by reconstructive surgery with adequate tissue coverage [22].

After extensive debridement, many patients sustain significant defects of the skin and soft tissue, creating a need for reconstructive surgery for wound coverage as well as satisfactory functional and cosmetic results. The primary goal of reconstruction in patients who have undergone genital skin loss due to necrotizing fasciitis is simple and efficient coverage. The preservation of penile function, including erection, ejaculation and micturition. Coverage has to be achieved in a way that restores function quickly with a good cosmetic outcome and low associated morbidity and mortality [22].

Conclusion

Fournier's Gangrene is a rare necrotizing fasciitis of the perineal, genital and perianal region with an aggressive clinical course. Isolated penile infection is rare.

Treatment involves an urgent extensive surgical debridement of all necrotic tissues, high doses of broad-spectrum antibiotics and good supportive care. Despite progress in diagnosing and managing the disease, the mortality rate remains high. A multidisciplinary approach is often necessary as these patients may require reconstructive procedures in the future. The surgical operation has to be performed in emergency to avoid a rapid spread of tissue necrosis and a possible development towards septic shock. Reconstructive techniques afford better cosmetic results. With early recognition, prompt treatment, improved wound care and reconstructive efforts, the mortality rates and cosmetic results should continue to improve

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Author's contributions: all authors contributed to the realization of this article.

References

- [1].B. Erol, A. Tuncel, V. Hanci et al., "Fournier's gangrene: overview of prognostic factors and definition of new prognostic parameter," *Urology*, vol. 75, no. 5, pp. 1193–1198, 2010.
- [2].Morpurgo E., Galandiuk S. (2002) Fournier's gangrene. *Surg Clin North Am* 82: 1213–1224.
- [3].N. Eke, "Fournier's gangrene: a review of 1726 cases," *British Journal of Surgery*, vol. 87, no. 6, pp. 718–728, 2000.
- [4].Ayumba BR, Magoha GA. Management of Fournier's gangrene at the Kenyatta National Hospital, Nairobi. *East Afr Med J*. 1998;75:370–3.
- [5].Basoglu M, Gul O, Yildirgan I, Balik AA, Ozbey I, Oren D. Fournier's gangrene: Review of fifteen cases. *Am Surg*. 1997;63:1019–21.
- [6].Oguz A, Gümüş M, Turkoglu A, Bozdağ Z, Ülger BV, Agaçayak E, et al. Fournier's gangrene: a summary of 10 years of clinical experience. *Int Surg*. 2015;100(5):934–41. Epub 2015 Apr 10.
- [7]. Kim SY, Dupree JM, Le BV, Kim DY, Zhao LC, Kundu SD. A contemporary analysis of Fournier gangrene using the National Surgical Quality Improvement Program. *Urology*. 2015;85(5):1052–6. Epub 2015 Mar 11.
- [8].Spirnak JP, Resnick MI, Hampel N, Persky L. Fournier's gangrene: Report of 20 patients. *J Urol* 1984;131:289-91
- [9]. Sorensen M., Krieger J., Rivara F., Klein M., Hunger W. (2009a) Fournier's gangrene: population based epidemiology and outcomes. *J Urol* 181: 2120–2126.
- [10].Alonso R., Garcia P., Lopez N., Calvo O., Rodrigo A., Iglesias R., et al. (2000) Fournier's gangrene:anatomo-clinical features in adults and children. *Therapy update. Actas Urol Esp* 24: 294–306.
- [11].J. R. Adams Jr., J. A. Mata, D. D. Venable, D. J. Culkin, and J.A. Bocchini, "Fournier's gangrene in children," *Urology*, vol. 35, no. 5, pp. 439–441, 1990.
- [12].G.Ekingen, T. Isken, H. Agir, S. Öncel, and A. Günlemez, "Fournier's gangrene in childhood: a report of 3 infant patients," *Journal of Pediatric Surgery*, vol. 43, no. 12, pp. e39–e42, 2008.
- [13].Korkut M., Icoz G., Dayangac M., Akgun E., Yeniay L., Erdogan O., et al. (2003) Outcome analysis in patients with Fournier's gangrene. Report of 45 cases. *Dis Colon Rectum* 46: 649–652.
- [14].Vijayan P. Gangrene of the penis in a diabetic male with multiple amputations and follow-up. *Indian J Urol*. 2009;25(1):123-125. PubMed | Google Scholar.

- [15].R.Vick and C. C. Carson III, "Fournier's disease," *Urologic Clinics of North America*, vol. 26, no. 4, pp. 841–849, 1999.
- [16].Yeniyol C., Suelozgen T., Arslan M., Ayder A. (2004) Fournier's gangrene: experience with 25 patients and use of Fournier's gangrene severity index score. *Urology* 64: 218–222.
- [17].McCormack M, Valiquette AS, Ismail S. Fournier's gangrene: a retrospective analysis of 26 cases in a Canadian hospital and literature review. *Can Urol Assoc J*. 2015;9(5–6):E407–10.
- [18].Sroczyński M, Sebastian M, Rudnicki J, Sebastian A, Agrawal AK. A complex approach to the treatment of Fournier's gangrene. *Adv Clin Exp Med*. 2013;22(1):131–5.
- [19].Bjurlin MA, O'Grady T, Kim DY, Divakaruni N, Drago A, Blumetti J, et al. Causative pathogens, antibiotic sensitivity, resistance patterns, and severity in a contemporary series of Fournier's gangrene. *Urology*. 2013;81(4):752–8. Epub 2013 Feb 20.
- [20]. Koukouras D, Kallidonis P, Panagopoulos C, Al-Aown A, Athanasopoulos A, Rigopoulos C, et al. Fournier's gangrene, a urologic and surgical emergency: presentation of a multi-institutional experience with 45 cases. *Urol Int*. 2011;86(2):167–72. Epub 2011 Jan 8.
- [21].Stevens DL, Bisno AL, Chambers HF, Dellinger EP, Goldstein EJ, Gorbach SL, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. *Clin Infect Dis*. 2014;59(2):e10–52. Erratum in: *Clin Infect Dis* 2015;60(9):1448.
- [22].P.C.Black, J. B. Friedrich, L. H. Engrav, and H. Wessells, "Meshed unexpanded split-thickness skin grafting for reconstruction of penile skin loss," *Journal of Urology*, vol. 172, no. 3, pp. 976–979, 2004.