

Fournier's gangrene: Clinical case and review of the literature

Remigio Perneti¹, Fabiano Palmieri¹, Elisabetta Sagrini², Marco Negri³, Claudio Morisi⁴,
Andrea Carbone⁵, Paolo Bassi⁶, Salvatore Voce¹

¹ UO Urology, Santa Maria delle Croci Hospital, Ravenna, Italy;

² UO Internal Medicine, Santa Maria delle Croci Hospital, Ravenna, Italy;

³ UO General Surgery, Santa Maria delle Croci Hospital, Ravenna, Italy;

⁴ Ambulatory Surgery Wounds-Necrotic Ulcers, Santa Maria delle Croci Hospital, Ravenna, Italy;

⁵ UO Plastic Surgery, Santa Maria delle Croci Hospital, Ravenna, Italy;

⁶ UO Infectious Diseases, Santa Maria delle Croci Hospital, Ravenna, Italy.

INTRODUCTION (1-4)

Fournier's gangrene is a life-threatening acute necrotizing fasciitis of perianal, genitourinary and perineal areas. *Alfred Jean Fournier* described cases of scrotal gangrene in France in 1843 and 1844. He thought it was an idiopathic condition without aetiology. Nowadays, it is well known that Fournier gangrene is almost never an idiopathic disease. When the aetiology is not found, it only means that the clinician is unable to determine the aetiology since the infection trigger may have been so trivial as to be overlooked. Fournier's gangrene is primarily an infective condition with multiple aetiological factors and it has several recognized predisposing factors and several entryways of the infecting organisms. Both aerobic and anaerobic organisms are involved since they usually act in synergism. Most frequently identified causative agents are *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Proteus mirabilis*, enterococci, *Bacteroides fragilis*, anaerobic *Streptococcus*. Predisposing aetiological factors are diabetes mellitus, alcoholism, thrombosis, urethral obstruction and Human Immunodeficiency Virus.

The usual infective focus may include urethral sepsis, genital sepsis, prostatic sepsis, perirectal sepsis, balanitis, ischio-rectal abscesses, perineal trauma, groin wound sepsis, surgical procedures (often scrotum surgery), perforated adenocarcinoma of the sigmoid colon etc.

The event leading to the inoculation of organism that induces this rapidly fatal condition may be so trivial that the patient or even the attending clinician fails to notice it. For example, the scratch of an enlarged and stretched scrotum by onchocerciasis may inoculate organisms into the skin leading to cellulitis which progresses to Fournier's gangrene. Other Fournier's gangrene causes might be urethral catheterization, prostatic massage and vasectomy.

Gangrene may extend to abdominal wall, intra-abdominal structures, and even retroperitoneal tissues.

Fournier's gangrene extends to the subcutaneous fascia and part of the deep fascia and may involve any part of the body, even though it tends to have a predilection for the genitoperineum, lower abdominal wall and upper thigh.

Characteristically this gangrene is characterized by synergism between theoretically low aggressive bacteria. Each microorganism produces the enzymes necessary to cause coagulation of the nutrient vessels reducing local blood supply and tissue oxygen tension. The resultant tissue hypoxia allows growth of facultative anaerobes and microaerophilic organism. These latter microorganisms may produce enzymes (lecithinase, collagenase), which lead to digestion of fascial barriers, thus fueling the rapid extension of the infection.

Clinical signs are pain, oedema and redness of the skin, and later dusky discoloration and then blistering before ulceration. Even before ulceration there is subcutaneous necrosis and severe toxæmia requiring aggressive antibiotic therapy, incision, drainage and debridement. Due to the lack of subcutaneous fat in the scrotum, necrosis of fascia containing the Dartos leads to exposure of the testis which may be coated with a thick layer of creamy pus. The testes are usually spared by the extending infection since the blood supply is intact, being derived from the abdominal aorta at the level of the second lumbar vertebra. When testicular involvement occurs it indicates a retroperitoneal or intra-abdominal source of infection. The muscle layer of the penis is also usually spared, thus the skin sloughs off leaving the muscles. However, *Campos et al.* described a case of Fournier's gangrene following synchronous cavernospongious thrombosis secondary to urethral lithiasis (5). We describe the case of a diabetic patient with Fournier's disease presented with severe sepsis and successfully treated with urgent deep debridement and reconstructive surgery.

DISCUSSION

Fournier's gangrene is a necrotizing fasciitis that rapidly spreads along adjacent tissues. Despite advanced management mortality is still high and averages 20-30% (6). The disease is common in the older age group and uncommon in children and adolescents. It has, however, been described in neonates and infants. The modern-day term of Fournier's gangrene refers to a polymicrobial necrotizing

soft tissue infection involving the superficial and deep fascial planes of the genital, perineal, or perianal areas.

Fournier's gangrene is a rare infection, occurring primarily in elderly men in their sixties and seventies. The average incidence is of 97 cases per year and a prevalence of approximately 1 case in 7500 persons.

Men are 10 times more likely to develop this infection, because women have better drainage of the perineal region through vaginal secretions. Even though rare it occurs in females and it usually involves the labia majora. Death is usually the result of systemic illness, such as multiple organ failure, coagulopathy, or sepsis.

One study evaluated the usefulness of lactate level in predicting overall clinical outcome and found that a level greater than 4.0 mmol/L was an independent predictor of mortality. On the contrary, factors associated with an improved prognosis include localized clinical disease, absence of systemic toxicity, and age younger than 60 years. Consultation for early surgical debridement and initiation of broad-spectrum IV antibiotics to cover Gram positive, Gram-negative, and anaerobic bacteria is critical.

REFERENCES

1. Eke N. Fournier gangrene: a review of 1726 cases. *Br J Surg.* 2000; 87:718-728.
2. Paty R, Smith AD. Gangrene and Fournier gangrene. *Urol Clin North Am.* 1992; 19:149-162.
3. Yanar H, Taviloglu K, Ertekin C, et al. Fournier gangrene: risk factors and strategies for management. *World J Surg.* 2006; 30:1750-1754.
4. Norton KS, Johnson LW, Perry T, et al. Management of Fournier gangrene: an eleven year retrospective analysis of early recognition, diagnosis, and treatment. *Am Surg.* 2002; 68:709-13.
5. Campos JA, Martos JA, Gutierrez del Pozo R, Carrettero P. Synchronous caverno-spongious thrombosis and Fournier's gangrene. *Arch Esp Urol.* 1990; 43:423-426.
6. Pawłowski W, Wronski M, Krasnodbski IW. Fournier's gangrene. *Polski Merkuriusz Lekarski.* 2004; 16:85-87.