

CASE REPORT**PATHOLOGY/BIOLOGY**

Danielle Bury,¹ M.B., B.S. and Roger W. Byard,^{1,2} M.D.

Fournier Gangrene and Unexpected Death

ABSTRACT: Fournier gangrene represents a rare but progressive perineal infection that may result in rapid death. A 70-year-old man with poorly controlled diabetes mellitus and alcohol abuse is reported who was found unexpectedly dead. He had last been contacted the night before his death. At autopsy, the most striking finding was deep necrotic ulceration of the scrotum with exposure of underlying deep muscles and testicles, with blood cultures positive for *Escherichia coli*. Death was, therefore, attributed to necrotic ulceration/gangrene of the perineum (Fournier gangrene) that was due to *E. coli* sepsis with underlying contributing factors of diabetes mellitus and alcoholism. In addition there was morbid obesity (body mass index 46.9), cirrhosis of the liver, and marked focal coronary artery atherosclerosis with significant cardiomegaly. Fournier gangrene may be an extremely aggressive condition that can result in rapid death, as was demonstrated by the rapid progression in the reported case.

KEYWORDS: forensic science, Fournier gangrene, *E. coli* sepsis, diabetes mellitus, alcoholism, immunosuppression, fulminant infection

In 1883, Jean-Alfred Fournier, a French venereologist, reported five cases of “fulminant gangrene” of the perineum (1). The cause was unknown, although an association with diabetes mellitus was noted (2). The condition was characterized by a rapidly advancing necrotizing infection of the perineal region and was associated with a high mortality rate. The following case is reported to demonstrate features of lethal Fournier gangrene that may still be encountered in forensic practice.

Case Report

A 70-year-old man was found dead in a shed where he lived. He had a history of poorly controlled insulin-dependent diabetes mellitus and alcohol abuse but had not sought medical attention for some time. He had last been spoken to in the evening 15 h prior to his being discovered deceased in bed next to two buckets filled with human feces. When last seen he had stated that he was “OK.” The shed did not have running water and was in a poorly kept condition being described as “dirty” and untidy.” The victim used to shower at a neighbor’s house. No information was available about the decedent’s level of social contact. The external temperature on the days before and after his death ranged from 14.8 to 29.4°C.

At autopsy, the most striking finding was deep necrotic ulceration of the scrotum with exposure of the underlying deep muscles and testicles (Fig. 1). There was no evidence of trauma, and there were changes of early decomposition. There was also no evidence of infection elsewhere. Blood cultures revealed a pure growth of *Escherichia coli* with groin swabs growing multiple organisms including mixed anaerobes, enterococci, *Proteus* and *Pseudomonas* sp., in addition to a fungal organism, in keeping with postmortem contamination. Other findings included morbid obesity (body mass index 46.9), cirrhosis of the liver with splenomegaly, and marked

focal coronary artery atherosclerosis with significant cardiomegaly (812 g). Toxicological screening was negative for alcohol and common drugs, and there was no evidence of diabetic ketoacidosis on biochemical analysis of vitreous humor. Death was, therefore, attributed to necrotic ulceration/gangrene of the perineum (Fournier gangrene) with *E. coli* sepsis. Contributing factors included diabetes mellitus and alcoholism, with underlying morbid obesity and significant cardiovascular and liver disease.

Discussion

Fournier gangrene has remained a rare condition with a mortality rate as high as 45% (2). *E. coli* is one of the major causative agents and it is believed that the underlying process is that of a simple infection or abscess occurring in an immunocompromised host that results in end artery thrombosis with marked tissue necrosis (3–5). It is thought that minor trauma occurs that facilitates bacterial proliferation in the warm and moist environment of the perineum (6). Other bacteria that may be involved are *Bacteroides*, *Streptococci*, and *Clostridia* sp. (2), with 61% of wounds being polymicrobial (4). Rarely *Candida* sp. has been identified, although this may be an incidental finding (5,7).

Bacteria derive from three main sources: dermatological (24%), colorectal (21%), and urological (19%) (2), with anorectal contamination thought to be the most significant. There is a suggestion that dermatological infections may be more common in those with poor hygiene (3,6). It is also possible that diabetic autonomic neuropathy may lead to urinary stasis with higher rates of urinary tract infections, predisposing to an increased risk of Fournier gangrene (3).

Although first described in young males, cases have now been reported at all ages, including childhood, and in both sexes. In children initiating events may include insect bites and circumcision (3,8). There remains a male preponderance, in the order of 10:1 (2), with the most common age being 50–70 years (5). Older victims may be more likely to perish due to associated comorbidities (2). For example, in the current case, there was underlying cirrhosis of the liver, coronary artery atherosclerosis and cardiomegaly, all of which may have contributed to the lethal episode.

¹Discipline of Anatomy and Pathology, The University of Adelaide, Frome Road, Adelaide, SA 5005, Australia.

²Forensic Science SA, 21 Divett Place, Adelaide, SA 5000, Australia.

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FIG. 1—Deep ulceration of the scrotum of a 70-year-old man was due to Fournier gangrene associated with disseminated *Escherichia coli* sepsis. The testicles were exposed but had not been involved in the inflammatory process. A strip of necrotic muscle is hanging from the scrotum. Insect larvae present around the wound may have been deposited before or after death.

One of the most striking features of Fournier gangrene is the rapidity with which it progresses, with a rate of encroachment on adjacent tissues of up to 2–3 cm/h (5). The area of necrosis may rapidly spread to involve the lower extremities or anterior abdominal wall. In the reported case, the speed of development of the lesion was unclear due to the relatively isolated circumstances of the victim; however, he had not appeared unwell only 15 h prior to being found. Factors predisposing to Fournier gangrene included lower socioeconomic status, alcoholism, and diabetes mellitus (2,9). There was also evidence of Diogenes syndrome in this case, a condition of elderly recluses who live in poor and unhygienic circumstances and who often have untreated illnesses (10). Bacterial growth may also have been accelerated by diabetes mellitus due to hyperglycemia and reduced immunity (7,11). In fact, Fournier gangrene has rarely been the presenting feature of diabetes (12). It is also possible that high temperatures in the decedent's shed may have contributed to the rapidity of spread of the infection.

Although victims may present with pain that appears out of proportion to the appearance of the lesion, in 15% of cases, the lesion

may be painless due to destruction and compression of the surrounding cutaneous nerves, allowing for more advanced presentations with a higher mortality rate. The presentation may also be relatively nonspecific with fever, malaise, and abdominal pain (3,4,13). Treatment consists of early surgical debridement and drainage with aggressive antibiotic cover (2). The role of hyperbaric oxygen remains unclear (2). Failure to seek treatment, or the rapid progression of local and disseminated sepsis as in the reported case, may result in quite sudden death with resultant presentation of these cases for forensic investigation.

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Additional information and reprint requests:

Roger W. Byard, M.D.
 School of Medical Sciences
 The University of Adelaide
 Frome Road
 Adelaide
 SA 5005
 Australia
 E-mail: roger.byard@sa.gov.au