Fournier's gangrene in diabetic and renal failure patients

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ABSTRACT

Objectives: To report our experience in the management of 9 patients with Fournier's gangrene seen in our institute, to identify the most common prognostic variables in our patients, and to evaluate the outcome of aggressive management in patients with Fournier's gangrene.

Methods: We reviewed the medical records of 9 patients admitted to King Abdul-Aziz University Hospital (KAUH) in Jeddah, Kingdom of Saudi Arabia from November 1999 until November 2002. Their age, sex, clinical presentation, predisposing factors, microbiology testing, management and prognosis were studied.

Results: Nine male patients were diagnosed and treated. The mean age was 68 years, 6 patients (66.6%) were diabetics and one of them had renal insufficiency not requiring dialysis, while 3 patients were on regular hemodialysis. Bacterial culture results revealed a single organism in 44.4%, and more than one organism in 55.6% of the cases. No anaerobes could be cultured, and one patient had *Candida albicans*. All patients had temporary suprapubic catheter diversion while stool diversion by colostomy was required in only one patient. In 7 patients, aggressive debridement and parental antimicrobial were successful to eradicate the infection, whereas 2 patients (22.2% of the cases) died of uncontrolled sepsis.

Conclusion: Fournier's gangrene is a very serious disease, understanding the criteria of early recognition of the disease, referral to the specialist, and aggressive debridement with the use of appropriate antimicrobial therapy will improve the outcome of the patients and decrease the mortality rate.

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Fournier's gangrene is a necrotizing soft tissue infection, usually highly lethal. In 1764 Baurienne and then in 1983 Fournier described idiopathic rapidly progressing necrotizing fasciitis of the penis and the scrotum in 5 otherwise, healthy young males as idiopathic cases.[1,2] Further international reports can no longer consider Fournier's gangrene as idiopathic. Cases have been reported in patients with renal failure, diabetes mellitus (DM), alcoholics, debilitated, immunosuppressed individuals, prolonged hospitalization, malnutrition, malignancy, after penile self injection with cocaine, Varicella infection, transrectal biopsies and vasectomy.[2-6] Fournier's gangrene may occur at any age.[7,8] Fournier's gangrene is a rapidly spreading bacterial infection that accounts for a relatively small proportion of infections, but is aggressive in nature and nearly uniformly fatal if untreated. Patients usually present with scrotal swelling, skin necrosis, hyperemia, fever and there may be a subcutaneous crepitus, foul smelling discharge, black or green plaques, and shock.[2] Eke[9] reviewed 1726 world wide reported cases through the medline database and relevant references lists in publications from January 1950-September 1999. This review revealed that Fournier's gangrene occurs worldwide, most reported cases are in United States of America and Canada. The major sources of sepsis were the local skin, colon, anus, rectum, the lower urinary tract, colonic and rectal

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sources were shown to carry the worst prognosis, and the diagnosis is made usually on clinical grounds. Urethrogram and proctoscopy are important in the evaluation of all patients with Fournier's gangrene to rule out massive urinary extravasations necessitating suprapubic diversion, or to reveal the source of infection, as well as the extent of anal and rectal involvement to determine the need for diverting colostomy.[2] Ultrasound, computerized tomography (CT) and magnetic resonance imaging (MRI) may play a role in the early diagnosis of Fournier's gangrene and in determination of the extent of the disease as they can detect subcutaneous gas and define the source of the infection which helps in planning debridement.[10-12] Early aggressive debridement and the systemic administration of antimicrobials are essential measures in improving the success rate of the treatment.[9]

Methods. The charts of all patients with Fournier's gangrene admitted to King Abdul-Aziz University Hospital (KAUH) in the period between November 1999 until November 2002 were reviewed. The data collected included the date of birth, sex, site of the infection, time before presentation to KAUH, clinical presentation, and predisposing factors. All bacteriological results, antibiotics used, suprapubic catheters, description and number of debridement sessions required for each patient, necessity for orchiectomy, colostomy for stool diversion, and pathology results were also reviewed. The data collected included the need for further plastic surgery, and the length of hospital stay, methods used to screen the patient for any urological, or recto-anal pathology such as ascending urethrogram, proctoscopy and CT scan of the pelvis and perineum to evaluate the extent of such disease. The outcome of the management was also evaluated.

Results. Nine patients were diagnosed and treated for Fournier's gangrene over 3 years. The mean age was 68 years old, all patients were admitted from the emergency room and all the patients were males. We considered delayed presentation to be 5 days or more from the start of the evidence of the disease, 2 patients presented early, while 7 patients presented late 5-8 days from the start of the illness, the mean was 6 days. Three of the patients (33.3%) had concomitant renal failure, 6 patients (66.6%) with DM one of them with renal insufficiency, one patient had heart failure, and 3 patients were smokers. All patients presented with strong offensive foul smelling odor of the scrotum or the perineum, scrotal swelling, while 7 patients presented with both scrotal and perineal swelling (77.7%), and in 5 patients the penis was also involved. Six patients (66.6%) were febrile with attacks of chills at the time of presentation, 2 of them had uncontrolled sepsis, while crepitation underneath the scrotal and perineal skin was founded in 4 cases. Ascending urethrogram was required in 3 patients with a severe urethral stricture; proctoscopy for all 7 patients presenting with perineal involvement was normal. Computed tomography scan of the pelvis and perineum was required in 3 cases (33.3%) with extensive perineal involvement (**Figure 1**). Swabs from the gangrenous or necrotic tissue and from the discharge taken preoperatively and postoperatively, all cases showed definite organisms, 4 showed growth of *Escherichia coli (E.coli)*, while 2 patients with *Staphylococcus aureus* and *E.coli*, one with *Klebsiella* and *Streptococci*, one with *Staphylococcus hemolyticus* and *Klebsiella*, and one with *Candida* species (**Table 1**). Suprapubic urinary diversion was performed in all cases while stool diversion by temporary colostomy was performed in 2 cases. All gangrenous and necrotic tissues were aggressively debrided in all cases within the first 12 hours of presentation; orchiectomy was only required in one patient. Antimicrobials against gram positive, and gram negative, and anaerobes were commenced for all patients in the emergency room using intravenous second generation cephalosporin,

Figure 1 - Extensive Fournier's gangrene of the penis, scrotum and perineum.

Table 1 - Results of microbiology cultures

Bacteria, fungal	n	(%)
E.coli	4	(44.4)
Staph.aureus, E.coli	2	(22.2)
Klebsiella, Streptococci	1	(11.1)
Staph.hemoliticus, E.coli	1	(11.1)
Candida albicans	1	(11.1)
Overall *E.coli*	7	(77.7)

E.coli - Escherichia coli,
Staph.aureus - Staphylococcus aureus,
Staph.hemoliticus - Staphylococcus hemoliticus

mitronidazole and aminoglycoside if there was no renal impairment. The diagnosis of Fournier's gangrene was confirmed in all cases by histopathology results. Postoperatively all patients underwent daily dressing and wound cleaning with povidone iodide, hydrogen peroxide, and local dressing with honey was used in 5 patients which showed definite accelerating effect in wound care. Six patients underwent skin grafts, 5 healed well, while one still needed further grafting. Two (22.2%) out 9 patients died from uncontrolled sepsis.

Discussion. Fournier's gangrene is a rapidly progressive, fulminant infection of the scrotum, perineum and the abdominal wall, it was originally a rare disease that has become more frequent, and in our study the death rate was 22.2%, which is within the average international reported death rate ranging between 16-67%.[9,13,14] Nine male patients of Fournier's gangrene seen in KAUH over the last 3 years; all had one or more risk factors. Previous attempts to classify Fournier's gangrene into primary, for example. Fournier's gangrene of the external genitals or secondary due to loco-regional injury has not been successful, Fournier's gangrene may occur in both sexes but is less reported in females.[9,15]

Diabetes mellitus is one of the most common medical problems in our country, 66.6% of the patients in this study were diabetics. Baskin et al[16] explained the high incidence of Fournier's gangrene in diabetics, as DM affects the small vessels and leads to tissue ischemia; also it increases the incidence of urinary tract infection via obstruction of the urinary outlet and the defective phagocytosis. Worldwide DM is the most common medical comorbidity condition in Fournier's gangrene.[17]

Early clinical identification of Fournier's gangrene is essential for better prognosis of the patients; the presence of swelling in the genital or perineal area with black purplish discoloration indicates the need for immediate debridement. The early diagnosed and managed cases had shorter hospital stay and did not necessarily require skin graft. Positive bacterial culture confirms infection, and many types of organisms, single or in combination are encountered in Fournier's gangrene and represent a polymicrobial infection. Our study cultured one or 2 organisms and no anaerobic infection could be cultured. Ralph[2] in his large series found that the average number of organisms recovered by culture ranged from 1.3-3.9; and in a combination of all series the average was 2.7. Anaerobes may be difficult to culture but should be suspected and treated in all cases.[2] Positive *Candida* infection occurred in our series in one patient only. Fournier's gangrene caused by *Candida* species as the primary organism is rare, and infrequently reported in renal transplantation.[18,19] All our patients underwent 2-5 debridement sessions in the surgical theater with mean of 3 sessions, hydrogen peroxide and povidone iodide were used routinely for all the cases; none of our cases required the hyperbaric oxygen chamber. Smith in his review in 1998 stated that prompt radical aggressive debridement is essential, with close monitoring of the wound as the surgeon must be prepared to return to the theatre if there is any doubt about tissue viability.[20] Several retrospective studies support the role of hyperbaric oxygen in the treatment of Fournier's gangrene, but it should not delay definite surgical treatment, it is probably best reserved for patients who remain toxic despite maximal debridement or for patients with clinical or microbiological evidence of anaerobic infection.[21,22] The histopathological findings in our patients were predominantly gangrene with extensive necrosis, vascular thrombosis and abscess formation.

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Authors: Abdulmajeed A. Mohammed, Mohammed K. Alam
Institute: Riyadh Medical Complex, Riyadh, Kingdom of Saudi Arabia
Title: Management of foot lesions in 310 diabetics
Source: Saudi Med J 1998; 3: 301-305

Abstract

Objective: To study epidemiology of foot complications in diabetics with a view adding to the local data and comparing our experience with other local and international experiences. **Methods:** Medical records of 325 diabetic patients admitted to Riyadh Medical Complex, Riyadh, Saudi Arabia, with foot lesions between September 1986 to August 1991 were studied retrospectively. Data of 310 patients, who completed the treatment were collected for gender, age, duration of diabetes mellitus, nature of foot lesions, presence of peripheral vascular disease, peripheral neuropathy, predisposing factors, concurrent medica illness, microbial flora, types and numbers of surgical procedures, duration of hospital stay, morbidity and mortality. **Results:** The majority of patients were males (69%), Saudis (70%), over fifty years of age (84%), and known diabetics (92%). History of trauma preceding foot complications was present in 23% of patients. Peripheral neuropathy was the main predisposing factor (58%). Toe gangrene (29%) and foot abscess (24%) were the most common form of presentation. Wound swabs were positive for bacterial culture in 94% of patients, 59.4% of them were polymicrobial. Lower limb amputations at different levels were the most common (51%) surgical procedures, 25% of them were major amputations. There were 14 deaths (4.5%) in the study group, mainly due to uncontrolled sepsis with concurrent medical illnesses. **Conclusions:** We conclude that foot complications is a common problem in elderly Saudi diabetics, particularly males. Peripheral neuropathy is the most common redisposing factor. Foot infections are usually polymicrobial. Majority will need some form of amputation, a quarter of them, will end up having major limb amputations.