

Case Analysis

## Fournier's Gangrene in Female Patients

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**Key Words**

Fournier's gangrene;  
Female;  
Mortality

**Purpose.** Fournier's gangrene is predominantly a disease of males. The present study reviews our 10-year experience with Fournier's gangrene in female patients.

**Methods.** A retrospective review of 8 consecutive female patients with Fournier's gangrene was performed. Demographic characteristics, bacteriology study, and treatment results were recorded.

**Results.** Mean age was 74.3 years (range, 54-96 years). Most cases of Fournier's gangrene originated from anorectal infections. Diabetes was the most common comorbid condition. Polymicrobial infection occurred in most patients. No predominant organism was found. Half of the patients had infection extending beyond the perianal and perineal regions. Seven (87.5%) patients received fecal diversion. The mortality rate was 25%.

**Conclusions.** Fournier's gangrene occurred in females with a pattern similar to that in males. However, most female patients received fecal diversion.

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Fournier's gangrene (FG) is a rapidly progressive necrotizing fasciitis of the perineal and genitourinary region.<sup>1</sup> Most patients have underlying medical problems which cause a variable degree of immunosuppression.<sup>2</sup> These medical problems include diabetes mellitus, alcohol abuse, renal insufficiency, and steroid use. It has been proposed that the pathogenesis of FG involves synergistic polymicrobial infection.<sup>3</sup> Most patients initially present with perianal or perineal pain. Diagnosis is based on clinical findings. Swelling, tenderness, and black dermal necrosis are typical cutaneous manifestations. Crepitus represents the presence of gas-forming bacteria. Once an infection is established, it progresses and extends rapidly through fascial planes to the buttock, abdominal wall, back, pelvis, and retroperitoneum. Radiological evaluation, including CT and MRI, provides early detection in clinically indolent cases.<sup>4</sup> Recently reported

mortality rates are still high, ranging from 14% to 45%.<sup>5</sup> Aggressive management, including surgical debridement, parenteral antibiotics, and treatment of underlying conditions, can improve survival.<sup>6,7</sup>

Most series of FG have reported a 10:1 male-to-female ratio.<sup>8</sup> In order to describe characteristics of FG in female patients, we retrospectively reviewed the medical records of 8 female patients within a 10-year period.

### Materials and Methods

A retrospective review was performed of 8 consecutive female patients who had undergone surgical interventions for FG at Chung Gung Memorial Hospital, Kaohsiung, Taiwan from January 1995 to December 2004. Diagnoses were made on clinical grounds.

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Only patients with FG that initially involved urogenital, perineal, or perianal regions were included. This criterion was designed to exclude severe localized infections such as anal abscess, pararectal abscess, etc, which were difficult to differentiate from FG.

All data were retrieved from retrospective review of medical records. A detailed assessment of demographics, including age, sources of infections, and predisposing factors was obtained. All patients were treated with antibiotics immediately upon diagnosis. After adequate resuscitation, all patients underwent prompt surgical debridement under general anesthesia. Multiple small incisions within the involved area were performed with excision and debridement of nonviable tissue. Subsequent debridement was performed in the operating room if the wound condition had deteriorated. Primary fecal diversion was through a colostomy created in the initial operation. A secondary colostomy was defined as a colostomy created in a subsequent operation. The indications for fecal diversion were based on each surgeon's judgment. The area of involvement was recorded from operation notes. The extent of involvement was categorized as localized or extensive. Infections limited to urogenital, perineal, or perianal regions were classified as localized FG, whereas infections extending beyond these regions were classified as

extensive FG. The extended area was also recorded as were the period of hospitalization and outcome.

Blood cultures were performed if patients were initially febrile. Wound cultures were obtained during the operation. The results of cultures were recorded. Monomicrobial infection was defined as the isolation of only a single species from both aerobic and anaerobic cultures.

## Results

The mean age of the 8 patients was 74.3 years (range, 54-96 years). Predisposing factors were identified in 7 patients (Table 1). Diabetes mellitus was identified in 3 patients, iatrogenic Cushing's syndrome in 1, leukemia in 1, liver cirrhosis in 1, and bed-ridden status due to hydrocephalus in 1. The etiology of the necrotizing infections was identified in all 8 patients. Seven patients had anorectal infections and 1 patient had an infection which was caused by sacral pressure. Six patients survived and 2 patients died of FG for an overall mortality rate of 25%. As would be expected, the patients who died had a shorter hospital course (average, 8 days). Hospital stay among the survivors averaged 32.2 days.

**Table 1. Clinical features, treatments and outcome of female patients of Fournier's gangrene**

Patient	1	2	3	4	5	6	7	8
Age	96	54	72	69	79	82	67	75
Predisposing factors	None	Diabetes	Diabetes	Diabetes	Iatrogenic Cushing's syndrome	Leukemia	Hydrocephalus	Liver cirrhosis
Etiology	Anorectal infection	Anorectal infection	Anorectal infection	Anorectal infection	Anorectal infection	Anorectal infection	Pressure sore	Anorectal infection
Extend of lesion	Extensive (Right flank, through subcutaneous fascia)	Localized	Localized	Extensive (Retroperitoneum, pelvis)	Localized	Localized	Extensive (Thigh, abdominal wall)	Extensive (Retrorectum)
Numbers of debridement	1	2	3	1	2	3	3	2
Fecal diversion	Primary loop sigmoid colostomy	None	Secondary loop sigmoid colostomy	Primary end sigmoid colostomy	Secondary loop sigmoid colostomy	Secondary loop transverse colostomy	Primary loop sigmoid colostomy	Secondary loop transverse colostomy
Hospitalization duration (day)	34	20	24	35	25	12	55	4
Outcome	Alive	Alive	Alive	Alive	Alive	Dead	Alive	Dead

Blood cultures were performed in 5 patients (Table 2). All were negative. Data for wound cultures were available in 7 patients. One patient had a monomicrobial, staphylococcal infection (Patient 2). Six patients had a mixed aerobic and anaerobic polymicrobial infection. The average number of cultivated species was 4. Distribution of organisms was even. No predominant species was noted.

Half of the patients had extensive FG (Table 1). The affected area included the flank, abdominal wall, thigh, or retroperitoneum. Surgical debridement was performed from 1 to 3 times (average, 2.1 times). A primary colostomy was created in 3 patients and a secondary colostomy in 4 patients. The stoma creation rate was 87.5%. Only 1 patient avoided fecal diversion. Most surgeons chose loop sigmoid colostomy for diversion.

## Discussion

Jean Alfred Fournier in 1883 described rapidly progressed gangrene of the genitourinary area in 5 healthy males.<sup>9</sup> The disease was characterized by abrupt onset in healthy young men, rapid progression to gangrene, and absence of specific causative agents. Thereafter, Fournier's gangrene (FG) has been the diagnosis applied to similar clinical conditions. However, the definition was not quite correct. In subsequent reports, many predisposing factors were determined, and it was definitely not unique to men as the

same phenomenon has also been described in women. The syndrome is now defined as synergistic, polymicrobial, necrotizing fasciitis of the perianal and perineal region occurring in both genders.<sup>1</sup> In our series, the percentage of female patients was 8.2%. This paralleled a previously reported 10:1 male-to-female ratio.<sup>2</sup> FG in female patients has been reported to be associated with infection from episiotomy wounds and Bartholin's abscess.<sup>10</sup> Our series demonstrated that anorectal infection was also an important cause of FG in female patients.

Most of the patients in our series had underlying medical problems. Diabetes has been the most frequent comorbid condition in most series, being present in 20% to 70% of patients.<sup>1</sup> Alcoholism, HIV infection and other conditions with immunocompromised status also have been associated with FG. Three of our patients had diabetes. Four others had iatrogenic Cushing's syndrome, leukemia, hydrocephalus, or liver cirrhosis respectively. All of these comorbid conditions caused a state of relative immunosuppression. Decreased defense mechanisms may explain why fulminant infection prevails.

Synergism of different microorganisms is responsible for fulminant infection.<sup>1</sup> Collagenase and heparinase produced by anaerobes, combined with platelet aggregation and complement fixation induced by aerobes, causes microvascular thrombosis with subsequent dermal necrosis. Hyaluronidase, streptokinase, and streptodornase produced by *Streptococcus* and *Staphylococcus* contribute to tissue damage.<sup>11</sup> In our

**Table 2. Bacteriology of 8 female patients of Fournier's gangrene**

Patient	1	2	3	4	5	6	7	8
Blood culture	-	-	N	N	-	N	-	-
<i>Escherichia. coli</i>					V			
<i>Klebsiella. pneumoniae</i>				V				V
<i>Enterococcus</i>				V		V		
<i>Morganella</i>	V				V	V		
<i>Pseudomonas</i>	V					V		
<i>Streptococcus</i>	V						V	
<i>Staphylococcus</i>		V						
<i>Proteus</i>	V			V				
<i>Bacteroides spp.</i>	V				V	V	V	V
<i>Peptostreptococcus</i>					V	V	V	V
<i>Prevotella</i>	V			V				V
<i>Clostridium. difficile</i>					V			

-: no growth of bacteria; N: not performed; V: positive wound culture.

patients, an average of 4 species were isolated. Most patients had a mixed aerobic and anaerobic infection. Our data further support the importance of synergism in the establishment, progress, and spread of infection. *E. coli* was most commonly isolated organism, accounting 40-55% of all cases. Small sample size limited announcement of this trend in our patients.

The anatomical aspect of extensive extension in FG has been well documented in male patients.<sup>1</sup> The most important fascial plane was Colles' fascia which surrounds the penis. It continues superiorly with Scarpa's fascia of the abdominal wall. Laterally and inferiorly it connects with the fascia lata of the lower limbs. Posteriorly it is limited by the levator ani muscle. If the anal sphincter is damaged, infections gain access into the retroperitoneum through pararectal spaces. The extent of infections in our female patients also corresponded to these fascial planes, which was to the abdominal wall, flank, thigh, and retroperitoneum. The anatomical basis for extension can be applied to female patients as well.

Patients with FG are treated by giving parenteral antibiotics and by surgical debridement. Numbers of debridement were not related to the extent of diseases in our patients. This might be attributed to differences between individual surgeons' judgments. Fecal diversion is indicated when the anal sphincter is grossly contaminated or to facilitate wound management. The primary colostomy rate has been reported to be 16%-17%, whereas the secondary colostomy rate has been reported to be 35%-40%. In total, a colostomy was created in 52%-56.7% of patients.<sup>6,12</sup> In our series, a colostomy was created in 83.7% of patients. Among these patients, 37.5% had a primary colostomy and 50% a secondary colostomy. Our data showed a higher stoma creation rate in female patients. Surgeons' judgment, patients' performance status, sphincter condition, and extent of lesions all influenced the decision to perform fecal diversion. The focus of these concerns was on facilitating wound care. The average age of our female patients was 74.3 years which was two decades older than female patients in previous reports (54-55 years).<sup>12,13</sup> As would be expected, older patients were considered to have poorer anal function and were more prone to be afflicted by morbidities. The high stoma creation rate therefore seems reason-

able in our female patients.

Despite the advances in medical and intensive care, FG remains a serious condition because of rapid progression leading to sepsis and death. Previously reported mortality rates range from 0% to 80%.<sup>14</sup> The overall mortality rate was 16% in a retrospective study of 1726 cases.<sup>2</sup> Many factors have been found that contribute to increased mortality. These include older age,<sup>15</sup> primary anorectal infections,<sup>16</sup> and delayed treatment.<sup>17</sup> Controversy exists about the role of diabetes.<sup>1</sup> Our data showed a comparable mortality rate in female patients (25%). Age and diabetes showed no influence on mortality in our series. Interestingly, both deaths occurred in the secondary colostomy group. Delay of fecal diversion might be attributed to persistent poor wound condition and in turn cause prolonged sepsis. Further studies that include more patients are necessary to clarify the validity of this assumption.

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病例分析

## 女性的富尼爾氏壞疽

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**目的** 富尼爾氏壞疽是男性為主的疾病，本文目的在於藉由過往十年的經驗，來界定富尼爾氏壞疽女性病人的特徵。

**方法** 回溯性回顧八個因富尼爾氏壞疽而住院接受手術的女性病人，收集關於病人特徵、病因、病程、細菌培養及治療的臨床資料。

**結果** 平均年齡為 74.3 歲，大部份源自於肛門直腸感染。糖尿病是主要的伴隨疾病。多種細菌的共同感染發生於大部份病人。半數病人呈現廣泛的感染。七位病人 (87.5%) 接受腸造口手術。死亡率為 25%。

**結論** 女性富尼爾氏壞疽的臨床特徵和男性相似。然而，較多的女性接受造口手術。

**關鍵詞** 富尼爾氏壞疽、女性、死亡率。