

Case Report

Fournier's Gangrene: Relationship between the Involvement of Deep Fascia and Its Prognosis

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We treated three patients with Fournier's gangrene, in whom a male aged 75 years and a female aged 65 years were cured while a female aged 78 years died. None of them had a history of anorectal or urogenital disease. Debridement and colostomy were performed for all patients. After debridement, two patients were given imipenem cilastatin sodium and clindamycin phosphate, while the remaining one was given only imipenem cilastatin sodium. The patient who died had necessitated a continuous dopamine injection for stabilizing the blood pressure. The infectious disease was progressive, despite the extensive debridement. In Fournier's gangrene with the involvement of deep fascia, particular attention should be paid for the development of sepsis.

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Introduction

Fournier's gangrene, first described by Fournier¹ in 1883 as fulminant gangrene of the penis and scrotum in young men, is now a surgical emergency which is occasionally fatal and is characterized by progressive necrotizing fasciitis of the perineal region in both sexes. What determines survival or death in Fournier's gangrene? We herein present three cases with Fournier's gangrene treated with debridement, antibiotics, and colostomy, and discuss the prognostic factors mentioned in English literature.

Case report

Case 1

A 78-year-old female was admitted to our hospital (Nagasaki Prefectural Shimabara Hospital) on December 3, 2000, with an extensive subcutaneous infection in the left hip spreading rapidly since 3 days before admission. The past histories included chronic heart failure and old cerebral infarction. Upon admission, the patient's blood pressure (systolic/diastolic) was 120/70 mmHg and her body

temperature was 37.8 °C. The subcutaneous lesions with partial necrosis of the skin and the smell spread from the left hip to the perineum and the inguinal region. The results of complete blood counts were as follows: erythrocytes (RBC) $450 \times 10^4/\text{mm}^3$; hematocrit (Ht) 40.9%; leukocytes (WBC) $5,600/\text{mm}^3$; and platelets (Plt) $15 \times 10^4/\text{mm}^3$. Blood chemistries and serum electrolytes showed the following (the parenthetical entries refer to the range of standard values): total protein (TP) 4.6 g/dL (6.2-8.3); alkaline phosphatase (ALP) 141 IU/L (88-275); C-reactive protein (CRP) 35.9 mg/dL (<1.2); blood urea nitrogen (BUN) 51.9 mg/dL (8-20); creatinine (Cr) 0.8 mg/dL (0.5-1.5); sodium (Na) 142 mEq/L (139-146); potassium (K) 4.2 mEq/L (3.7-4.8); chloride (Cl) 112 mEq/L (99-108); and calcium (Ca) 7.8 mg/dL (8.2-9.8). Pelvic computed tomography (CT) revealed an extensive gas shadow along the deep fascia of the hip, thigh, and inguinal region (Figure 1). Debridement and transverse colostomy were performed. *Corynebacterium* species, *Enterococcus faecalis*, *Escherichia coli* (*E. coli*) and *Proteus mirabilis* grew from the lesion. Imipenem cilastatin sodium (IPM) and clindamycin phosphate (CLDM) were injected. After debridement, the patient fell into shock. Dopamine was continuously injected to stabilize the patient's low blood pressure. The extensive necrotic le-

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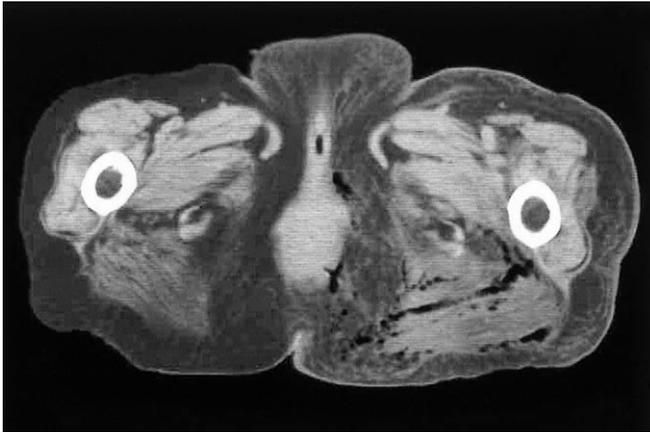


Figure 1. Case 1. Pelvic computed tomography revealed a gas shadow along the deep fascia of the hip and thigh just near the femoral bone.

sions, however, developed progressively to the thigh and the back, and finally the patient died from sepsis approximately 1 month after the onset of the disease.

Case 2

A 75-year-old male complaining of perianal redness and induration was admitted to our hospital on July 4, 2002. A high fever over 38 °C had persisted for 5 days before admission. The past history included a subtotal gastrectomy for gastric cancer and a left hemiplegia after cerebral infarction. On admission, the patient's blood pressure was 110/53 mmHg and his body temperature was 38.4 °C. The right perineum and scrotum were red and swollen. The complete blood count results were as follows: RBC $365 \times 10^4/\text{mm}^3$; Ht 35.6%; WBC $9,900/\text{mm}^3$; and Plt $13.3 \times 10^4/\text{mm}^3$. Blood chemistries and serum electrolytes showed the following: TP 5.3 g/dL; ALP 418 IU/L (115-359); CRP 27.4 mg/dL; BUN 17.4 mg/dL; Cr 0.67 mg/dL; Na 136 mEq/L (138-146); K 3.8 mEq/L; and Cl 95 mEq/L. Endotoxin values were below 5.0 pg/mL (<10.0).

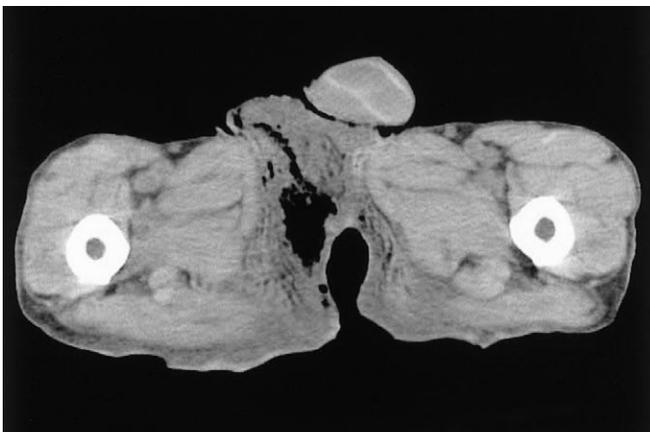


Figure 2. Case 2. Pelvic computed tomography revealed a gas shadow that had spread to the subcutaneous space of the right-sided perineum and the scrotum.

Pelvic CT revealed an extensive gas shadow that had spread to the subcutaneous space of the right-sided perineum and the scrotum (Figure 2). Debridement with drainage and sigmoid colostomy were performed. *Enterococcus raffinosus* grew first from the lesion and then grew *Corynebacterium* species and *Bacteroides fragilis*. IPM was injected. The patient recovered and was discharged on the 60th hospital day.

Case 3

A 65-year-old female was admitted on March 6, 2003 to our hospital because of extensive painful swelling with redness in the bilateral buttocks, which initially arose from the left hip as a pain 7 days before admission. A total hysterectomy had been performed for myoma uteri 20 years before. On admission, the patient's blood pressure was 102/70 mmHg and her body temperature was 37.3 °C. Her buttocks were swollen with partial necrosis of the skin and smelled. The results of complete blood counts were as follows: RBC $382 \times 10^4/\text{mm}^3$; Ht 34%; WBC $50,600/\text{mm}^3$; and Plt $38.6 \times 10^4/\text{mm}^3$. Blood chemistries and serum electrolytes showed the following: TP 4.8 g/dL; albumin 2.4 g/dL (4-5); ALP 464 IU/L; CRP 16.6 mg/dL; BUN 26.6 mg/dL; Cr 0.55 mg/dl; Na 127 mEq/L; K 3.0 mEq/L; and Cl 94 mEq/L. Pelvic CT revealed an extensive gas shadow in the subcutaneous space of the buttocks (Figure 3). Endotoxin values were below 5.0 pg/mL. Debridement and sigmoid colostomy were performed. *E. coli* grew from the lesion, and IPM and CLDM were injected. The patient recovered and was discharged on the 66th hospital day.

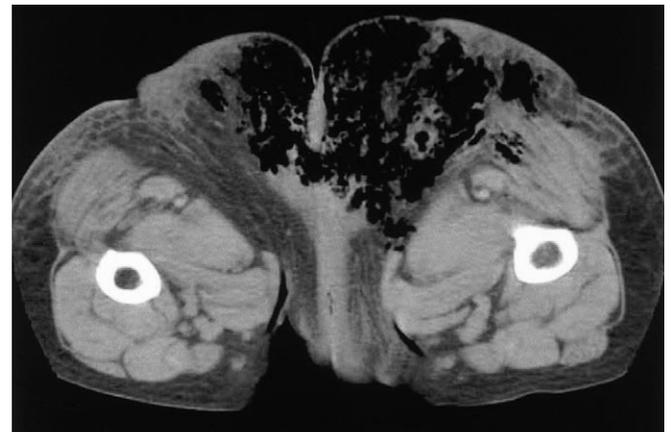


Figure 3. Case 3. Pelvic computed tomography revealed an extensive gas shadow in the subcutaneous space of the buttocks.

Discussion

In Fournier's gangrene, it is essential that surgeons promptly recognize the entity of the disease and provide adequate treatment. Initial symptoms include fever, local swelling, pain, and redness of the skin, which are nonspecific. Crepitus is usually present due to

gas-producing bacteria.² Laboratory data are also nonspecific. The diagnosis of Fournier's gangrene is generally established with worsening of the cutaneous and subcutaneous inflammation and with the presence of cutaneous necrosis.² The treatment of Fournier's gangrene is basically surgical debridement.

The mortality rate of the disease ranges from 3-45%, and the overall mortality rate is 16% in the collective series.³ Causes of death reported are infection-related diseases: sepsis, coagulopathy, renal failure, multi-organ failure, and diabetic ketoacidosis.³

Predisposing diseases prior to Fournier's gangrene have been reported, including anorectal or urogenital infections, trauma, and perianal or genital skin injuries.² Even in recent reports, the number of cases with unknown origin (idiopathic) remains significant.^{3,4} Indeed, the three cases presented here are considered idiopathic because none had a history of perineal illness. Among the underlying associated factors, including diabetes mellitus, alcoholism, hypertension, obesity and smoking, none have been reported to be statistically significant with regard to outcome.⁵

Laor et al.⁶ reported that prognosticators which significantly differ between patients who survive and who die are age, hematocrit, blood urea nitrogen, calcium, albumin, alkaline phosphatase, and cholesterol, and that the deviation from homeostasis is the most important parameter for predicting outcome. In our Case 1, who died, the serum level of blood urea nitrogen was much higher than that in Cases 2 and 3. The duration of symptoms before presentation, the extent of body surface area involved in the necrotizing process, and the amount of surgical debridement are not significantly different between the two groups.^{6,7} The duration of symptoms was shortest in Case 1 among our three cases. In contrast, the interval from the onset of clinical symptoms to the surgical intervention has been reported to be the most important prognostic factor.⁸ It is therefore proposed that early recognition with prompt radical debridement is the key to

the successful management of Fournier's gangrene. On the basis of the experience we had in Case 1, we performed debridement more radically in Case 3 compared to Cases 1 and 2.

CT is useful for determining the precise extent of the disease.⁹ In the present study, the body surface area involved in necrotizing fasciitis was largest in Case 3, but the involved fascia was deepest in Case 1, who died, nearly reaching the femoral bone. We therefore emphasize the importance of considering depth as well as extent in CT study.

In conclusion, necrotizing fasciitis involving deep fascia cannot be removed successfully by debridement. In Fournier's gangrene with the involvement of deep fascia, particular attention should be paid for the development of sepsis.

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