

Case Report

Fournier's gangrene – a case report –

Takashi MIYAMOTO, Tatsuya FUKUSHIMA, Kenji TAGUCHI, Kiyoshi SATA, Akihiko YONEKURA, Masato TOMITA, Makoto OSAKI

Department of Orthopaedic Surgery, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki, Japan

We report a case of Fournier's gangrene in a patient with underlying untreated diabetes. A 42-year-old woman noticed induration of the left vulva and was prescribed antibiotics by a local physician. However, symptoms were unimproved, so she was transferred for further evaluation in the Department of Obstetrics and Gynecology at our hospital. A soft tissue infection was suspected, and she was referred to our department. The patient had a temperature of 38.8°C, examination revealed erythema and swelling extending from the left vulva to the left medial thigh, and blood tests indicated a high degree of inflammation. Plain radiography showed gas formation in the left inguinal region, and magnetic resonance imaging (MRI) revealed necrotizing fasciitis. Fournier's gangrene was diagnosed, and emergency debridement was performed. The infection subsided with antibiotic therapy and repeated debridements. Fournier's gangrene can be fatal if diagnosed late. Early diagnosis by MRI, defining the extent of necrosis, and early debridement are useful. Negative pressure wound therapy (NPWT) was useful to treat the open wound after debridement.

ACTA MEDICA NAGASAKIENSIA 61: 37–40, 2017

Key words: Fournier's gangrene, Magnetic resonance imaging (MRI), Negative pressure wound therapy

[Case report]

A 42-year-old woman with underlying untreated diabetes usually shaved her pubic hair twice weekly. Four days prior to evaluation at our hospital, she noticed induration of the left vulva. She saw her local physician and received oral antibiotics. However, symptoms remained unimproved, so she was evaluated in the Department of Obstetrics and Gynecology at our hospital. A soft tissue infection was suspected, and the patient was referred to our department.

Physical examination revealed a height of 165 cm, weight of 70 kg, and temperature of 38.8°C on initial evaluation at our hospital. Blood tests indicated a high degree of inflammation with a white blood cell (WBC) count of 18,300/ μ l and C-reactive protein (CRP) level of 26.4 mg/dl. In addition, casual blood glucose was 319 mg/dl and hemoglobin

(Hb)A1c was 10.1%, so untreated diabetes was diagnosed. Further examination showed erythema and swelling extending from the left vulva to the medial thigh, with crepitations and a cutaneous fistula (Fig. 1). Plain pelvic radiography showed gas formation in the left perineal region (Fig. 2). Emergency magnetic resonance imaging (MRI) was taken, and showed hyperintensity signal along the fascia from the left pectineus muscle to the adductor muscle (Fig. 3). Fournier's gangrene was diagnosed.

Emergency debridement was performed immediately. The necrotic tissue was removed, followed by copious irrigation of the wound with saline (Fig. 4). Second-look debridement was performed 2 days later, and a 7 × 4 cm open wound ultimately developed. Negative pressure wound therapy (NPWT) started the day after second-look debridement.

In addition to surgical debridement and NPWT, antibiot-

Address correspondence: Takashi Miyamoto, Department of Orthopaedic Surgery, Nagasaki University Graduate School of Biomedical Sciences 1-7-1 Sakamoto, Nagasaki 852-8501, Japan

Tel: +81-95-819-7321, Fax: +81-95-849-7325, E-mail: taka4@nagasaki-u.ac.jp

Received August 30, 2016; Accepted September 23, 2016

ics were started on the first day of hospitalization. Considering that the infection involved the pubic region and that the patient regularly shaved her pubic hair, mixed infection including Gram-positive cocci and Gram-negative bacilli was suspected. Cefazolin (CEZ) 2 g and piperacillin/tazobactam (PIP/TAZ) 4.5 g were administered before surgery. Gram staining of the tissue removed during surgery showed infection due to multiple organisms including both Gram-positive and Gram-negative cocci. Enterococcal infection was also suspected, so PIP/TAZ was continued after surgery, but CEZ was switched to vancomycin (VCM) 1 g ($\times 2$). Cultures subsequently identified *Prevotella* and *Staphylococcus epidermidis*. Based on susceptibility testing, VCM was continued, but PIP/TAZ was switched to ampicillin/sulbactam (ABPC/SBT) 3 g ($\times 4$). Antibiotic therapy continued until the day of discharge. The Department of Metabolic Medicine initiated glycemic control at the same time.



Figure 1. Erythema and swelling extending from the left vulva to the medial thigh, with crepitations and a cutaneous fistula.



Figure 2. Plain pelvic radiography. Gas formation in the left perineal region.

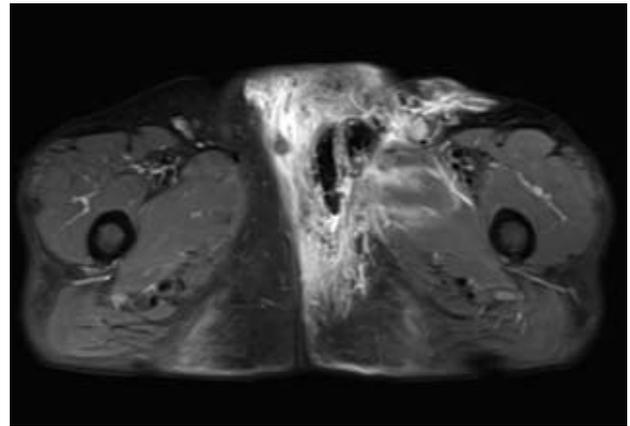


Figure 3. MRI on coronal plane. Hyperintensity along the fascia from the left pectineus muscle to the adductor muscle.



Figure 4. Debridement of the necrotic tissue



Figure 5. 12days after split-thickness skin graft.

After initial treatment, fever rapidly resolved and inflammatory response improved. The open wound was irrigated with saline, and NPWT sponges were changed daily. The open wound became smaller, granulation was good, and the wound was closed with a split-thickness skin graft on hospital day 30. MRI showed disappearance of the gas and abscess formation, and the signal hyperintensity from the pectineus muscle to the adductor muscle that were initially seen on MRI imaging improved. The patient was discharged to home on hospital day 42 (Fig. 5).

[Discussion]

Fournier's gangrene is a necrotizing fasciitis of the pubic and perineal region that was first reported by Fournier in 1883¹⁾. This pathology is more common in men, with a male:female ratio of 9:1. The mean age of patients ranges from 50 to 60 years, and the mortality rate ranges from 3% to 45%. About 60% of patients with Fournier's gangrene have diabetes, and risk factors besides diabetes include alcohol abuse, malignant tumors, and steroid treatment.²⁾

Skin and soft tissue infections include cellulitis, necrotizing fasciitis, and gas gangrene; however, the site of inflammation is different in each one. Cellulitis involves inflammation of the dermis and subcutaneous tissue, whereas necrotizing fasciitis involves inflammation from the subcutaneous tissue to the fascia, and gas gangrene involves in-

flammation of the subcutaneous tissue, fascia, and muscle.²⁾

Necrotizing fasciitis such as Fournier's gangrene requires early diagnosis and appropriate treatment. However, in early necrotizing fasciitis when infection may only involve the epidermis, differentiating this pathology from cellulitis can be difficult. Puvanendran et al.²⁾ reported that only 15–34% of cases of necrotizing fasciitis are diagnosed correctly at initial onset.

As an indicator to achieve early differentiation of necrotizing fasciitis from cellulitis, Wong et al.¹⁾ reported the Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score. Scoring is based on CRP, WBC count, Hb, Na, Cr, and glucose levels; and a total score ≥ 6 suggests necrotizing fasciitis. LRINEC score offers 92.0% positive and 96.0% negative predictive values. The patient in this case had a LRINEC score of 9, strongly suggesting necrotizing fasciitis from the initial stage (Table 2).

MRI is also useful for early diagnosis. In cellulitis, subcutaneous thickening with fluid collection is seen, whereas necrotizing fasciitis shows deep fascial thickening with fluid collection. Schmid et al.³⁾ reported that MRI offers 100% sensitivity and 86% specificity for diagnosing necrotizing fasciitis. Yoneda et al.⁴⁾ reported that with MRI for fascial necrosis, T1WI shows signal hypointensity and T2WI shows signal hyperintensity; this aids in identifying the extent of necrosis. In our patient, comprehensive evaluation based on LRINEC score and MRI led to a diagnosis of Fournier's gangrene.

Table 1. LRINEC score

Variable	Value			Score		
	CRP (mg/dl)	<15.0	≥ 15.0		0	4
WBC (/ μ l)	<15000	15000 – 25000	>25000	0	1	2
Hb (g/dl)	>13.5	11 – 13.5	<11	0	1	2
Na (mEq/l)	≥ 135		<135	0		2
Cr (mg/dl)	≤ 1.6		>1.6	0		2
Glucose (mg/dl)	≤ 180		>180	0		2
Total Score	0 – 5		6 – 7	8 – 14		
Risk (Probability)	Low (<50%)		Moderate (50 – 75%)	High (>75%)		

NPWT was performed after debridement. Al Fadhli et al.⁵⁾ reported that with NPWT, fibroblasts increase, granulation is promoted, capillaries dilate, blood flow increases and circulation around the wound improves. In addition, removing excessive exudate and maintaining a moist environment help to promote wound healing. In our patient, NPWT started the day after second-look debridement, and good wound bed preparation was achieved with good granulation and downsizing of the open wound.

[Conclusion]

We have presented a case of Fournier's gangrene. LRINEC score and MRI were useful for early diagnosis of Fournier's gangrene and determining the extent of infection. Moreover, NPWT was effective for management of skin defect wounds after debridement.

References

1. Wong CH, Khin LW, Heng KS, et al. The LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis) score : a tool for distinguishing necrotizing fasciitis from other soft tissue infections. *Crit Care Med* 32 : 1618-1619, 2004
2. Puvanendran R, Huey JC, Pasupathy S. Necrotizing fasciitis. *Can Fam Physician* 55 : 981-987, 2009
3. Schmid MR, Kossmann T, Diewell S. Differentiation of necrotizing fasciitis and cellulites using MR imaging. *Am J Roentgenol* 170:615-620, 1998
4. Yoneda A, Fujita F, Tokai H, et al. MRI can determine the adequate area for debridement in the case of Fournier's gangrene. *Int Surg* 95:76-79, 2010
5. Al Fadhli A, Alexander G, Kanjoor JR. Versatile use of vacuum-assisted healing in fifty patients. *Indian J Plast Surg* 42:161-168, 2009