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Case Report

Successful Surgical Management of Fournier's Gangrene: A Case Report

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ABSTRACT

Background:

Fournier's gangrene (FG) is a rapidly progressive necrotizing soft tissue infection associated with high mortality, particularly in patients with diabetes mellitus. Early recognition and immediate surgical source control are critical determinants of survival.

We report the case of a 62-year-old male with long-standing type 2 diabetes mellitus who presented with rapidly progressive perineal necrosis complicated by systemic inflammatory response and severe metabolic derangement, including hyperlactatemia (7.3 mmol/L) and metabolic acidosis. Emergency radical surgical debridement was performed within hours of admission, followed by intensive multidisciplinary management. Despite high predicted mortality risk based on clinical and laboratory parameters, the patient demonstrated favorable clinical recovery with wound healing by secondary intention.

This case highlights the potential limitation of traditional scoring systems and emphasizes the prognostic role of hyperlactatemia as an early indicator of tissue hypoperfusion requiring immediate surgical intervention.

Keywords: Fournier's Gangrene; Type 2 Diabetes Mellitus; Necrotizing Fasciitis; Sepsis; Hyperlactatemia; Surgical Treatment

Introduction

Fournier's gangrene (FG) is a subtype of necrotizing fasciitis that affects the skin and fascia of the scrotum, perineum, and pubic region. The disease is more common in men and is associated with risk factors such as diabetes mellitus, immunodeficiency conditions, chronic cardiovascular diseases, and obesity (1-2). The progression of the infection is characterized by rapid necrotic development, pronounced systemic inflammatory response, and a high risk of septic complications (3-4).

Despite advances in modern medicine, Fournier's gangrene remains a serious surgical emergency with reported mortality rates ranging from 20% to 30%, depending on disease severity and comorbidities (5).

The cornerstone of management includes early diagnosis, immediate radical surgical debridement, broad-spectrum antibiotic therapy, and intensive multidisciplinary care (6).

The novelty of this case lies in the discrepancy between a borderline Fournier's Gangrene Mortality Index (FGMI) score and severe metabolic derangement, particularly marked hyperlactatemia, highlighting the potential role of lactate as an early independent prognostic marker guiding urgent surgical intervention.

Materials and Methods

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A retrospective analysis of the patient's medical records was performed. The patient was treated at the Central City Clinical Hospital, Almaty, Kazakhstan, in December 2025. Clinical data, laboratory findings, and specialist consultations were analyzed.

Ethical Approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. Ethical approval was waived by the institutional review board due to the retrospective nature of the study.

Case presentation

Patient B., a 62-year-old male, was urgently admitted to the emergency department with complaints of severe pulsating pain, swelling, and dark discoloration of the skin in the scrotal and perineal region, fever up to 38.2°C, pronounced weakness, and chills. The patient reported that symptoms had been present for approximately three days. He had attempted self-treatment with topical ointments without improvement. Due to progression of symptoms, he sought emergency medical care.

According to the medical history, the patient had been suffering from type 2 diabetes mellitus for more than 10 years and was taking glucose-lowering medications (Jardiance, Forxiga). Comorbidities included coronary artery disease, grade III arterial hypertension, and chronic heart failure (functional class II).

On physical examination, the patient's condition was assessed as severe. Tachycardia was noted (heart rate 118 bpm), along with leukocytosis and signs of systemic intoxication.

Local examination revealed a painful infiltrate in the right half of the scrotum measuring approximately 8.0 × 4.0 cm, extending to the perineal and pubic regions. The overlying skin was black with areas of necrosis. Purulent discharge with a foul odor and fluctuation were present.

Based on the clinical presentation, physical findings, and laboratory results, the patient was immediately transferred from the emergency department to the operating room with a preliminary diagnosis of Fournier's gangrene complicated by sepsis.

To assess disease severity, the Fournier's Gangrene Mortality Index (FGMI) was calculated as 8 points, indicating significant physiological derangement and a borderline high-risk clinical profile approaching the threshold associated with increased mortality (Table 1).

Table 1. Fournier's Gangrene Mortality Index (FGMI) calculation

Parameter	Patient Value	Points
Age	62 years	2
Creatinine	1.26 µmol/L	1
Albumin	2.4 g/L	2
Lymphocytes	4.3 %	2
NLR	20	1
Total FGMI		8 points

NLR - *Neutrophil-to-Lymphocyte Ratio*

Laboratory investigations demonstrated marked inflammatory and metabolic abnormalities, including leukocytosis (up to 15.0 × 10^9/L) with neutrophilia up to 90%, elevated C-reactive protein (140.3 mg/L), and procalcitonin (1.3 ng/mL). Metabolic acidosis (pH 7.29–7.33), hyperglycemia (up to 16.1 mmol/L), and elevated serum lactate levels (7.3 mmol/L) were also observed.

Comparative laboratory analysis (Table 2) showed significant neutrophilia, lymphopenia, and an elevated neutrophil-to-lymphocyte ratio (~20), consistent with severe infection and poor prognostic indicators reported in the literature.

Table 2. Comparison of patient laboratory values with literature data on survivors and non-survivors of Fournier's gangrene

Parameter	Patient	Survivors (literature)	Non-survivors (literature)
WBC (×10^9/L)	12.9–15.1	16	19
Neutrophils (%)	84–88	82	89
Lymphocytes (%)	4.3–6.9	9.5	4.8
NLR	20	8.5	18
Creatinine (µmol/L)	111.9	80	130
Glucose (mmol/L)	12.3–16.1	9.3	9.5
Lactate (mmol/L)	7.3	<2	>4

Source: *Adapted from recent studies on prognostic factors in Fournier's gangrene (7).*
NLR *- Neutrophil-to-Lymphocyte Ratio*
WBC *- White Blood Cells*

Instrumental findings: Chest radiography showed no acute pathological changes; however, signs of pulmonary congestion were noted.

Treatment: Emergency surgical intervention was performed to achieve radical debridement of the necrotic and purulent focus. Surgery was carried out immediately after admission. During the procedure, wide incision of the affected tissues was performed, followed by excision of necrotic areas down to visually viable tissue and wound drainage. Urinary bladder catheterization was also performed (see Figure 1).

Figure 1 - Intraoperative findings of Fournier's gangrene. Extensive soft tissue involvement of the scrotum with necrosis identified during emergency surgical intervention.

In the postoperative period, the patient received intensive infusion therapy and broad-spectrum antibiotic therapy, including intravenous ceftriaxone (2 g/day) combined with metronidazole to ensure anaerobic coverage.

Microbiological cultures were obtained postoperatively, revealing a polymicrobial infection typical for Fournier's gangrene. Aerobic bacteria included *Escherichia coli* and coagulase-negative *Staphylococcus* species, while anaerobic organisms included *Bacteroides fragilis* and *Peptostreptococcus* spp. No multidrug-resistant strains were detected. These findings support the use of broad-spectrum antibiotic therapy covering both aerobic and anaerobic pathogens.

Correction of carbohydrate metabolism and blood glucose monitoring were performed under the supervision of an endocrinologist, along with symptomatic therapy. Daily wound assessment was carried out with staged debridement and regular dressing changes.

Oxygen therapy was administered to improve tissue perfusion and oxygen delivery to the affected tissues, which contributed to accelerated wound healing and prevention of further infection spread.

During treatment, positive clinical dynamics were observed, including reduction of body temperature, decreased intoxication symptoms, and normalization of inflammatory laboratory markers. The wound gradually became cleaner, and granulation tissue formation was noted, indicating a favorable wound healing process (see Figure 2).

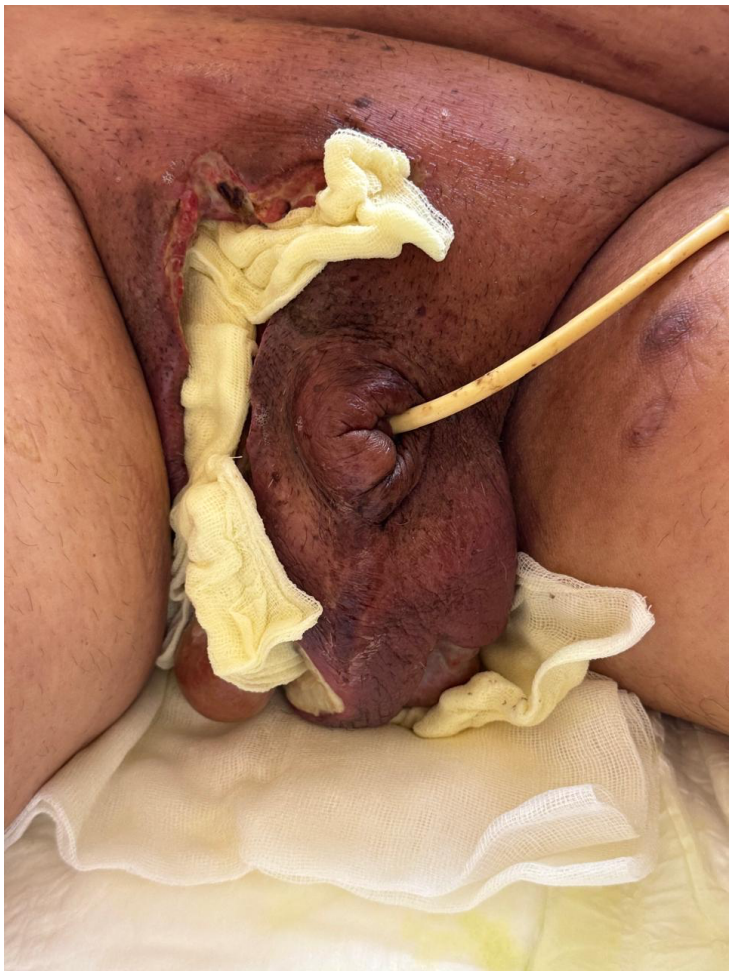

Figure 2 - Wound condition on postoperative day 7. The wound is clean, without progression of necrosis, and granulation tissue formation is observed.

Wound healing occurred by secondary intention, which is considered standard practice for large defects after Fournier's gangrene. The wound was left open to allow gradual granulation tissue formation followed by epithelialization. This approach reduces the risk of recurrent infection, minimizes tension on surrounding tissues, and provides safer restoration of function and cosmetic outcome in the affected area (see Figure 3).

Figure 3 - Wound healing stage one month after surgery. The figure demonstrates the wound defect after surgical debridement and subsequent suturing.

Results

Following emergency radical surgical debridement and initiation of intensive multidisciplinary therapy, the patient demonstrated rapid clinical stabilization. Hemodynamic status improved within the early postoperative period, with resolution of fever and reduction of systemic inflammatory signs.

During the intensive care unit stay (3 days), progressive clinical and laboratory improvement was observed. Glycemic control was achieved under endocrinology supervision, and no further metabolic deterioration occurred.

Local wound assessment showed absence of progression of necrosis and progressive development of healthy granulation tissue. Serial wound care and staged debridement contributed to effective local infection control.

The patient was transferred to the surgical ward in stable condition and subsequently discharged after a total hospital stay of 18 days. Wound healing progressed successfully by secondary intention without complications or need for additional surgical intervention.

Discussion

Fournier's gangrene in patients with diabetes mellitus is characterized by a more severe and rapidly progressive course due to microangiopathy, impaired immune response, and delayed tissue regeneration. In the presented case, long-standing type 2 diabetes mellitus significantly increased the risk of an unfavorable outcome (8-9).

In our patient, the calculated FGMI score of 8 indicated substantial physiological disturbance at admission and approached the classical high-risk threshold (≥9). Although the score did not exceed the critical cutoff, the presence of hyperlactatemia (7.3 mmol/L) and metabolic acidosis suggested a high risk of rapid clinical deterioration. Early surgical source control likely prevented further progression and systemic decompensation.

Lactate elevation is increasingly recognized as an independent predictor of poor outcomes in necrotizing infections and may reflect tissue hypoperfusion earlier than composite scoring systems.

Building on this observation, this case highlights the potential limitation of traditional scoring systems such as FGMI, as severe metabolic derangement may be present even in patients with borderline scores. We suggest that lactate level may serve as an early independent prognostic marker indicating the need for immediate surgical intervention, even before composite indices reach high-risk thresholds.

According to recent literature (2023-2025), key factors influencing survival include rapid surgical debridement, early initiation of broad-spectrum antibiotics, and adequate intensive care management

(10-11). Modern approaches emphasize aggressive surgical treatment combined with staged wound care, which correlates with favorable outcomes as observed in this case (12-13).

Survival in this patient can be attributed to immediate surgical source control, early metabolic stabilization, and the absence of delay between diagnosis and intervention.

This case supports the growing evidence that metabolic markers, particularly lactate, should be incorporated into early clinical decision-making and may complement existing prognostic scoring systems (14-16).

Conclusion

Fournier's gangrene in patients with type 2 diabetes mellitus is a life-threatening surgical emergency requiring rapid recognition and immediate intervention.

This case demonstrates that severe hyperlactatemia may serve as an early indicator of systemic hypoperfusion and clinical deterioration, even in patients with borderline prognostic scores.

Early surgical source control combined with prompt metabolic stabilization and coordinated multidisciplinary care can significantly improve outcomes and survival in high-risk patients.

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