
DIAGNOSIS AND TREATMENT OF FOURNIER GANGRENE IN SECONDARY HOSPITAL; A REPORT OF TWO CASES

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Abstract. Fournier Gangrene (FG) is a specific form of necrotizing fasciitis that localized on genital and perianal, although it is rare but it is progressively fast and potentially fatal. The incidence of FG is 1.6 cases per 100,000 males, with a case fatality rate of 7.5%. Proper diagnosis and management are very important to avoid serious complications. Early debridement, broad-spectrum antibiotics and immediate supportive therapy, can reduce mortality. The objective is reporting two cases of FG who were admitted to a secondary hospital and what is the best management based on our setting. The method is qualitative observational study. The material collected through direct interview and from medical record. The best management for our setting was rapid diagnosis and followed by prompt debridement.

Keywords: gangrene fournier; diagnosis; treatment.

INTRODUCTION

Fournier's gangrene is a specific form of necrotizing fasciitis, localized to the external genital organs, perianal, accompanied by arterial thrombosis, which causes gangrene of the skin and subcutaneous tissue, with manifestations of severe sepsis, to organ failure multiple (Chennamsetty et al., 2015). predisposing factors for this disease are age, diabetes mellitus, hypertension, immunosuppression, chronic renal failure, alcoholism, obesity, cachexia, pulmonary disease, and systemic disorders (Hsu et al., 2014).

Fournier's gangrene represents <0.02% of hospitalized patients. Stay in hospital. The incidence of FG is 1.6 cases per 100,000 men and the case fatality is 7.5% in America. 1972 The highest mortality reported in one study was 88%. Fournier gangrene is an emergency in the field of diagnosis and treatment urology (Sorensen & Krieger, 2016). fast, precise and aggressive important for bagus.5results Debridement immediate are essential to ensure a good result for delayed intervention is done, give a prognosis that buruk.⁶ The objective of this work was reported two cases of Fournier gangrene treated in secondary hospital setting and find the best approach management.

MATERIALS AND METHODS

This case report method is an observational study with retrospective approach. Two cases are our sample and population that came to Sultan Imanuddin

General Hospital, a secondary hospital. The material collected through direct interviews and medical records then discussed qualitatively with recent literature

RESULTS AND DISCUSSION

Case Presentation

First Case

A 70-year-old male, with a history of previous urinary tract infection and unknown diabetes, came to the emergency department with complaints of swelling of the testicles within 3 days after being treated with traditional oil, initially pain was felt in the testicles for 6 days. Before coming to the ED, fever for 7 days. From physical examination, vital signs 120/60, pulse 98, s 36.5 degrees Celsius, rr20 spo2 99%, BMI 17.6 GCS 15. Gangrene in the right scrotum and abscess in the right scrotum, there is crepitus and tenderness to the touch. Rectal examination was within normal limits. From the laboratory examination, it was found that leukocytes in the urine were macroscopic and full leukocytes were evenly distributed in the urine sediment. The patient was diagnosed with a scrotal abscess with suspicion of Fournier's gangrene. From routine hematology Hemoglobin 11.2g/dl, Leukocytes 20,800/ul, Hematocrit 35.1%, Platelets 313,000, from the leukocyte count, neutrophils 78%, lymphocytes 13%, urea 30 mg/dl, creatinine 0.5 mg/dl, and random blood sugar 261 mg/dl, with a Neutrophil-Lymphocyte Ratio (NLR) of 6.3, and a Platelet-Lymphocyte Ratio (PLR) of 115.75. He was given maintenance crystalloid fluid therapy, injection of Cefotaxime 1 g twice a

day, Metronidazole 500 mg 3 times a day, and the patient was immediately debrided. An abscess of about 10 cc was found, tissue was necrotic and the right testicle was necrotic, so a right orchiectomy was decided. The antibiotic injection was continued, the wound was treated with 0.9% NaCl, and blood sugar control was carried out using fast-acting insulin and basal insulin. The patient went home with good wound healing results after 7 days of treatment.

Second Case

A 50-year-old man with a previous history of type 2 diabetes, Consultant of Internal Medicine with scrotal abscess. The patient entered the emergency room with the initial complaint that a lump appeared near the anus, without pain for \pm six days of SMRS. After two days, the lump disappeared, and a lump appeared in the right pubic pouch area. Within \pm four days, the pubic pouch enlarges and is followed by pain. CHAPTER and BAK within normal limits. Nausea (-), fever (-), vomiting (-). From inspection, the scrotum is enlarged, tissue necrosis, pus, tenderness, and crepitus are seen. Physical examination revealed vital signs, BP 95/60, HR 112, RR 20, SpO₂ 96%, temperature 36.5 degrees Celsius, BMI 24.2, GCS 15. Rectal examination showed a lump at 6 o'clock. Diagnosed with hyperglycemia suspicious of Diabetic Ketoacidosis, with Orchitis, and Internal Hemorrhoids. The patient received one-liter crystalloid resuscitation fluid therapy, injection of Cefotaxime 1 g/12 hours, Metronidazole 500 mg/8 hours inj, and 12 IU fast-acting insulin sc. From laboratory tests, it was found. Hemoglobin

13.3 g/dl, Leukocytes 15.300/ul, Platelets 317.000, Hematocrit 37.7%.. From the leukocyte count, it was found that Basophils 0, Eosinophils 1, Neutrophils rods 10, Neutrophil segment 71, lymphocytes 12, monocytes 6, Blood glucose at 594 mg/dl, Urea 37, Cr 1.7, SGOT 54, SGPT 45. Urinalysis examination showed protein (Albumin) +3, Glucose +3 Leukocytes negative, Blood negative, Bacteria +1. NLR scores 6.75 and PLR 172.65. After being examined by a surgeon, it diagnosed Fournier's gangrene. A cito debridement was performed, gangrene was found in the fascia, it detected a feculent odor, a fasciotomy, and a right orchidectomy were decided. After one week of treatment, the wound healed, and the patient was allowed to go home.

In Both cases prompt diagnosis and debridement were the best management in our secondary hospital setting.

Fournier's gangrene (FG) is a specific form of necrotizing fasciitis, localized to the external genital organs, perianal, accompanied by arterial thrombosis, which causes gangrene of the skin and subcutaneous tissue, with manifestations of severe intoxication, up to multiple organ failure.¹ Fournier's gangrene is a rare and often fulminant disease. This condition was first described as a disease of young adults of unknown cause by Fournier in 1888 (Chalya et al., 2015).

Fournier's gangrene represents <0.02% of hospitalized patients. The incidence is 1.6 cases per 100,000 men and the case fatality is 7.5% in America. The literature reports a mortality rate of 20-40%, with some studies reporting mortality

as high as 88% (Sorensen & Krieger, 2016).

A Case Series in an Australian tertiary hospital reported a FG incidence of 15 cases out of 250,000 with a mortality rate of 7 per cent during 2012-2017 (Heijkoop et al., 2019). Meanwhile, the incidence in Polish hospitals was 13 cases per 450,000 patients and all were male during 1995-2013.⁹ A retrospective study in Tanzania for the period 2006-2014 found 84 cases with a male to female ratio of 41:1 (Chalya et al., 2015).

Studies on the incidence of Fournier Gangrene in Indonesia have not been found. The reported predisposing factors are age, diabetes mellitus, hypertension, immunosuppression, chronic renal failure, alcoholism, obesity, cachexia, pulmonary disease, and systemic disorders (Hsu et al., 2014). The most common predisposing factor in Fournier's gangrene is diabetes mellitus. Chemotaxis, phagocytosis, and cellular respiration are impaired in diabetic patients. This leads to an increased susceptibility to infection (Oymacı et al., 2014). The predisposition in both of our cases was also diabetes mellitus, which is thought to increase susceptibility to Fournier's gangrene. As a predisposing factor, diabetes is present in 32% to 66% of cases of Fournier's gangrene. Notably, the patient profiles tended to be younger and wound cultures revealed distinct bacterial colonies. Patients with uncontrolled diabetes will have a poorer prognosis requiring more aggressive wound care and extensive debridement (Singh et al., 2016).

In another study Diabetes mellitus was the most frequent comorbid (64%) (Yilmazlar et al., 2017). It is explained in the

case of one with diabetes who are not known to occur in old age (70 years) with blood sugar randomized 261 mg / dl, while in the second case occurs relatively young (50 years old) with a blood sugar randomized 596 mg / dl. It seems that random blood sugar can indicate the severity of the case at the time of presentation.

In the first case the portal entry FG probably started from the urogenital tract due to a history of urinary tract infection, while in the second case it started from a perianal abscess. Although it cannot be ascertained because there was no fistula between the scrotum and urogenital in the first case, and no digestive tract fistula was found in the second case.

In a study by (Bilgiç et al., 2020), infections of perianal origin (58%) were the most common cause of FG, followed by pressure ulcers (12%) and Bartholin's abscess (10%).¹² In line with this, (Morais et al., 2017) The suspected etiologic factors for Fournier's gangrene are: perianal abscess (26.3%); urinary tract infection (21%); Genital infection, trauma and surgical wound account in 1 each case.⁵ Another study also stated that the most common etiologic origins were perianal abscess (41.6%), rectal tumor (16.6%), Bartholin's abscess (8.3%), vulvar abscess (8.3%).¹³ The cultures were monomicrobial in 20% of patients and polymicrobial in 76%. *Escherichia coli* was the most frequently identified microorganism (72%), followed by *Enterococcus* sp. (62%) and *Acinetobacter baumannii* (30%) (Yilmazlar et al., 2017). The causative agent of infection in both cases could not be

determined because bacterial cultures were not performed.

Clinical presentation in both cases was pain for 6 days in the first case, and pain for 4 days in the second case. Scrotal swelling that lasted about 3 days in the first case, and 4 days in the second case. Scrotal swelling, fever and pain are the most common symptoms of FG, symptoms usually lasting from 2 days to more than a week (Wroblewska et al., 2014). Although initially described as sudden in onset, this condition more often has a slow onset. Symptoms of pruritus, pain and general discomfort tend to worsen 3-5 days before hospital admission (Singh et al., 2016).

One study showed that the clinical characteristics of Fournier's gangrene in elderly patients (>65 years) did not differ from those of younger patients, and that elderly patients did not experience more severe clinical findings. However, the percentage of elderly patients who experience shock is quite significant, and the majority of patients who eventually die are also in shock at presentation (Hsu et al., 2014). In both cases there was gangrene, pus and crepitus. Physical examination may reveal purulent discharge, crepitus, and patches of necrotic tissue with surrounding edema (Singh et al., 2016). Crepitation is a common sign of this disease in the presence of gas-forming anaerobic microorganisms. The degree of internal necrosis is often much greater than external clinical signs indicate (Wroblewska et al., 2014). In a subacute process, the patient may experience generalized symptoms such as fever and fatigue. Signs such as skin erythema with ill-defined

margins and swelling may be found (Matilsky et al., 2014).

Early diagnosis and management of FG is important to avoid serious complications of this disease. A high degree of suspicion is required for early diagnosis (El-Shazly et al., 2016). In the first case a scrotal abscess was diagnosed with a suspicion of Fournier's gangrene from the clinical presentation. Whereas in the second case the diagnosis of hyperglycemia and orchitis was made because of the patient's presentation in shock and suspicion of diabetic ketoacidosis.

The diagnosis of FG is mainly based on the clinical findings of fluctuation, crepitus, local tenderness and sores on the genitalia and perineum, an atypical clinical presentation found on the genitals, especially in older or advanced patients, may lead to misdiagnosis (Chennamsetty et al., 2015). In most cases, imaging is not required. Under no circumstances should surgery be significantly delayed for any imaging. However, imaging modalities can be useful in cases when the presentation is atypical or when there is concern about the true extent of the disease (Yim et al., 2016).

In the case report of (Matilsky et al., 2014) with a clinical presentation such as scrotal cellulitis, ultrasound examination was performed, and fluid and gas were found in the scrotum. Cool scrotal skin is evidenced by hypoechoic tissue over the testes, whereas heterogeneous hypoechoic appearance with irregular borders shows tissue edema, fluid and gas. Ultrasound has a sensitivity of 88.2% and a specificity of 93.3% for diagnosing suspected necrotizing fasciitis and a sensitivity of

100% for detecting soft tissue air in cadaveric studies (Matilsky et al., 2014).

Ultrasound is also useful in differentiating necrotizing soft-tissue infections from other scrotal pathologies. In this context, ultrasound is superior to radiography (Singh et al., 2016). Meanwhile, the case of Fournier's gangrene presented by Miyamoto et al. used the LLINEC score and MRI for the initial diagnosis of Fournier's gangrene and determining the extent of infection. (Wong et al., 2004) reported scores of Laboratory Risk Indicators for Necrotizing Fasciitis (LRINEC). Assessment is based on CRP, WBC count, Hb, Na, Cr, and glucose levels; and a total score of 6 indicates necrotizing fasciitis. The LLINEC score offers 92.0% positive and 96.0% negative predictive value. (Fazekas et al., 1998) it was reported that MRI offers 100% sensitivity and 86% specificity for diagnosing necrotizing fasciitis.

In both cases at our secondary hospital, MRI was not available, while ultrasound was not available for emergency cases, for LLINEC CRP examination, nor was it available in our hospital. So the ability to diagnose FG based on clinical examination and immediate referral to a surgeon is very important for the diagnosis of FG in our hospital.

Management of FG consists of three main principles: rapid and aggressive surgical debridement of necrotizing tissue, hemodynamic support with immediate fluid resuscitation, and broad-spectrum parental antibiotics (Chennamsetty et al., 2015). The first cases were admitted to the surgical ward and planned for cito

debridement while the second case was admitted to the internal medicine ward for one day and planned cito debridement after being consulted to the surgery department. In the study of (El-Shazly et al., 2016), cases with conservative management required more debridement sessions and had greater skin defects and consequently more skin grafts than cases with early exploration and debridement.

Mortality of FG patients also increased with delayed surgical debridement, mentioned (Lin et al., 2019) The mortality rate for high-risk FG was 26.32% with surgical time within 12 hours, 40% between 12-24 hours and 69.23% > 24 o'clock.18 In both cases, a single debridement and a right orchiectomy were performed. Inpatients FG, serial debridement is often required which can result in significant skin and soft tissue loss, requiring reconstructive surgery (Kuzaka et al., 2018).

Orchidectomy is rarely performed in FG patients (Kuzaka et al., 2018). Orchidectomy was performed when intraoperative findings revealed testicular gangrene. The number of procedures performed on FG patients corresponds to the intraoperative findings. In the study of Chalya et al, unilateral orchiectomy was performed for gangrenous testis in 3 (3.6%) patients out of 88 cases (Chalya et al., 2015). In the (Heijkoop et al., 2019) study, five patients (38%) had tests requiring orchiectomy during the debridement procedure (Heijkoop et al., 2019).

In both cases the initial parenteral antibiotics used were the same, namely Cefotaxime and Metronidazole, the administration of these two types of

antibiotics was routinely given in gangrene cases in our hospital. Parenteral broad-spectrum antibiotic regimens are required in the management of Fournier's gangrene. According to the recommendations of the European Urological Association, the antibiotics given include gram-positive and gram-negative anaerobes, with a choice of Vancomycin/linezolid in MRSA, clindamycin in streptococci, fluoroquinolones in gram-positive and broad-spectrum Gram-negative, cephalosporins in gram-positive, and metronidazole in anaerobes. Culture and subsequent sensitivity can change the choice of antibiotics. There are no recommendations for optimal antibiotic therapy in Fournier's gangrene and patient management is dependent on local hospital guidelines (Singh et al., 2016).

Various scoring systems and prognostic factors have been proposed in an attempt to predict survival and prognosis in FG. The Fournier gangrene severity index (FGSI), first described in 1995, is a scoring system consisting of several clinical and laboratory parameters that help in predicting prognosis and survival (Bozkurt et al., 2015). FGSI 9 has a 75% probability of death and FGSI <9 has a 78% probability of survival. In the case of Tarchouli et al, the FGSI was significantly higher in the non-surviving patients (Bozkurt et al., 2015).

According to (Yilmazlar et al., 2017) using the Uludag FGSI (UFGSI), adding 2 parameters (age and disease extent) to the classic FGSI score, with a score over 9.5 increasing mortality and morbidity.¹² FGSI requires the collection of at least nine clinical parameters from FG patients. To be

more practical, (Lin et al., 2019) published the Simplified Fournier Gangrene Severity Index (SFG scoring system), with only three parameters of serum creatinine, hematocrit and potassium levels. Although the FGSI remains the most widely used with a sensitivity of 65-88% and a specificity of 70-100%, the SFGSI showed a sensitivity of 87% and a specificity of 77%, when the total score was greater than 2 in the study of (Tenório et al., 2018).

The Laboratory Risk Indicator for Necrotizing Fasciitis score (LRINEC) is a scoring system composed primarily of laboratory-specific parameters described to differentiate necrotizing fasciitis and other soft tissue infections (Bozkurt et al., 2015). The LRINEC score is constructed and converted into a diagnostic not a prognostic tool.⁵ Neutrophil Lymphocyte Ratio (NLR) and Platelet Lymphocyte Ratio (PLR) are used as markers of subclinical inflammation, by dividing the neutrophil count by the lymphocyte count to obtain the NLR, or by dividing the platelet count by the lymphocyte count to produce a PLR. (Yim et al., 2016), with NLR scores > 8, and PLR > 140 compared with FGSI in their study. FGSI High (>9) does not indicate a poor prognosis, whereas high NLR and PLR are associated with high mortality, with NLR sensitivity = 76.9%, specificity = 63.8%, positive predictive value = 60.6%, negative predictive value = 79.3%, and PLR sensitivity = 84.6%, specificity = 66.6%, positive predictive value = 64.7%, negative predictive value = 85.7%.²²

According to (Saber & Bajwa, 2014) advocate a simplified eight-scale prognostic scoring system with a maximum

score of eighteen points indicating the highest risk of death and a minimum score of eight points with a lower relative risk of death. The proposed system contains patient age, BMI, temperature, pulse, systolic blood pressure, presentation time, area involved and comorbidities (Sakr et al., 2011).

Scoring system components such as FGSI, UFGSI, SFGSI, LNRIEC can be performed in tertiary health facilities. Meanwhile, our possible settings are NLR, PLR and Score from (Saber & Bajwa, 2014). In the first case the NLR score of 6, PLR 115, showed a low risk of mortality, while the second case the NLR score of 6.75 and PLR 172.65, showed a higher risk of mortality in the second case than in the first case, it seems to be based on delays in diagnosis and therapy compared to the first case. Still the best management is rapid diagnosis and prompt debridement for both cases.

CONCLUSIONS

FG is an emergency that is quite rare, but the mortality is quite high. The best approach management in FG is quick diagnosis and treatment to reduce mortality and morbidity. High suspicion of Fournier's gangrene in infections of the urogenital and early consultation with a surgeon can improve early detection of this disease. Quick debridement of FG can provide good outcomes.

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