Original Article

Surgical Treatment of Perineal and Scrotal Phlegmon: Clinical Case

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ABSTRACT

Fournier's gangrene is an acute necrotizing infection that predominantly affects the subcutaneous adipose tissue of the perianal region and external genitalia. It was first described in 1883 by Jean-Alfred Fournier [1].

Although rare, Fournier's gangrene represents a serious medical, social, and economic challenge. Its relevance is underscored by the steadily increasing incidence, delayed diagnosis, prolonged hospitalization, high treatment and rehabilitation costs, as well as significant rates of disability and mortality.

The condition most commonly occurs in men of reproductive age with underlying immunodeficiency. More frequently, however, it affects middle-aged and elderly patients with compromised immunity, particularly those with diabetes mellitus, obesity, or chronic alcoholism [2–4]. Nevertheless, cases in women and children have also been reported [4]. Additional predisposing factors include increased scrotal skin moisture, anatomical characteristics of the genital region, and the close proximity of the anal and urethral canals, which create favorable conditions for the proliferation of pathogenic flora [5–7].

In the study by Timerbulatov V. M. et al., the incidence of Fournier's gangrene has tripled over the past decades [8]. According to epidemiological data, the condition occurs at a frequency of approximately 1.6 cases per 100,000 patients per year [8]. The mean age of patients diagnosed with Fournier's gangrene is 50.9 years [9, 10]. The disease does not demonstrate seasonal variability [11].

Epidemiological observations indicate a higher incidence in African and Asian countries. However, mortality rates in Europe and the Americas surpass those reported in less developed regions. This discrepancy is most likely associated with the predominance of antibiotic-resistant strains among patients with Fournier's gangrene [12–14].

Keywords: Plastic Surgery; Fournier's Gangrene; Necrotizing Fasciitis; Epifascial Necrosis

Introduction

The etiology of Fournier's gangrene can be identified in approximately 95% of cases [15]. The primary causes include trauma (often of iatrogenic origin), as well as purulent-inflammatory diseases of the urogenital tract and the large intestine [16–18]. The most common pathogens are *Klebsiella*, *Proteus*, *Escherichia coli*, *Bacteroides*, *Streptococcus*, and *Staphylococcus* species [19–21]. Morphologically, Fournier's gangrene is characterized by thrombosis of the microcirculatory bed, leading to necrosis and ischemic hypoxia. Necrosis may be accompanied by purulent inflammation, which in turn contributes to the development of a systemic inflammatory response [22–23].

The gold standard for the treatment of Fournier's gangrene remains surgical intervention. However, precise strategies and standardized guidelines have not yet been fully established [24, 25].

Case Presentation

We present the case of a 49-year-old patient with clinical signs of anaerobic subcutaneous infection of the scrotum and pubic region (Fournier's gangrene). In 2024, at the Department of Urology of Multidisciplinary City Hospital No. 3 in Astana, the patient underwent surgical treatment consisting of incision and drainage of the scrotum and abdominal wall. The procedure lasted 90 minutes, with an estimated blood loss of approximately 50 ml.

This clinical case highlights that delayed medical intervention is associated with significantly increased mortality, reaching up to 88%. Late diagnosis and postponed surgical treatment contribute to severe complications, including fatal outcomes [26].

Patient X., 49 years old, was admitted on an emergency basis on April 20, 2024, to the Department of Urology, Multidisciplinary City Hospital No. 3, with complaints of severe pain in the left half of the scrotum (intensifying with movement), bilateral inguinal pain, fever up to 38 °C, and general weakness. Objective status: height 177 cm, weight 94 kg. BMI 30 kg/m2. Bad habits: smoking for 25 years. Hemodynamics are stable, 130/90 mmHg, pulse 98 beats per minute.

According to the patient, symptoms had been present and progressively worsening over the course of three days. Due to deterioration of his condition, he presented independently to the emergency department of Multidisciplinary City Hospital No. 3. The patient reported no comorbidities or allergic reactions. He denied any history of hepatitis, tuberculosis, diabetes mellitus, or dermatovenereological diseases. At the Department of Urology, Multidisciplinary City Hospital No. 3, general clinical, laboratory, and instrumental examinations were performed, confirming the presence of inflammation (figure 1).

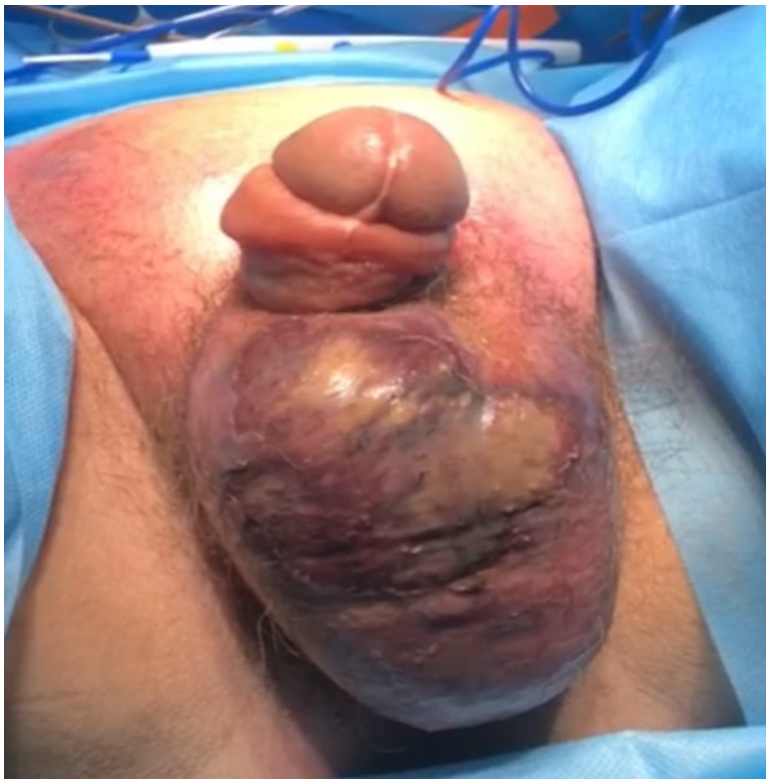

Figure 1. Preoperative condition.

Microprecipitation test with cardiolipin antigen for Treponema pallidum antibodies: positive, 2+.

Complete blood count: leukocytosis 22

CRP 14, procalcitonin 3.3, creatinine 89

Microbiological examination of the wound discharge: Escherichia coli 10*5 CFU/ml, Enterococcus fecalis 10*6 CFU/ml (Susceptibility to levofloxacin, meropenem).

Ultrasound of the scrotum: edema and infiltration of scrotal soft tissues with signs of abscess formation; chronic epididymitis; bilateral funiculitis; left-sided hydrocele.

Ultrasound of soft tissues: signs of inguinal lymphadenopathy.

Magnetic resonance imaging of the pelvis with contrast: MRI findings consistent with anaerobic subcutaneous infection of the scrotum and pubic region (Fournier's gangrene); no organic pathology in pelvic organs was identified.

FGSI - 8.4

Based on the patient's complaints, medical history, laboratory findings, and diagnostic results, the final diagnosis of Fournier's gangrene was established.

Management decision: surgical intervention.

Surgical treatment

Procedure performed: incision and drainage of the scrotum and abdominal wall.

Date of surgery: April 23, 2024, 16:30

Operative report: Under spinal anesthesia, with the patient in the supine position, the surgical field was disinfected three times with chlorhexidine. Bilateral longitudinal incisions up to 15 cm in length were made along the abdominal wall with excision of dermal necrosis. The skin and subcutaneous adipose tissue were dissected, and approximately 200 ml of purulent material was evacuated. Samples were collected for bacteriological culture. Necrotic areas of the scrotal skin and subcutaneous tissue were excised within the margins of viable tissue. The testes were fully skeletonized, and necrotic tunicae were removed.

The wounds were treated with 6% hydrogen peroxide and packed with povidone–iodine–soaked gauze strips. Drainage tubes were placed and secured to the skin. Wound toilet was performed, followed by application of an aseptic dressing with povidone–iodine. Urinary bladder catheterization was also carried out.

Duration of surgery: 90 minutes.

Postoperative management

During the postoperative period, the patient received intensive syndrome-oriented and supportive therapy in the intensive care unit, including antibacterial treatment (levofloxacin, meropenem parenterally), blood transfusions for correction of anemia, parenteral and enteral nutrition, as well as anticoagulant and antiulcer therapy. Daily wound care was performed, consisting of irrigation of the postoperative wound with 3% hydrogen peroxide and povidone–iodine, followed by replacement of the aseptic dressing with *Oflomeelid* (figure 2,3).

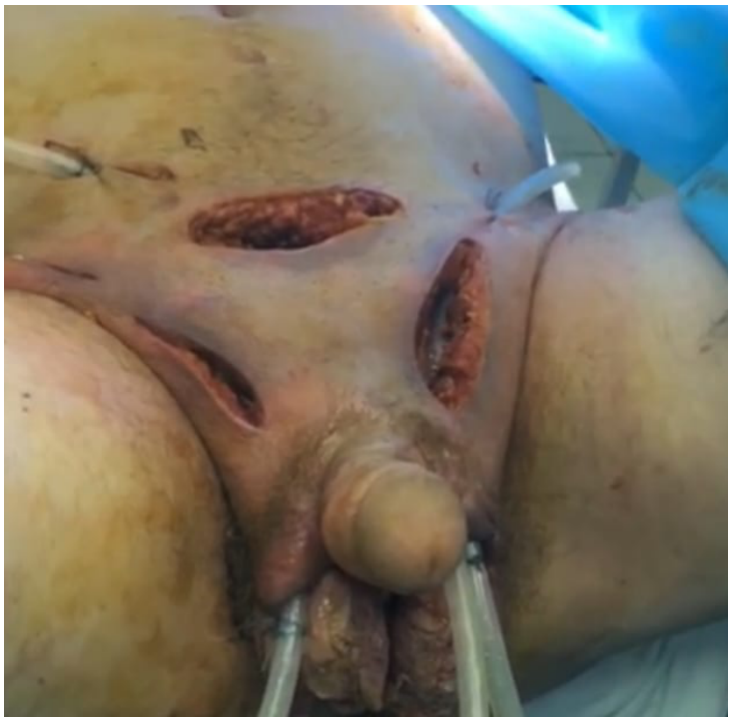

Figure 2. First postoperative day.

Figure 3. Fifth postoperative day

As a result of the treatment, the wound was cleared and covered with granulation tissue, while signs of perifocal inflammation completely regressed. The patient was discharged from the hospital on the 24th day under outpatient follow-up by a urologist and surgeon at his place of residence for continuation of local therapy and preparation for planned hospitalization aimed at scrotal skin defect reconstruction (figure 4).

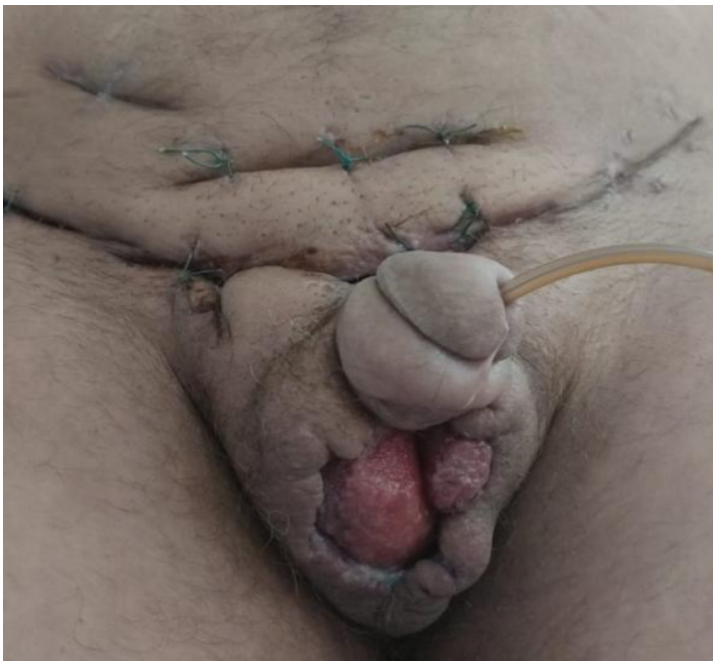

Figure 4. Postoperative day 24

Laboratory findings prior to discharge:
10.05.2024

Complete blood count (CBC): leukocytes – 7.0 /L; hemoglobin (HGB) – 119 g/L; erythrocytes (RBC) – 4.50 /L; platelets (PLT) – 522 /L; neutrophils (NEUT%) – 73.8%.

Urinalysis (UA): specific gravity – 1025; protein – 0.00 g/L; glucose – 0.0 mmol/L; leukocytes – 4 per field of view.

Discussion

Fournier's gangrene is characterized by edema of the affected area, localized pain, and hyperthermia, which may be accompanied by fever, weakness, and chills. Laboratory findings typically reveal leukocytosis, metabolic acidosis, and elevated creatinine levels [27]. However, the classic triad of symptoms is observed in only 10–40% of patients [28]. The disease is marked by diagnostic complexity and rapid progression, with delayed treatment often resulting in severe complications.

One of the earliest clinical signs of Fournier's gangrene is skin hyperemia with progressive tissue edema. Fever, swelling, and pain are considered the most typical manifestations [29]. According to the literature, the pathogenesis of this condition is facilitated by the synergy between anaerobic and aerobic bacteria [30]. These microorganisms secrete enzymes and toxins that promote vascular thrombosis, tissue necrosis, and severe cardiovascular complications. Hospitalization typically lasts 6–8 weeks, although some sources report durations exceeding 73 days. Increased mortality is noted particularly among patients with diabetes mellitus and sepsis.

Management of Fournier's gangrene requires urgent intervention, including antimicrobial therapy, early surgical debridement, and, when necessary, intensive care measures [31]. The primary causes of death are sepsis and its complications, such as disseminated intravascular coagulation, acute renal failure, multiple organ dysfunction, and diabetic ketoacidosis [31–36]. Reported mortality rates range from 24% to 88% [37, 38].

E. Laor et al. proposed the Fournier's Gangrene Severity Index (FGSI) as a prognostic tool [39]. This index combines critical physiological parameters, including blood pressure, body temperature, pulse and respiratory rates, as well as measures of fluid–electrolyte balance [40, 41]. Statistical analysis has demonstrated a correlation between disease outcome and regression model scores. A score of 9 corresponds to a 75% probability of mortality [42]. Prognosis in Fournier's gangrene depends primarily on early diagnosis and emergency surgical intervention [43–45]. Without treatment, the condition is uniformly fatal [46, 47].

Fournier's gangrene is also associated with prolonged hospitalization, ranging from 2 to 300 bed-days [48]. Treatment places a considerable economic burden, and following discharge, 30% of patients require long-term care, while 50% require repeated reconstructive plastic surgery [49, 50].

Conclusion

Fournier's gangrene, although rare, presents a complex clinical challenge that requires a multidisciplinary approach to ensure optimal patient care. This clinical case demonstrates that early diagnosis, timely surgical intervention, and an active surgical strategy—including primary radical necrectomy combined with comprehensive intensive care support—can significantly reduce mortality, decrease healthcare costs, and shorten the duration of treatment in patients with this pathology.

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References

1. Fournier JA. Jean-Alfred Fournier 1832-1914. Gangrene foudroyante de la verge (overwhelming gangrene). Sem Med 1883. Dis Colon Rectum. 1988;31(12):984-8. doi:10.1007/BF02554904 https://doi.org/10.1007/BF02554904
2. Aliev SA, Aliev ES, Zeynalov VM. Fournier's disease in light of modern concepts. Surgery. 2014;(4):34-9.

3. Shaw JJ, Psoinos C, Emhoff TA, et al. Not just full of hot air: hyperbaric oxygen therapy increases survival in cases of necrotizing soft tissue infections. Surg Infect. 2014;15(3):328-35. https://doi.org/10.1089/sur.2012.135
4. Yanar H, Taviloglu K, Ertekin C, et al. Fournier's gangrene: risk factors and strategies for management. World J Surg. 2006;30(9):1750-4. https://doi.org/10.1007/s00268-005-0777-3
5. Eskitascioglu T, Ozyazgan I, Coruh A, et al. Experience of 80 cases with Fournier's gangrene and "trauma" as a trigger factor in the etiopathogenesis. Ulus Travma Acil Cerrahi Derg. 2014;20(4):265-74. https://doi.org/10.5505/tjtes.2014.67670
6. Martinschek A, Evers B, Lampl L, et al. Prognostic aspects, survival rate, and predisposing risk factors in patients with Fournier's gangrene and necrotizing soft tissue infections: evaluation of clinical outcome of 55 patients. Urol Int. 2012;89:173-9. https://doi.org/10.1159/000339161
7. Ye J, Xie T, Wu M, et al. Negative pressure wound therapy applied before and after split-thickness skin graft helps healing of Fournier gangrene: a case report. Medicine (Baltimore). 2015;94(5):e426. https://doi.org/10.1097/MD.0000000000000426
8. Timerbulatov VM, Khasanov AG, Timerbulatov MV. Gangrena Furn'ye. Khirurgiya. 2009;(3):26-8.
9. Benjelloun ElB, Souiki T, Yakla N, et al. Fournier's gangrene: our experience with 50 patients and analysis of factors affecting mortality. WJES. 2013;8(13):1-5. https://doi.org/10.1186/1749-7922-8-13
10. Khandelwal R, Chintamani, Tandon M, et al. Fournier's gangrene severity index as a predictor of outcome in patients with Fournier's gangrene: a prospective clinical study at a tertiary care center. J Young Med Researchers. 2013;1(1):1-5. https://doi.org/10.7869/jymr.2
11. Kashtalyan MA, Gerasimenko OS, Okoletz VP, Masunov KL. Surgical treatment of necrotic soft tissue infections. Hospital Surgery. 2013;(3):96-8.
12. Benjelloun ElB, Souiki T, Yakla N, et al. Fournier's gangrene: our experience with 50 patients and analysis of factors affecting mortality. WJES. 2013;8(13):1-5. https://doi.org/10.1186/1749-7922-8-13
13. Herlin C. Negative pressure therapy in the loss of perineal substance. Soins. 2014;(782):37-8. https://doi.org/10.1016/j.soin.2013.12.009
14. Wroblewska M, Kuzaka B, Borkowski T, et al. Fournier's gangrene-current concepts. Polish J Microbiol. 2014;63(3):267-73. https://doi.org/10.33073/pjm-2014-036
15. Hakkarainen TW, Kopare NM, Fellow B, Evans HL. Necrotizing soft tissue infections; review and current concepts in treatment, systems of care, and outcomes. Curr Probl Surg. 2014;51(8):344-62. https://doi.org/10.1067/j.cpsurg.2014.06.001
16. Aliev SA, Aliev ES, Zeynalov VM. Fournier's disease in light of modern concepts. Surgery. 2014;(4):34-9.
17. Kashtalyan MA, Gerasimenko OS, Okoletz VP, Masunov KL. Surgical treatment of necrotic soft tissue infections. Hospital Surgery. 2013;(3):96-8.
18. Benjelloun ElB, Souiki T, Yakla N, et al. Fournier's gangrene: our experience with 50 patients and analysis of factors affecting mortality. WJES. 2013;8(13):1-5. https://doi.org/10.1186/1749-7922-8-13
19. Grinev MV, Soroka IV, Grinev KM. Fournier's gangrene - a clinical type of necrotizing fasciitis. Urology. 2007;(6):69-73.
20. Efimenko NA, Privolnev VV. Fournier's gangrene. Clin Microbiol Antimicrob Chemother. 2008;10(1):34-42.
21. Benjelloun ElB, Souiki T, Yakla N, et al. Fournier's gangrene: our experience with 50 patients and analysis of factors affecting mortality. WJES. 2013;8(13):1-5. https://doi.org/10.1186/1749-7922-8-13
22. Grinev KirM. Nekrotiziruyushchiy fastsiit [Necrotizing fasciitis]. Saint Petersburg: Gippokrat; 2008. 120 p.
23. Grinev MV, Korolkov AYu, Grinev KM, Beybalaev KZ. Nekrotiziruyushchiy fastsiit - klinicheskaya model' razdela

zdravookhraneniya: meditsiny kriticheskikh sostoyaniy [Necrotizing fasciitis - a clinical model of the health sector: medicine of critical conditions]. Vestnik Khirurgii. 2013.

24. Insua-Pereira I, Ferreira PC, Teixeira S, Barreiro D, Silva A. Fournier's gangrene: A review of reconstructive options. Cent Eur J Urol. 2020;73:74-9. doi:10.5173/ceju.2020.0060 https://doi.org/10.5173/ceju.2020.0060
25. Huayllani MT, Cheema AS, McGuire MJ, Janis JE. Practical Review of the Current Management of Fournier's Gangrene. Plast Reconstr Surg Glob Open. 2022;10:e4191. doi:10.1097/GOX.0000000000004191 https://doi.org/10.1097/GOX.0000000000004191
26. Altarac S, Katusin D, Crnica S, et al. Fournier's gangrene: etiology and outcome analysis of 41 patients. Urol Int. 2012;88(3):289-93. https://doi.org/10.1159/000335507
27. Chennamsetty A, Khourdaji I, Burks F, Killinger KA. Contemporary diagnosis and management of Fournier's gangrene. Ther Adv Urol. 2015;7:203-15. doi:10.1177/1756287215584740 https://doi.org/10.1177/1756287215584740
28. Anaya DA, Dellinger EP. Necrotizing soft-tissue infection: diagnosis and management. Clin Infect Dis. 2007;44:705-10. doi:10.1086/511638 https://doi.org/10.1086/511638
29. Gadler T, Huey S, Hunt K. Recognizing Fournier's Gangrene in the Emergency Department. Adv Emerg Nurs J. 2019;41(1):33-8. https://doi.org/10.1097/TME.0000000000000221
30. Beschastnov VV, Ryabkov MG, Malakhova NI, Moskovskaya AE, Kleymentyev EV. Izvestiya vysshikh uchebnykh zavedeniy. Povolzhskiy region. Meditsinskiye nauki [News of higher educational institutions. Volga region. Medical sciences]. 2013;28(4):61-9.
31. Aliev SA, Aliev ES, Zeynalov VM. Fournier's disease in light of modern concepts. Surgery. 2014;(4):34-9.
32. Privolnev VV. Fournier's gangrene. Medical Bulletin of the Ministry of Internal Affairs. 2013;67(6):26-32.
33. Kashtalyan MA, Gerasimenko OS, Okoletz VP, Masunov KL. Surgical treatment of necrotic soft tissue infections. Hospital Surgery. 2013;(3):96-8.
34. Altarac S, Katusin D, Crnica S, et al. Fournier's gangrene: etiology and outcome analysis of 41 patients. Urol Int. 2012;88(3):289-93. https://doi.org/10.1159/000335507
35. Benjelloun ElB, Souiki T, Yakla N, et al. Fournier's gangrene: our experience with 50 patients and analysis of factors affecting mortality. WJES. 2013;8(13):1-5. https://doi.org/10.1186/1749-7922-8-13
36. Wroblewska M, Kuzaka B, Borkowski T, et al. Fournier's gangrene-current concepts. Polish J Microbiol. 2014;63(3):267-73. https://doi.org/10.33073/pjm-2014-036
37. Agostini T, Mori F, Perello R, et al. Successful combined approach to a severe Fournier's gangrene. Indian J Plast Surg. 2014;47(1):132-6. https://doi.org/10.4103/0970-0358.129648
38. Herlin C. Negative pressure therapy in the loss of perineal substance. Soins. 2014;(782):37-8. https://doi.org/10.1016/j.soin.2013.12.009
39. Laor E, Palmer LS, Tolia BM, et al. Outcome prediction in patients with Fournier's gangrene. J Urol. 1995;154(1):89-92. https://doi.org/10.1016/S0022-5347(01)67236-7
40. Aliev SA, Aliev ES, Zeynalov VM. Fournier's disease in light of modern concepts. Surgery. 2014;(4):34-9.
41. Wroblewska M, Kuzaka B, Borkowski T, et al. Fournier's gangrene-current concepts. Polish J Microbiol. 2014;63(3):267-73. https://doi.org/10.33073/pjm-2014-036
42. Morykwas MJ, Simpson J, Punger K, et al. Vacuum-assisted closure: state of basic research and physiologic foundation. Plast Reconstr Surg. 2006;117(7 Suppl):121S-6S. https://doi.org/10.1097/01.prs.0000225450.12593.12
43. Aliev SA, Aliev ES, Zeynalov VM. Fournier's disease in light of modern concepts. Surgery. 2014;(4):34-9.
44. Eskitascioglu T, Ozyazgan I, Coruh A, et al. Experience of 80 cases with Fournier's gangrene and "trauma" as a trigger factor in the

etiopathogenesis. Ulus Travma Acil Cerrahi Derg. 2014;20(4):265-74. https://doi.org/10.5505/tjtes.2014.67670

45. Khandelwal R, Chintamani, Tandon M, et al. Fournier's gangrene severity index as a predictor of outcome in patients with Fournier's gangrene: a prospective clinical study at a tertiary care center. J Young Med Researchers. 2013;1(1):1-5. https://doi.org/10.7869/jymr.2
46. Levenson RB, Singh AK, Novelline RA. Fournier gangrene: role of imaging. Radiographics. 2008;28(2):519-28. https://doi.org/10.1148/rg.282075048
47. Wroblewska M, Kuzaka B, Borkowski T, et al. Fournier's gangrene-current concepts. Polish J Microbiol. 2014;63(3):267-73. https://doi.org/10.33073/pjm-2014-036
48. Martinschek A, Evers B, Lampl L, et al. Prognostic aspects, survival rate, and predisposing risk factors in patients with Fournier's gangrene and necrotizing soft tissue infections: evaluation of clinical outcome of 55 patients. Urol Int. 2012;89:173-9. https://doi.org/10.1159/000339161
49. Efimenko NA, Privolnev VV. Fournier's gangrene. Clin Microbiol Antimicrob Chemother. 2008;10(1):34-42.
50. Kashtalyan MA, Gerasimenko OS, Okoletz VP, Masunov KL. Surgical treatment of necrotic soft tissue infections. Hospital Surgery. 2013;(3):96-8.