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ACUTE PARAPROCTITIS, FOURNIER'S PHLEGMON: A CLINICAL CASE. RADICAL TREATMENT WITH THE PLASTY OF THE WOUND OF THE PERINEUM AND SCROTUM

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Background: *The article presents the stages and results of treating a patient with a life-threatening condition caused by acute paraproctitis complicated by necrotizing fasciitis of the perineum and scrotum (Fournier's gangrene). The patient underwent a radical surgical treatment with the removal of the affected tissues, and, in the delayed period, a plastic surgery of the perineum and scrotum with a pedicled flap.* ***Clinical case description:*** *Patient Sh., 62 years old, was hospitalized at the Federal Research and Clinical Center of the Federal Medical and Biological Agency of Russia on an emergency basis with the following diagnosis: acute horseshoe-shaped posterior paraproctitis; non-clostridial phlegmon of the perineum and scrotum; sepsis. The patient was operated on urgently: a total necrectomy was performed with a wide excision of the affected tissues, excision of the anterior fistula, and a leak along the left inguinal cord into the abdominal cavity was identified and drained. The patient's condition in a few hours after the operation was characterized by pronounced positive dynamics, the effects of intoxication were stopped. 7 hours after the operation, the patient was transferred from the ICU to the department of coloproctology. A repeated surgical treatment with the revision of wounds was not required. 16 weeks after the first operation, a planned operation was performed with an excision of the fistula of the rectum and plasty of the perineum and scrotum with a rotary flap. The wounds healed by first intention. The patient recovered with all the pelvic functions completely restored.* ***Conclusion:*** *This clinical example can be used as a guide for the step-by-step treatment in this category of patients.*

Keywords: *clinical case; acute paraproctitis; Fournier's phlegmon; necrotizing fasciitis; perineal plasty; skin movable flap.*

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BACKGROUND

Fournier's gangrene is a unique case of necrotizing fasciitis of polymicrobial etiologies, characterized by lesions of external sex organs and perineum. The disease has a severe fulminant course. The prognosis for Fournier's gangrene is determined mainly by the timing of surgical care; however, even with prompt treatment, the mortality rate can be 50% or higher. Delayed treatment increases mortality, and 100% of cases not treated by surgery end in death due to septic, infectious, and toxic shock and complications. Thus, patients with Fournier's gangrene must undergo emergent surgical intervention with the sanitation of the purulent and necrotic foci [1–4].

During the surgery, the volume of the excised affected tissue is determined visually. Generally, altered tissues are very different from intact ones: they have a dull color and possible gas bubbles, and they are saturated with pus or serous discharge. With a digital revision of wounds, leakage is often detected. Thus, these patients are highly likely to undergo repeated sanitation [5]. Antimicrobial therapy begins in the operating room or immediately after the surgery. After the results for sensitivity to antibiotics are known, antibiotic therapy must be initiated [5].

The only true method of treating necrotizing fasciitis is an aggressive surgical treatment with extensive excision of all necrotic tissues and opening and drainage of leakage sites, soft tissue phlegmon, and soft tissues of genital organs [6]. The patient must be hospitalized urgently and brought to the operating room after minimal preoperative preparation [7].

Complete elimination of the purulent and inflammatory focus during the first 3–4 days from disease

onset, together with adequate antibacterial, detoxification, and anti-inflammatory therapy, usually leads to the recovery of most patients. However, if treatment is delayed, sepsis, infectious-toxic shock, and multisystem organ failure may occur. Complete excision of the affected tissues does not ensure recovery because the disease is already systemic as evidenced by high levels of systemic inflammation markers and a risk for leukopenia [5].

The need for extensive excision of the affected tissues, which results in the formation of extensive wounds of the perineum, represents a psychological problem for the operating surgeon, because in most cases, there is a need for phased plastic surgery to close tissue defects. However, this should not affect the radicalism of surgical treatment, as removing the affected tissues as completely as possible is important [5, 8].

A preventive colostomy is an issue in patients with Fournier's gangrene. Conflicting data are available regarding the effect of this intervention on poor disease outcomes. Thus, in a randomized study by Korkut et al. [9], which involved 45 patients, mortality after preventive colostomy was higher in patients with a colostomy (38%) than in patients without colostomy (7%). In a study by Unalp et al. [10], which included 68 patients, lethal outcomes occurred less frequently after colostomy (4.5% versus 13% in patients without colostomy). Akcan and Estrada reported comparable results [11, 12]. Thus, in the study by Akcan et al. [11], which involved 37 patients, colostomy influenced significantly the increase in mortality (42% and 29% in the study group without colostomy; p=0.031) in the delay period. At present, a preventive colostomy is not compulsory in this disease and should be performed when strictly indicated [13].

Antimicrobial therapy for Fournier's gangrene is obligatory and should be started simultaneously with surgical treatment. Broad-spectrum antibiotics are used, taking into account the sensitivity of the main disease pathogens, such as *Staphylococcus aureus*, streptococci, as well as clostridial flora with an appropriate clinical presentation [6]. In this case, the main antibacterial drugs are ceftriaxone, ciprofloxacin, and metronidazole [14]. With the rapid spread of a purulent–necrotic process and the clinical presentation of clostridial phlegmon, carbapenems are recommended. Macrolides are allowed as reserve antibiotics, and in patients with a history of previous antibiotic therapy, linezolid is used [14].

Plastic surgery on the perineum is performed over the entire surface of open wounds after their complete cleansing and granulation tissue formation. Grafting with local tissues is most commonly used, as well as autografting with a perforated or split-thickness graft, pedicle flap grafting, and their various combinations [15].

If <50% of the scrotal skin is affected, then grafting is usually performed with local tissues. If the lesion area is higher, then grafting is performed with a full-thickness skin flap [6, 8]. If the testicle or penis is completely exposed, then the simplest method is their placement under the skin of the inguinal, thigh, and/or pubic regions, after which a reconstructive surgery is performed [8].

This study presents a clinical case of the successful treatment of Fournier's gangrene, which is a rare and life-threatening complication of acute paraproctitis. In the treatment of this patient, the authors were guided by both clinical recommendations and extensive personal clinical experience in the treatment of purulent diseases of the perineum.

CLINICAL CASE

Patient information

Patient Sh. (62 years old, Caucasian, resident of Moscow) visited the clinic in October 2021 with complaints of general weakness, fever up to 39.5°C for a week, scanty serous discharge in the perineum, enlargement and soreness of the scrotum, and lack of appetite. According to the patient, he was ill for 4 days and took analgesics and antipyretics without effect. He denied having had allergies and bad habits. His condition at admission was of moderate severity, due to intoxication syndrome. He was normosthenic. His respiratory rate, blood pressure, and pulse rate were 18 per min, 125/75 mmHg, and 100 beats per min. The abdomen was soft and nontender in all areas.

Physical and laboratory diagnostics

The perianal area, scrotum, and penis were severely edematous and hyperemic (Fig. 1). Skin necrosis in the perianal region anterior to the anus and on the scrotum. The scrotum was extremely tender on palpation and initiation of rectal examination; therefore, the examination was terminated.

Laboratory examination revealed pronounced leukocytosis (31×10^9/l at a norm of 4–9), increased concentrations of total bilirubin (37.6 μM/L), urea (19.3 mmol/L), and glucose (9.6 mmol/L).

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Fig. 1. Patient Sh., 62 years old, diagnosis of acute horseshoe-shaped posterior paraproctitis, non-clostridial phlegmon of the perineum and scrotum, sepsis (Fournier's phlegmon): local status at the time of admission.

Fig. 2. The same patient. Type of surgical wound after necrectomy and drainage.

Provisional diagnosis

The patient was diagnosed with acute paraproctitis and non-clostridial phlegmon of the perineum and scrotum (Fournier's phlegmon).

Treatment prognosis

The patient was taken to the operating room through the emergency department. Extensive necrectomy was performed within healthy tissues, non-viable skin areas in the perianal region, perineum, and scrotum were excised, and the membranes of both testicles were partially excised. A revision of the inguinal canals was performed, which revealed leakage along the left inguinal canal; the affected tissue was excised, and drainage along the canal was made (Fig. 2). The wounds were repeatedly and abundantly treated with hydrogen peroxide and tamponed with gauze wads with levomekol.

Postoperatively, in the intensive care unit, the patient received antibiotic therapy (cefoperazone + sulbactam at a dose of 2 g two times a day), vasopressor support, detoxification and anticoagulant therapy, correction of blood glucose levels, transfusion of blood components (albumin 20%), and analgesic therapy.

In the first hours after the surgery, pronounced improvement was observed. After 7 h of stay in the intensive care unit, vasopressor support was gradually terminated, and the patient was transferred to the coloproctology department where wound irrigation with antiseptic solutions and dressings up to 2–3 times a day using antibacterial ointments were started. After 2 weeks, the patient was discharged with recommendations for secondary wound healing.

The patient was readmitted for plastic surgery in February 2022. The patient underwent grafting of the perineum and scrotum with a movable pedicled skin flap from the thigh skin. The wounds were sutured with interrupted sutures (Fig. 3). After 2 weeks, the wounds healed by first intention. The prognosis was favorable, and the functions of the pelvic organs were fully restored (Fig. 4).

DISCUSSION

According to a retrospective analysis of such diseases over 11 years [16], 33 patients of different age groups (30–85 years) underwent more than one surgery (maximum 7, on average 3.25). All patients received broad-spectrum antibiotics, three of them died, so the mortality rate was 9%. According to the study, the main factor determining the disease outcome was a quick and aggressive surgical approach. In two other clinical cases [17, 18], the same factors were identified as determining factors.

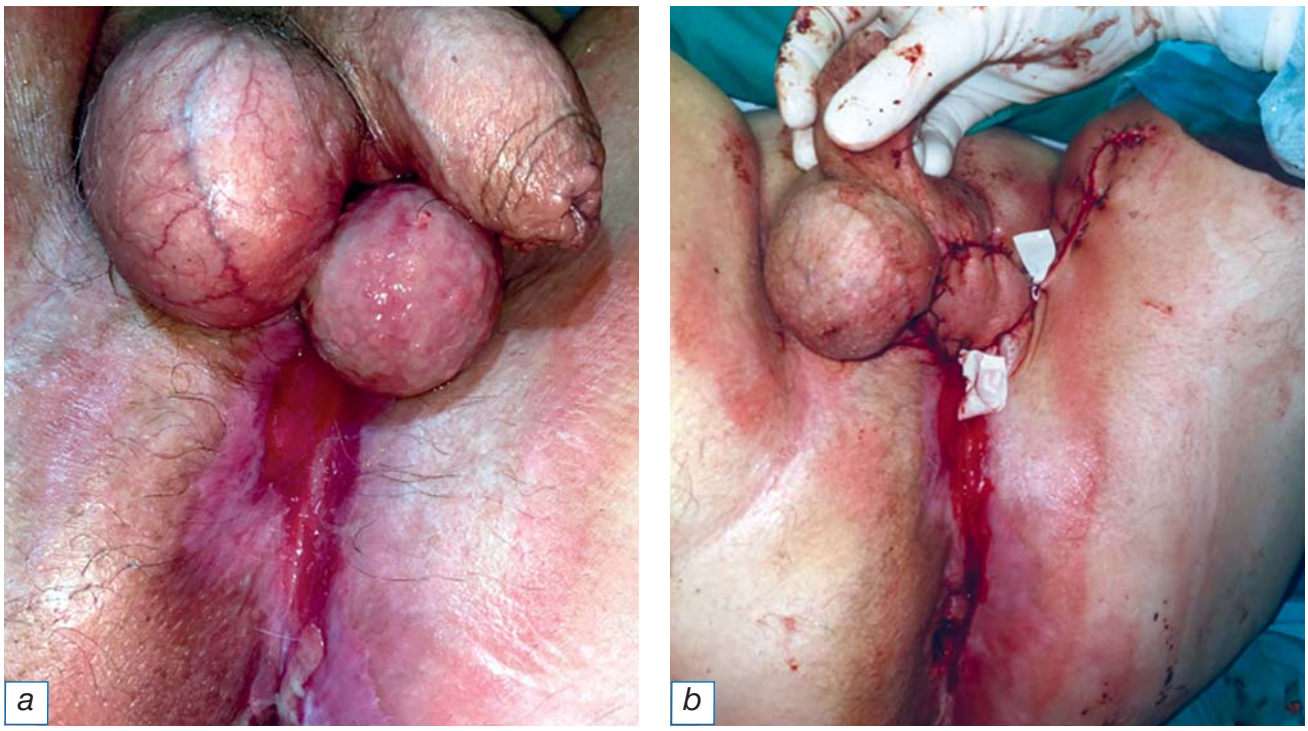

Fig. 3. The same patient. The condition before and 3 months after necrectomy: *a* — local status before surgery; *b* — the result of plastic surgery of the perineum and scrotum with a movable skin flap on the leg of the thigh skin.

Some publications present evidence of the efficiency of treatment using hyperbaric oxygenation. Thus, Korhonen [19] and Sroczyński et al. [20] suggest that hyperbaric oxygen therapy is as important as an aggressive surgical approach and antibiotic therapy.

A 2018 study [21] analyzed the latest articles, including studies and reviews published in 2005–2016. Clinical cases were studied in the Department of Purulent Surgery of Central Clinical Hospital No. 1, where seven patients were diagnosed with Fournier's gangrene and treated. Considering the unfavorable epidemiological situation of syphilis in Russia and the increase in the incidence of a complicated atypical chancre, the author emphasizes the need for differential diagnostics of Fournier's gangrene with manifestations of syphilis such as necrosis, estiomenotic chancre, and indurative edema.

Fig. 4. The same patient. The result of plastic surgery.

Hagedorn et al. [22] developed several prognostic and diagnostic tools to support clinical decision-making after establishing the diagnosis of Fournier's gangrene, primarily based on physical examination combined with laboratory and imaging findings. The authors argue that emergency treatment with antibiotics and rapid extensive surgical treatment of the wound, including intensive care, are key elements of therapy. Postoperative manipulations include careful wound care and, if necessary, repeated surgical sanitation of the purulent and necrotic foci. After the cessation of the purulent-inflammatory process, options for the reconstruction of the genitals and perineum may be considered to improve the functionality, cosmetic effect, and psychological comfort of the patient [22].

According to Gadler et al. [23], early intervention is a key component of the treatment plan for Fournier's gangrene. The primary intervention involves the surgical treatment of necrotic tissues. In the case of an abscess, incision and drainage are indicated. In addition

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to surgical debridement, broad-spectrum antibiotics and hemodynamic stabilization are required.

Based on a systematic review and meta-analysis of 38 studies by El-Qushayri et al. [24], a higher risk of mortality in Fournier's gangrene was registered in patients with comorbidities such as diabetes mellitus, heart diseases, and kidney diseases with renal insufficiency, with risk ratio and 95% confidence intervals (95% CI) of 0.72 (0.59–0.89), 0.39 (0.24–0.62), 0.41 (0.27–0.63), and 0.34 (95% CI 0.16–0.73), respectively. However, no relationship was found between mortality rates and comorbid hypertension, lung disease, liver disease, or malignant neoplasms (p >0.05). The highest mortality rates were associated with sepsis (76%) and multisystem organ failure (66%); the rates of respiratory (19.4%), renal (18%), cardiovascular (15.7%), and hepatic (5%) mortality were lower. The authors recommend amending the Fournier's gangrene severity index to include comorbidities as an important predictor of Fournier's gangrene mortality [24].

Wongwaisayawan et al. [25] conducted agraphical review and suggested using computed tomography (CT) more actively for the initial diagnosis. CT allows for confirming the diagnosis in doubtful cases, determining the infection source, and assessing the extent of purulent–necrotic changes. Knowledge of various manifestations of Fournier's gangrene on CT is essential for an accurate diagnosis, and assessment of the disease extent is critical to determine the optimal surgical approach.

Singh et al. [26] searched for all applicable studies, including clinical reviews, retrospective studies, and case reports of Fournier's gangrene. In addition, the most recent recommendations were searched for in reports from the European Association of Urology, the British Association of Urological Surgeons, and publications in the *British Medical Journal*. The authors concluded that immediate broad-spectrum antibiotic therapy and urgent surgical wound treatment are the main principles of treatment for Fournier's gangrene. The use of supplementary therapies such as hyperbaric oxygen therapy and vacuum dressings is supported in some studies, whereas contested in others. The lack of randomized controlled trials limits the use of these potential supplementary therapies to case reports of patients not responding to conventional treatment.

A study highlights the value of raw honey as a topical antimicrobial agent for small lesions in patients without complications. The aggressive nature of the infection necessitates early detection, allowing immediate surgical intervention. The conflicting results of available studies and the lack of high-quality evidence for rescue therapy preclude their routine use in the treatment of Fournier's gangrene. The lack of a specific therapy algorithm may hinder the effective treatment of Fournier's gangrene [26].

The approach of treating patients with acute paraproctitis complicated by phlegmon differs from the generally accepted one for common purulent paraproctitis. Releasing pus from a purulent cavity is not sufficient. In this case, the purulent cavity was absent. Instead, there were large amounts of infected tissues and an infection that spreads rapidly through the fascial spaces of the perineum. The external manifestations of the infection do not correspond to the severity of the infectious process and can puzzle even an experienced doctor. In this case, indirect signs of the severity of the infectious process may be symptoms of intoxication, pronounced leukocytosis in the general blood test, and presence of several extensive areas of skin necrosis, which is a sign of deep and extensive damage to subcutaneous tissues. The affected tissue must be quickly and completely removed. Moreover, a reconstructive plastic surgery does not appear to be a problem due to the presence of numerous well-vascularized local tissues.

Thus, this clinical case represents an isolated confirmation of the basic rules for the treatment of patients with Fournier's gangrene:

- The earliest possible surgical treatment on an emergency basis; intoxication syndrome and tissue damage in such patients progress and spread extremely rapidly and can become life-threatening within a few hours, or even tens of minutes.
- The most complete removal of affected tissues; adequate opening and drainage of all leakage sites contribute to the rapid relief of sepsis and intoxication syndrome.
- Adequate antibacterial and detoxification therapy is important.
- The testicles, having a large number of membranes, are rarely affected and should be preserved.
- Due to the adequate blood supply to this zone, extensive wound defects can be healed by secondary intention.
- High efficiency of plastic surgeries with healing by primary intention provided that the patient is adequately prepared and the postoperative wound is kept clean before and after surgery.

CONCLUSION

The clinical case presented can serve as a guide for the stepwise treatment of Fournier's gangrene.

INFORMED CONSENT

A voluntary written informed consent was obtained from the patient for the publication of his images for scientific purposes in the medical Journal of Clinical Practice, including the online version of the journal (date of signing 09/19/2022).

ADDITIONAL INFORMATION

Author contribution. *D.L. Davidovich*, *A.Ya. Solomka* — surgical treatment, management of the patient's treatment, manuscripts writing; *A.K. Burovskiy*, *G.S. Tomashevskiy*, *D.V. Razbirin* — treatment of the patient. The authors made a substantial contribution to the conception of the work, acquisition, analysis, interpretation of data for the work, drafting and revising the work, final approval of the version to be published and agree to be accountable for all aspects of the work.

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