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Research Article

Features of the Clinical Course of Fournier's Disease and the Results of an Improved Method of Surgical Treatment

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Abstract

Fournier's disease was considered a rare pathology, but over the past 10 years this trend has changed, the number of such patients has increased significantly. Mortality with untimely treatment reaches 90% due to the development of septic shock and multiple organ dysfunction syndrome. *Purpose of the study.* Study the results of BF treatment depending on the timing of admission and the method of surgical treatment. *Methods.* The results of treatment of 31 patients with BF who were admitted to the Republican Department of Surgical Infection, Makhachkala City Clinical Hospital were analyzed. The main group included 18 (58%), in the control group 13 (42%) The terms of admission of patients to the hospital from the onset of the disease were: during the first day from the onset of the disease, 7 (22.6%) patients were admitted (3 in the main and 4 in the control group); on the second day, 13 (41.95%) were admitted - (7 in the main and 6 control); 8 (32.3%) were admitted within 3 to 4 days (5 in the main and 3 in the control group). Upon admission, patients of both groups were hospitalized in the intensive care unit, where they received complex treatment, which included: antibacterial therapy, protein solutions, correction of electrolyte disorders and sugar, full parenteral and enteral nutrition, anticoagulant and detoxification therapy, proton pump preparations to protect the stomach from stress ulcers, vasopressor support-noradrenaline, if necessary, blood transfusion. In the main group, emergency surgical treatment consisted of a wide autopsy throughout the spread of the process, with the formation of a single open wound. In the control group, surgical treatment consisted of the use of separate incisions, along the spread, with their wide opening. Statistical data processing was performed using Student's t-test and χ^2; correlation analysis - using the r criterion. Data processing is performed using Statistic 6.0. *Results*. The use of the developed surgical treatment method in the integrated treatment of Fournier's disease significantly reduced the number of repeated interventions and reduced the mortality rate to 5.6%, compared with the control group, where the mortality rate was 38.4%. The highest mortality was noted in patients admitted late from the onset of the disease. *Conclusion*. Wide autopsy throughout the spread of the process with the formation of a single wound in Fournier's disease can significantly improve treatment results and reduce mortality.

Keywords

Fournier's Disease, Timing of Admission, Emergency Surgical Treatment, Necrectomies

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1. Introduction

Fournier's disease (BF) is a severe progressive putrefactive surgical infection that develops spontaneously, most often begins with necrotic damage to the skin and fascia of the scrotum, with further spread to the perineum, pubic region, thigh, and through the inguinal canal to the retroperitoneal space, accompanied by severe intoxication, sepsis and multiple organ dysfunction syndrome (SPON) [1-8]. Mortality with untimely treatment can reach 90% due to the development of septic shock and SPON [5, 7, 11-15].

The incidence of BF has increased significantly in recent years. Over the past 7 years, 65 patients with this pathology have been admitted to the republican department of surgical infection in Makhachkala. Most often, BF develops in males, aged 50-75 years, suffering from diabetes and obesity. We agree with many researchers who associate the development of this disease with the presence of infection of the anorectal and urogenital zones, or saprophytes of the skin itself [7-10, 12, 15]. In the pathogenesis of BF, the presence of both aerobic and anaerobic microflora among the causative agents of wound infection in patients plays a significant role, in which the combined actions of their enzymes and toxins lead to the rapid spread of infection in soft tissues. Aerobic flora produce the coagulase enzyme, which increases coagulation in the extensive capillary network, contributing to a decrease in local blood flow and tissue oxygenation, thereby creating favorable conditions for the active activity of anaerobic bacteria [5, 6, 8, 9].

2. Material and Methods

This study analyzed the results of surgical treatment of 31 patients with BF who were admitted to the ROHI City Clinical Hospital No. 1 in Makhachkala. The main group included 18 (58%) patients, in the control group 13 (42%). Their age ranged from 55 to 72 years. Between the ages of 55 and 60 years, there were 6-3 (16.7%) in the main and 3 (23.1%) in the control group) patients, from 60 to 65 years old -15- 7 (38.9%) in the main and 8 (61.5%) in the control) and over 65 years 7-(5 (27.8%) in the main and 2 (15.4%) in the control). Type 2 diabetes mellitus was detected in 8 (44.4%) patients of the main and 6 (46.2%) control. No statistically significant differences in groups were found.

The terms of admission of patients to the hospital from the onset of the disease were: during the first day from the onset of the disease, 7 (22.6%) patients were admitted (3 in the main and 4 in the control); on the second day, 13 (41.95%) were admitted - (7 in the main and 6 control); 8 (32.3%) were admitted within 3 to 4 days (5 in the main and 3 in the control group).

Inclusion criterion - patients with BF admitted within 1 to 4 days from the onset of the disease.

Exclusion criterion - severe chronic cardiopulmonary diseases, cancer, CRF-dialysis stage.

Upon admission, patients of both groups were hospitalized in the intensive care unit, where they received complex treatment, which included: correction of concomitant diseases, antibacterial therapy from 2 or three groups of antibiotics: from the group of glycopeptides (vancomycin 1.0 × 2p intravenously); from the group of carbopenems (meronem or other drugs 1.0 x 2 times intravenously); protoprosoic drug (metrogil 100 x 2 p intravenously). In addition, togopatients received protein solutions, correction of electrolyte disorders and sugar, full parenteral and enteral nutrition, anticoagulant and detoxification therapy, proton pump preparations to protect the stomach from stress ulcers, vasopressor support with noradrenaline, and blood transfusion if necessary.

Statistical data processing was performed using Student's t-test and χ^2; correlation analysis - using the r criterion. Data processing is performed using Statistica 6.0.

Clinical manifestations and prevalence of the process depended on the timing of patient admission.

In patients who were admitted on the first day from the onset of the disease, pain and swelling in the scrotum and sometimes in the penis, general weakness came to the fore (Figure 1). After a few hours, patients noted the appearance of dark areas on the scrotum, the condition worsened, and chills appeared (Figure 2). The swelling increased and within 24 hours spread to the perineum, inguinal regions, abdomen. With untreated BF, within 48 hours, the appearance of necrosis sites was noted not only on the scrotum, but also in the inguinal regions, perineum. The condition deteriorated sharply, signs of severe purulent-septic intoxication of septic shock and (SPON) appeared. When palpating the affected areas, crepitation was often determined, respiratory, cardiovascular and acute renal failure increased. Further delay with the operation led to the progressive spread of the purulent-necrotic process to other areas - to the hips, chest, retroperitoneal spaces, (Figures 3-5).

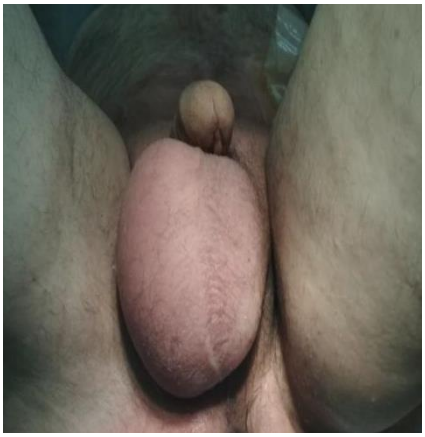

Figure 1. *4 hours from the onset of the disease. Severe swelling of the scrotum.*

Figure 2. *16 hours after onset.*

Figure 3. *16 hours after onset.*

Figure 4. *48 hours after onset.*

Figure 5. *4 days after the onset of the disease.*

Mortality is most often associated with an increase in SPON against the background of septic shock.

Our experience of observing these patients showed that regardless of the prevalence of the process, from the first hours they develop purulent-necrotic changes in the subcutaneous tissue and fascia (due to the presence of anaerobic flora), and thrombosis of small vessels of the scrotum enhances these processes. Obvious necrotic changes in the scrotal skin appear 2-12 hours from the start of the process. Therefore, these patients need to undergo full-fledged surgical treatment on an emergency basis.

In the control group, emergency surgical treatment included necrectomy of altered tissues, in the presence of leaks, their autopsy. In common forms of BF, opening of purulent leaks was performed by separate additional incisions with excision of necrotic tissues in the perineum, pubic and inguinal regions, without opening the inguinal canals. The wound was thoroughly washed with antiseptics, betadine and loosely plugged with gauze wipes, abundantly moistened with a solution of 3% hydrogen peroxide. In subsequent days, staged necrectomies were performed. Our experience in treating these patients has shown that individual even lamp incisions, without mobilizing skin fascial flaps and aponeurosis, do not always allow us to recognize the depth of tissue damage and their prevalence.

In the main group, we modified the tactics of surgical treatment.

Patients admitted on the first day from the onset of the disease, who had severe edema and slight changes on the scrotal skin, after short-term preoperative preparation aimed at stabilizing hemodynamic parameters and concomitant diseases, underwent surgical treatment under peridural anesthesia: soft tissues were dissected in two parallel incisions, starting from and to lateral scrotal surfaces, in direction of inguinal regions to protein membrane on both sides. Further, anterior and posterior scrotal flaps were mobilized, necrotic and altered tissues were excised throughout, elements of the spermatic cord were isolated to the inguinal canals. Along the seed channels, purulent necrotic tissues occurred in all three cases, which were excised within healthy tissues. The wound was thoroughly washed with antiseptics, betadine and loosely plugged with gauze wipes, abundantly moistened with a solution of 3% hydrogen peroxide. The next day, under peridural anesthesia, wound dressing and revision were performed to eliminate new necrosis sites if they appeared. Such radicalism in the local process in the scrotum made it possible to stop further progression of the disease and delimit the purulent-necrotic process.

Patients admitted on days 2-4 from the onset of the disease, when there was a spread of a purulent-necrotic process into the penis and through the inguinal spaces towards the abdomen, we used an improved method of surgical treatment (patent No.). Immediately after hospitalization, they carried out measures to stabilize hemodynamic parameters in the intensive care unit: infusion and dystocking therapy, vasopressor support, and correction of concomitant diseases. Surgery was

performed under endotracheal anesthesia or peridural anesthesia. Skin with subcutaneous tissue and all membranes were dissected in two parallel sections, starting from the bottom and lateral surfaces of the scrotum in the direction of the inguinal regions, to the protein membrane. The incisions were continued towards the inguinal canals, with their opening all the way to the inner opening. If the process spread to the pubic region, the incision was made along the skin fold. Incisions in the inguinal and pubic regions were connected to each other, forming a single wound surface, where, after mobilization of the skin-fascial flaps and aponeurosis, the necessary manipulations were performed. Radical excision of necrotic tissues was performed throughout the wound. In the presence of intermuscular leaks, they were widely opened. With necrosis of the skin of the penis, it was excised within healthy tissues. This tactic made it possible to excise all the altered tissues throughout the wound, eliminate purulent-necrotic processes in the scrotum, anterior abdominal wall, along the inguinal canal, intermuscular spaces and minimize further progression of the disease. The wound was thoroughly washed with antiseptics, dioxydine, hydrogen peroxide, betadine and loosely plugged with napkins moistened with hydrogen peroxide. On subsequent days, dressings were done under peridural anesthesia, in case of detection of new foci, repeated necrectomies were performed, dressings were done 2 times a day. From the second day, extracorporeal detoxification of the body by hemosorption was carried out. This tactic continued until the complete elimination of the inflammatory process and stabilization of the patient, who has been in the intensive care and intensive care unit all this time. After cleansing, the wounds were covered with local tissues, skin-aponeurotic flaps or free skin plastic. The treatment stages according to the developed method are shown in Figures 6-10.

Figure 6. *Type at receipt.*

Figure 7. *Surgical treatment, common necrotizing.*

Figure 8. *Day 10 of treatment.*

Figure 9. *Day 16 of treatment.*

Figure 10. *20 days. Secondary suturing and skin grafting.*

In the case when the purulent-necrotic process spreads into the pararectal space, the presence of pararectal fistula is preliminarily excluded. The incisions on the scrotum were continued into the pararectal spaces, opened widely throughout with excision of necrotic tissues to healthy tissues (Figures 11-14).

Figure 11. *Fournier's disease with spread to the perineum.*

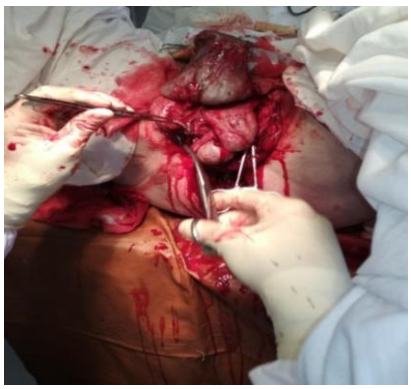

Figure 12. *Course of an operation.*

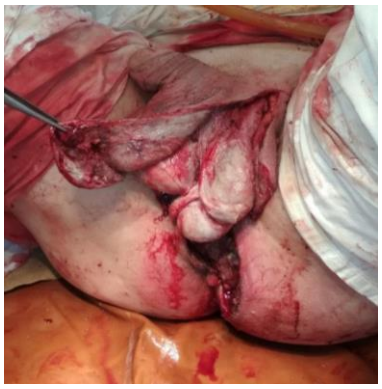

Figure 13. *Type of wound after radical surgical treatment.*

Figure 14. *Wound closure with local tissues.*

3. Results on Discussion

In all three patients of the main group, who were admitted on the first day from the onset of the disease with local damage to the scrotum and operated on after short-term preoperative preparation, they managed to clear the wound from purulent necrotic processes in a short time, close the wound with secondary sutures and discharge after recovery.

Of the 4 patients in the control group who underwent local necrectomy within the scrotum, in 2 cases there was a progression of the disease with the spread of the process in the inguinal and pubic region, which in one case was recognized on day 3 after admission, in the other on day 5, when the process spread into the retroperitoneal space. A late autopsy in the latter case was fatal.

Of the 7 patients of the main group who were admitted within 24 to 48 hours from the onset of the disease, repeated interventions were required twice in 2 cases - on the second and fourth days. He performed repeated necrectomies. In the control group of 6 patients who were admitted within 2 days from the onset of the disease, repeated repeated repeated operations were performed in 5 cases due to the progression of the purulent-necrotic process. There were no deaths in the main group, in the control group - in 2 cases.

Patients of both groups, who were admitted on days 3-4

from the onset of the disease, with the spread of the purulent-necrotic process to remote areas, had to perform repeated necrectomies repeatedly. In the main group, all 7 patients underwent repeated necrectomies, from 3 to 4 times. In the control group, repeated autopsies and necrectomies were performed 4 to 10 times. Of the five patients in the main group of deaths, 1 (14.3%), in the control group - 2 (66.7%) (Table 1).

Table 1. Mortality in the compared groups depending on the timing of admission.

Dates of admission (days)	Groups, number of patients and case fatality				P (Fisher exact test)
	Basic	mortality	control	mortality	
1 day	3	0	4	1 (25%)	0, 33
2 days	8	0	6	2 (33, 3%)	0, 05
3-4 day	7	1 (14, 3%)	3	2 (66, 7%)	0, 042
Total	18	1 (5, 6%)	13	5 (38, 4%)	0, 035

Thus, studies have shown that the success of the treatment of complicated forms of BF depends on both the timing of admission and the timing and volume of surgery.

So, in the patients of the main group, admitted in the first two days from the onset of the disease and urgently operated on the developed method, there were no deaths. There were 3 deaths in the control group due to the progression of the purulent-necrotic process. These studies show statistically significant differences in the compared groups for this parameter ($p < 0.05$).

The highest mortality was observed in patients admitted on days 3-4 from the onset of the disease in the control group - 66.7%, while in the control group - 5.6% ($p = 0.035$).

Early detection of purulent necrotic leaks and radical surgical treatment with mobilization of skin-fascial flaps and revision of intermuscular spaces can significantly reduce mortality and increase the chances of a successful outcome.

4. Conclusions

The surgical method developed and used in this study in the complex treatment of BF significantly reduced the number of repeated interventions and reduced mortality to 5.6%.

Abbreviations

BF	Fournier's Disease
SPON	Multiple Organ Dysfunction Syndrome

Author Contributions

Aliyev Magomed Alievich: Conceptualization, Funding acquisition, Methodology, Resources, Writing – review & editing

Svelimanov Zulkarnay Aliyevich: Data curation, Investigation, Validation, Writing – original draft

Suleimanov Sharip Alievich: Formal analysis, Project administration, Supervision, Visualization, Software

Conflicts of Interest

Authors declare no conflicts of interest.

References

[1] Actuality. Abdullaev S. A. Choice of surgical treatment method and Fournier's disease. Research Focus, T. 4, Issue 1, 2025, Research Bip. Samarkand State Medical University https://doi.org/10.5281/zenodo

[2] Abdullaev S. A. Tactics of treating purulent necrotizing fasciitis in diabetes mellitus. Research Focus. – 2025. - VOL. 4. – №. 1. - S. 187-191.

[3] Abdullaevich, A. S., Usmonovich, B. Sh. (2023). Fournier's disease is a rare disease in surgery.. Central Asian Journal of Medical and Natural Science, 4(6)-2023, 212–216. https://doi.org/10.51699/cajmns.v4i6.2014

[4] Aliyev S. A., Aliyev ES, Zeynalov B. M. Gangrena Fournier in the light of modern ideas. Surgery 2014, No. 4, S. 34-39.

[5] Aliyev S. A. O., Aliyev E. S. O. Gangrena Fournier-multidisciplinary problem of purulent-septic surgery Clinical medicine. – 2023. - T. 101. – №. 7-8. - S. 368-375.

[6] allazov S. A., Yuldashev S. S., Gafarov R. R. Gangrena Fournier. Doctor's Bulletin, 2016; 2: 54-62.

[7] Beloborodov V. A., Frolov A. P. Gangrena Fournier in modern conditions Tauride medical and biological bulletin. – 2023. - VOL. 26. – №. 3. - S. 18-25.

[8] Grinev M. V., Soroka I. V., Grinev K. M. Gangrene Fournier - model of necrotising fascitis (clinical and pathogenetic aspects). Urology. 2007; (6): 69–73.

[9] Efimenko N. A., Privolnev V. V. Gangrena Fournier. Wedge. microbiol. and anti-microbe. chemoterap. 2008; 10(1): 34–42 (In Russ.)].

[10] Plekhanov A. N. Case of successful treatment of Fournier gangrene. Yakut Medical Journal. – 2025. – №. 3. - S. 74-76.

[11] Prokopovich M. A., Korchagin M. P., Zuban O. N. Clinical case of Fournier gangrene in a patient with tuberculosis Tuberculosis and socially significant diseases. – 2025. - T. 13. – №. 1. - S. 79-83.

[12] Samorodov K. S., Belikov A. V. Opportunities to improve treatment results in gangrene Fournier. Week of Russian science (WeRuS-2023). – 2023. - C. 1056-1057.

[13] Altarac S., Katusin D., Crnica S. et al. Fournier's gangrene: etiology and outcome analysis of 41 patients. Urol. Int. 2012; 88: 289–293.

[14] Barreda J. T., Scheiding M. M., Fernandez C. S. et al. Fournier's gangrene. A retrospective study of 41 cases. Cir. Esp. 2010; 87: 218–223.

[15] Benjelloun E. B., Souiki T., Yakla N. et al. Fournier's gangrene: our experience with 50 patients and analysis of factors affecting mortality. WJES. 2013; 8: 1–5.