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Diagnostics and treatment of complicated perianal abscess in patients with hematologic malignancies

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ABSTRACT AIM: to work out an algorithm for diagnosis and tactics of treatment of complicated perianal abscess (CPA) in oncohematology.

PATIENTS AND METHODS: the cohort study (January 2021 — December 2022) included 78 patients with hematologic malignancies and infectious lesions of the perianal soft tissues. Complex perianal infection (CPI) was distinguished in the presence of supralelevator abscess, pelvic phlegmon, destruction of the rectal wall above the level of the dentate line, and pelvic organs involvement. The correspondence of clinical, laboratory data and MRI results, as well as the results of surgical drainage, antibacterial therapy, and vacuum therapy were assessed.

RESULTS: CPI was detected in 7 (8.97%) patients with perianal infection. The neutropenia was detected in all patients (neutrophils $< 500 \times 10^9/L$); no fever occurred in two patients. Clinical data were adjusted after MRI results in 6 (85.7%) cases. Pelviorectal abscesses were noted in 5 patients, in 2 — pelvic phlegmon was detected. In addition, 2 patients revealed perforation of the rectum above the dentate line, 1 — rectovaginal fistula. Due to sepsis, 4 (57.14%) patients were in the intensive care unit, the period in the intensive care unit was 32.5 (17–54) days. Abscess drainage was performed in all patients, in 3 cases — diverting sigmoidostomy. The wound repair phase was achieved in all patients. The time of reparation was 79 (37–142) days. Vacuum therapy was used in 2 cases with wound repair time of 53.5 days. Postoperatively, febrile fever with periods of normothermia for 1 month was revealed in all cases. Two patients died within 50 and 215 days from causes unrelated to perianal abscess.

CONCLUSION: pelvic MRI is a preferable diagnostic test to determine the volume of lesion in CPI in patients with hematological malignancies. CPI in patients with neutropenia is associated with a high incidence of sepsis. The main methods of infection control are abscess drainage and antibacterial therapy, which should be started before surgery and continued in the postoperative period until normothermia and regression of local signs of inflammation. Vacuum therapy is a safe and effective method in treatment of big postoperative wounds in patients with neutropenia.

KEYWORDS: perianal abscess, perianal infection, abscess, leukemia, neutropenia, hemoblastosis

CONFLICT OF INTEREST: The authors declare no conflict of interest

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LIST OF ABBREVIATIONS

Allo-HSCT — Allogeneic hematopoietic stem cell transplantation;

Auto-HSCT — Autologous hematopoietic stem cell transplantation;

GCS — glucocorticosteroids;

MRI magnetic resonance imaging;

AML — acute myeloid leukemia;

ALL — acute lymphoblastic leukemia;

ICU — Intensive Care Unit;

PI — perinatal infection;

CPA — complicated perianal abscess;

ChT- chemotherapy.

INTRODUCTION

Infection of the soft tissues of the perianal region (hereinafter referred to as perianal infection) occurs in 7–11% of oncohematological patients [1–5].

Perianal infection (PI) in this category of patients differs in the variability of clinical manifestations.

In addition to anal abscesses and fistulas, PI includes inflammatory masses, necrosis of the skin of the anal canal and perianal area, soft tissue lesion due to hematogenous spread of infection, etc. [1,6]. The proportion of patients with PI requiring surgical treatment is 22.1% [6]. The group of patients with complicated perianal abscess (CPA), lesions of deep cellular spaces and pelvic organs appears to be the most severe [7]. The development of infection in oncohematological patients occurs against the background of an active tumor process, lesion to the hematopoiesis system, disorder of cellular and humoral immunity, therapy with cytostatics and glucocorticosteroids (GCS). Under these conditions, local manifestations of infection may be extremely scarce or absent [1,6], and traditional clinical signs such as fever, leukocytosis, and the activity of proinflammatory markers lose their diagnostic value. Surgical treatment of patients with hemoblastosis is associated with the risk of infection dissemination. The incidence of sepsis is 20–33% [4,8]. A disorder of the function of cellular immunity is the cause of such problems of the postoperative period as the lack of borders of infection and wound reparation. The published studies present summary data on the results of treatment of oncohematological patients with various forms of PI. Studies covering the diagnosis and treatment of CPA in patients with hemoblastosis are not presented in the literature. The urgent tasks are: to develop reliable criteria for the diagnosis and assessment of the changes of the course of the infectious process in CPA; to study the rational strategy of antibacterial therapy; to evaluate the possibility and effectiveness of using modern methods of treatment of purulent wounds in patients with neutropenia, such as hydro-impulse and vacuum therapy [9,10]. The most important aspect of the study is the possibility of antitumor therapy in this category of patients. In addition to the immediate threat to the patient's life, infectious complications requiring long-term treatment hinder the implementation of cytostatic therapy programs and have a negative impact on the oncological prognosis

[11]. According to the research by Solmaz, S. et al., the presence of anorectal complications increases the overall mortality rate in oncohematological patients from 22.2% to 41.2%, and with an active tumor disease of the blood system, its value reaches 60.9% [4].

The concentration of patients with tumors of the blood system allows analyzing aspects of the diagnosis and treatment of CPA in this category of patients on a large number of clinical cases.

AIM

To work out an algorithm for the diagnosis and treatment of CPA in oncohematological patients.

PATIENTS AND METHODS

The study, performed between January 2021 and December 2022, included patients with an established diagnosis of hemoblastosis and an infectious lesion of the soft tissues of the perianal area. CPA was distinguished in the presence of a supralelevator abscess, pelvic phlegmon, lesion of the rectal wall above the level of the dentate line, and pelvic organ lesion. The presence of an infectious process in the perianal tissue and the volume of the lesion were evaluated clinically and according to magnetic resonance imaging (MRI) data. Clinical signs of PI were considered to be the presence of inflammatory infiltration, abscess, necrosis or pararectal fistula. MRI of the pelvic organs was performed to confirm the presence and determine the localization of a pararectal abscess or fistula, as well as in clinically unclear situations in febrile patients. MR signs of inflammation were considered to be high signal intensity, different from the intensity of normal blood vessels. An abscess was defined as a localized accumulation with a signal intensity corresponding to a liquid; a fistula was defined as a tubular structure with an internal and external opening. An intravenous contrast agent was used for the differential diagnosis of scarring and fistulas. The patient's status

Table 1. Characteristics of patients with PI

Indicator	Number of patients, <i>n</i> (%)
Number of patients	78
Gender m/f	34/44
Age median (range) years	41 (18–69)
Diagnosis:	
Acute myeloid leukemia	37 (47.4)
Acute lymphoblastic leukemia	10 (12.8)
Non-Hodgkin's lymphomas	17 (21.8)
Hodgkin's lymphoma	5 (6.4)
Multiple myeloma	4 (5.1)
Others	5 (6.4)
Clinical manifestations of PI:	
Inflammatory mass	42 (53.8)
Anal abscesses, of which	21 (26.9)
Pelvic rectal	7 (8.9)
Anal fistulas	8 (10.3)
Rectovaginal fistulas	1 (1.3)
Perforations of the rectum above the dentate line	2 (2.6)
Lesions of the perianal skin (ulcers, erosions, necrosis)	7 (8.9)

Note: * Chronic myeloid leukemia *n* = 3, chronic lymphocytic leukemia *n* = 2

was assessed according to the Eastern Cooperative Oncology Group (ECOG) scale [12].

In order to monitor the microflora, a smear or biopsy was performed from the wound surface. Hemoculture was studied at a body temperature of 38°C and above. When considering PI as a source of sepsis, the species correspondence of microorganisms isolated from the rectum and blood was taken into account.

Drainage of abscesses was performed by pararectal access. Sigmoidostomy was performed in patients with extensive wounds, severe somatic status (4 points on the ECOG scale), prolonged neutropenia, sepsis. In the postoperative period, the surgical status was monitored visually and using MRI. Antibacterial therapy was initiated before surgery and continued in the postoperative period until normothermy and regression of local signs of inflammation. For initial empirical antibacterial therapy, β -lactam antibiotics with β -lactamase inhibitors (piperacillin/tazobactam or cefoperazone/sulbactam) or carbapenem with antipseudomonas activity (imipenem/cilastin, meropenem, doripenem) were used. Modification of antibacterial therapy was carried out according to the results of microbiological studies. Intraoperatively and in the early postoperative period, hydroimpulsive sanitation of the wound surface was used.

0.9% NaCl solution and 0.2% chlorhexidine solution were used during hydroimpulse sanitation. The pressure in the working circuit during the procedure was 7 atmospheres. Vacuum instillation therapy was used in stoma patients. Vacuum drainage was installed on the bottom of the wound for instillation of antiseptics, after which the wound was filled with a polyurethane sponge. For sealing, a film was used, under which the drainage port was immersed. In the inflammatory phase, a vacuum of 120 mmHg was used, during the reparation period, a variable vacuum of 50–80 mmHg was used to stimulate the growth of granulations. System components were replaced after 48 hours.

A statistical analysis included standard methods of descriptive statistics. To test hypothesis on categorical features in comparison groups, an analysis of conjugacy tables was used. To assess the significance, the two-sided Fisher test (for tables 2×2) and the χ^2 test for tables of larger dimension were used.

RESULTS

PI was diagnosed in 78 patients with hemoblastosis (34 men and 44 women). The mean age of the patients was 41 years (from 18 to 69 years). The majority of patients were with acute leukemia

Table 2. Characteristics of patients with CPA and other forms of PI (n = 78)

Indicator	Patients, n (%)	
	CPA	Other PI forms
Number of patients	7	71
Gender m/f	4/3	33/41
Age median (range) years	49 (33-63)	39 (18-69)
Clinical manifestations of PI:		
Inflammatory mass	—	42 (59.1)
Anorectal abscesses:		
Subcutaneous	—	13 (18.3)
Ischio anal	—	1 (1.4)
Pelvio rectal	7 (100)	—
Anal fistulas	—	8 (11.3)
Rectovaginal fistulas	1 (14.3)	—
Perforations of the rectum above the dentate line	2 (28.6)	—
Lesions of the perianal skin (ulcers, erosions, necrosis)	—	7 (9.9)
A variant of hemoblastosis:		
Acute myeloid leukemia	3 (42.8)	34 (47.9)
Acute lymphoblastic leukemia	2 (28.6)	8 (11.3)
Non-Hodgkin's lymphomas	2 (28.6)	17 (23.9)
Others*	—	12 (20.3)
Remission of the disease	3 (42.8)	43 (60.5)
Chemotherapy	4 (57.1)	55 (77.5)
Allo-HSCT	—	5 (7.0)
Auto-HSCT	—	3 (4.2)
Neutrophils $\leq 500 \times 10^9 / l$	7 (100)	54 (76.1)
Combination of PI with other infections	4 (57.1)	28 (39.4)
Bloodstream infections	4 (57.1) **	11 (15.5) **
Treatment of PI at the previous stage:		
Antibacterial therapy	4 (57.1)	19 (26.8)
Drainage of the abscess	2 (28.6)	3 (4.2)
It was not carried out	1 (14.3)	49 (69.0)
MRI of the pelvic organs was performed	7 (100)	17 (23.9)
The diagnosis was established/corrected after the MRI results	6 (85.7)	4 (5.6)
Observation in the ICU	4 (57.1)	4 (5.6)
Surgical treatment of PI	7 (100)	15 (21.1)
Antibacterial therapy	7 (100)	56 (78.9)

Note: * Hodgkin's lymphoma n = 5, multiple myeloma n = 4, chronic myeloid leukemia n = 3, chronic lymphocytic leukemia n = 2; ** Statistically significant difference $p < 0.05$

(AML — 47.4%, ALL — 12.8%) and non-Hodgkin's lymphomas (21.8%). The most common manifestations of PI were inflammatory masses (53.8%) and perianal abscesses (26.9%) (Table 1).

CPA was diagnosed in 7 (8.97%) of 78 patients (Table 2). Of these, 5 patients showed pelvio rectal abscesses, in 2 patients the lesion of pelviorectal tissue was represented by phlegmon. In addition, two patients had a perforation of the rectum above the dentate line, and 1 had a rectovaginal fistula. The age of patients in this group ranged from 33 to 63 years (median 49), men — 4, women — 3. Acute myeloid leukemia was diagnosed in 3 patients, acute lymphoblastic leukemia — in 2,

non-Hodgkin's lymphomas — in 2. The ineffective PI treatment at previous stages was the reason for the development of CPA in 6 (85.7%) of 7 patients. Thus, in 4 patients, pelviorectal abscesses was revealed against the background of antibacterial therapy of infiltrative forms of PI, in 2 — the progression of the purulent-inflammatory process and the development of pelvic phlegmon after surgical treatment of pararectal abscesses (performed in other medical institutions) without adequate antibacterial therapy in the postoperative period. In all patients, the development of CPA occurred against the background of neutropenia (neutrophils $\leq 500 \times 10^9 / l$); in 3 cases, agranulocytosis

Table 3. Diversity of microorganisms in blood and in rectum detected via CPA diagnostics

Microorganisms	Locus of Isolation	
	Rectal Microorganisms, <i>n</i> = 19	Blood Microorganisms, <i>n</i> = 4
Gram-negative bacteria	12 (63.2)	4 (100)
Family <i>Enterobacteria ceae</i>	10 (52.6)	3 (75)
<i>Klebsiella spp.</i> , of which	4 (21.1)	2 (50)
with ESBL products	2 (10.5)	2 (50)
carbapenem-resistant	1 (5.3)	0
<i>Proteus spp</i>	3 (15.8)	0
<i>Escherichia coli</i> , of which	2 (10.5)	1 (25)
With ESBL products	2 (10.5)	1 (25)
<i>Enterobacter spp.</i>	1 (5.3)	0
Non-fermenting bacteria		
<i>Pseudomonas aeruginosa</i> ;	1 (5.3)	1 (25)
<i>Stenotropho monasmaltophilia</i>	1 (5.3)	0
Gram-positive bacteria	4 (21.1)	0
<i>Enterococcuspp</i> ;	4 (21.1)	0
<i>Enterococcus faecium</i> vancomycin-resistant	1 (5.3)	0
Fungus <i>Candida spp</i>	3 (15.8)	0

was tumor, in 4 — myelotoxic against the background of induction or consolidation therapy of acute leukemia. At the time of diagnosis of acute infection, febrile fever was detected in 5 out of 7 patients, two had normothermia (in one case against the background of NSAIDs, in the other against the background of multicomponent antibacterial therapy.

The condition of patients at the time of detection of CPA was assessed as severe and extremely severe (3–4 points on the ECOG scale) in 5 out of 7 cases. Bloodstream infections in CPA were detected in 4 (57.1%) of 7 patients. The incidence of bloodstream infections in CPA was 57.1% (4 out of 7 patients), significantly higher than other forms of PI 15.5% ($p < 0.05$).

Due to sepsis, unstable hemodynamics, and the threat of septic shock, 4 (57.1%) patients with CPA were in the intensive care unit (ICU). It is worth noting the longtime of stay in the ICU, 32.5 (17–54) days (Table 2).

In order to clarify the form of inflammation or site of the pathological focus, MRI was performed in 24 (30.8%) of 78 patients. It should be noted that in the diagnosis of CPA, the data obtained with objective imaging differed from the clinical assessment in 6 (85.7%) of 7 cases. Thus, pelviorectal abscesses were detected during the examination

of patients with subcutaneous inflammatory mass in 2 cases, anal fistulas in 2 and the absence of external signs of PI in 2 cases (Table 2).

The pathogens identified during the diagnostics of CPA were represented by associations of microorganisms, strains of *Klebsiella pneumonia* (20%) and *Enterococcus faecium* (20%), *Pseudomonas aeruginosa* (15%) were more common. The proportion of resistant microorganisms was 25%, including 5% with carbopenemase products. Bloodstream infections in CPA were detected in 4 (57.1%) of 7 patients; in all cases gram-negative microorganisms were identified (Table 3).

All patients with CPA were operated urgently. Abscesses were drained by perianal access, additional collections revision, necrectomy. Sigmoidostomy was performed in three patients with vastperianal wounds and sepsis. It should be noted that in other forms of PI, urgent surgery was performed only in 21.1% of cases.

In all cases, antibacterial therapy was initiated preoperatively. The time of antibacterial therapy varied depending on the clinical situation and the presence of other infectious complications. The minimal time of antibacterial therapy was 21 days. In all patients with CPA, open wound management with step-by-step sanitation using hydro-impulse treatment of the wound surface was used.

Table 4. *Treatment of complicated perianal abscess*

Indicator	Number of Patients, <i>n</i> = 7 (%)
Urgent surgeries for CPA:	
Drainage of perianal tissue	7 (100)
Colostomy	3 (42.9)
Vacuum therapy	2 (28.6)
Scheduled surgeries:	
Closure of the sigmoidostomy	2 (28.6)
Plastic surgery of the perineum with local tissues	1 (14.3)
Plastic surgery of the rectovaginal septum	1 (14.3)
Excision of the anal fistula	1 (14.3)
Wound reparation, days	79 (37–142)
ChT program after PI episode	4 (57.1)
Transplantation of allogeneic hematopoietic blood stem cells	1 (14.3)
Achieved remission of hemoblastosis after PI episode	3 (42.9)
Mortality	2 (28.6)

Despite the positive changes after surgery, in all cases, febrile fever with periods of normothermy occurred within 1 to 1.5 months after surgery. All patients needed anesthesia during the first 10 days. Complications were noted in two patients: bleeding and recurrence of inflammation after palliative drainage.

The wound reparation phase was achieved in all patients. The reparation period ranged from 37 to 142 days, with an average of 79 days. Vacuum instillation therapy was performed on two males after sigmoidostomy. When using vacuum instillation therapy, the mean period of wound reparation was 53.5 days.

Re-operations were performed in five patients: excision of the anal fistula — 1, plastic surgery of the rectovaginal septum — 1, plastic surgery of the perineum — 1, closure of the sigmoidostomy — 2 (Table 4).

After stopping the infectious process, chemotherapy (ChT) was continued in 4 patients, two of whom underwent induction courses, as a result of which remission of acute leukemia was achieved, in 1 case, allogeneic hematopoietic stem cell transplantation was performed. ChT was started in the presence of an open clean wound, against the background of antibacterial therapy. The follow-up period averaged 272.4 days (from 50 to 719 days). Two patients died within 50 and 215 days after surgery from causes unrelated to PI.

A CLINICAL CASE

Patient A., 33 years old. Diagnosis: T-cell lymphoma/leukemia from large granular lymphocytes. The onset of the disease was in 2019, when pancytopenia was detected in the hemogram. Bone marrow and spleen histology (diagnostic splenectomy was performed), showed the diagnosis of T-cell lymphoma/leukemia from large granular lymphocytes (CD3+, CD4–, CD8+, CD5–). Specific therapy was carried out, which was finished in September 2021. Further, follow up was carried out.

In February 2022, the patient was admitted to a city hospital of Moscow with a diagnosis of acute PI, where an urgent surgery was performed to drain the abscess. In the postoperative period, due to persistent hyperthermia, wound revisions were performed three times. From February to April 2022, the patient was at home, with local treatment on his own, metronidazole and NSAIDs. The pain in the wound persisted, hyperthermia was up to 39 °C, and weakness increased.

The patient independently applied to the hematology unit in April 2022. Upon admission, the condition was severe (3 points on the ECOG scale), due to the ongoing infectious process in the perianal area. The level of consciousness was 15 points on the Glasgow scale. The body temperature was 36.6 °C, while taking NSAIDs. The hemogram showed anemia (hemoglobin — 64 g/l),

neutropenia ($0.38 \times 10^9/l$), hypoproteinemia (serum protein was 50.9 g/l). According to CT scans, bilateral pleuropneumonia was detected.

The local admission status is shown in Figure 1a. Extensive necrosis of the skin and subcutaneous tissue spread from the scrotum to the coccyx, phlegmon of the perianal area and perineum was detected.

MRI revealed a supralelevator abscess on the right and an ischiorectal abscess on the left.

The microflora identified in the perianal area was represented by an association of microorganisms: *Klebsiella pneumoniae* with the production of carbapenemases (metallo- β -lactamases); *Proteus hauseri*; *Staphylococcus hominis*.

Antibacterial therapy, transfusions, parenteral nutrition were started.

An urgent revision of the perineal wound, drainage of the pelviorectal abscess, additional collections in the pararectal tissue, and laparoscopic sigmoidostomy were performed. On the third day, a vacuum-instillation system was installed (Fig. 1b). A drainage for the introduction of antiseptic solutions and a polyurethane foam sponge were installed in the abscess cavity. After sealing the bandage, a dilution of 120–100 mmHg was used. The dressing was changed and the microflora in the wound was monitored after 2–3 days. On the 10th day after the surgery, cleansing and reduction of the wound size in the perianal area were noted (Fig. 1b). The

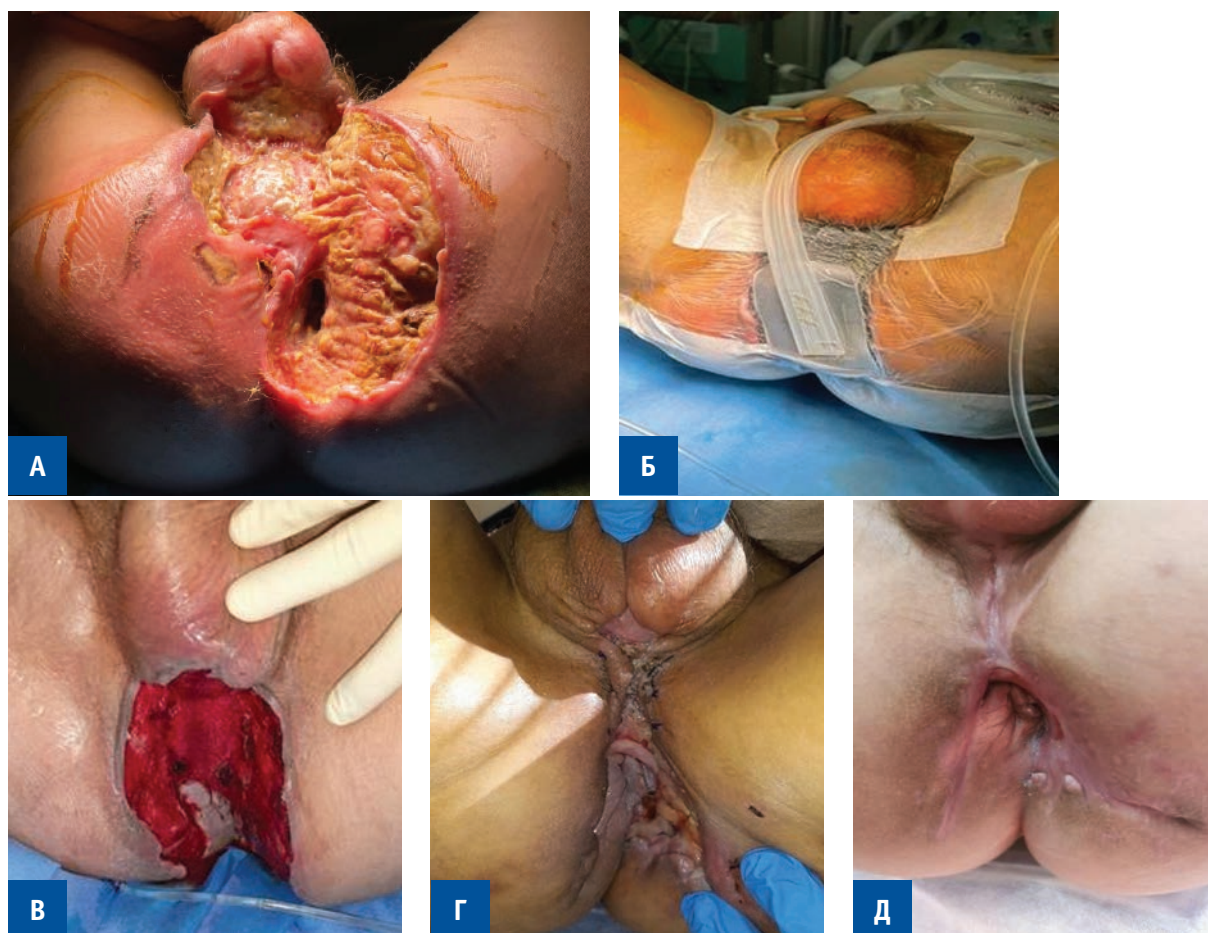


Figure 1. Clinical case. The patient is 33 years old. Diagnosis: T-cell lymphoma|leukosis from large granular lymphocytes
 A — perineal phlegmon, supralelevator abscess, pararectal abscess on the right, ischiorectal abscess on the left. Б — laparoscopic sigmoidostomy, revision of the perineal wound, drainage of the pelviorectal space. A system for vacuum therapy has been installed.
 B — on the 10th day, a clean wound on the background of vacuum therapy. Г, Д — plasty of a skin defect and complete healing after 2.5 months on the background of neutropenia less than $0.5 \times 10^9/l$

total duration of negative pressure therapy was 38 days.

Despite the positive changes in wound, the patient's condition remained severe, febrile fever continued (Fig. 2). Fever turns were accompanied by an increase in septic markers (presepsin) (Fig. 3).

A thorough check up revealed no other foci of infection. A consistent escalation of antimicrobial therapy was carried out (ceftazidime/avibactam, linezolid, sodium colistimethate, amphotericin B, daptomycin). Taking into account the persistent neutropenia (Fig. 4), 10 plasmapheresis sessions and pulse therapy with methylprednisolone (1000 mg intravenously No. 3) were performed as part of the treatment of the underlying disease. After the steroids, normothermy was achieved; however, no significant changes in the hemogram were obtained.

The patient was in the intensive care unit for 35 days. After stabilization of the patient's condition, antibacterial therapy was de-escalated (the previous regimen was replaced with meropenem and amikacin and then with moxifloxacin). The total duration of antibacterial therapy was 40 days.

After 1.5 months, the plastic surgery of the skin lesion was performed. Complete wound healing was achieved after 2.5 months against the background of persistent neutropenia (Fig. 1 Г-Д). After 8 months (December 13, 2022), the sigmoidostomy was closed without complications.

DISCUSSION

The incidence of CPA according to this study is 8.97% of PI cases.

The CPA in patients with oncohematological diseases and neutropenia is often the result of the ineffectiveness of previous stages of treatment of PI. CPA can develop both with the ineffectiveness of conservative treatment of infiltrative forms of PI, and as a result of further progression of the process after drainage in the absence of adequate antibacterial therapy in the postoperative period. When examining patients with tumors of the blood system, it should be taken into account that clinical signs and laboratory parameters largely depend on factors such as lesion of the hematopoietic system, the use of GCS and cytostatics, the presence of multiple foci of infection. In this

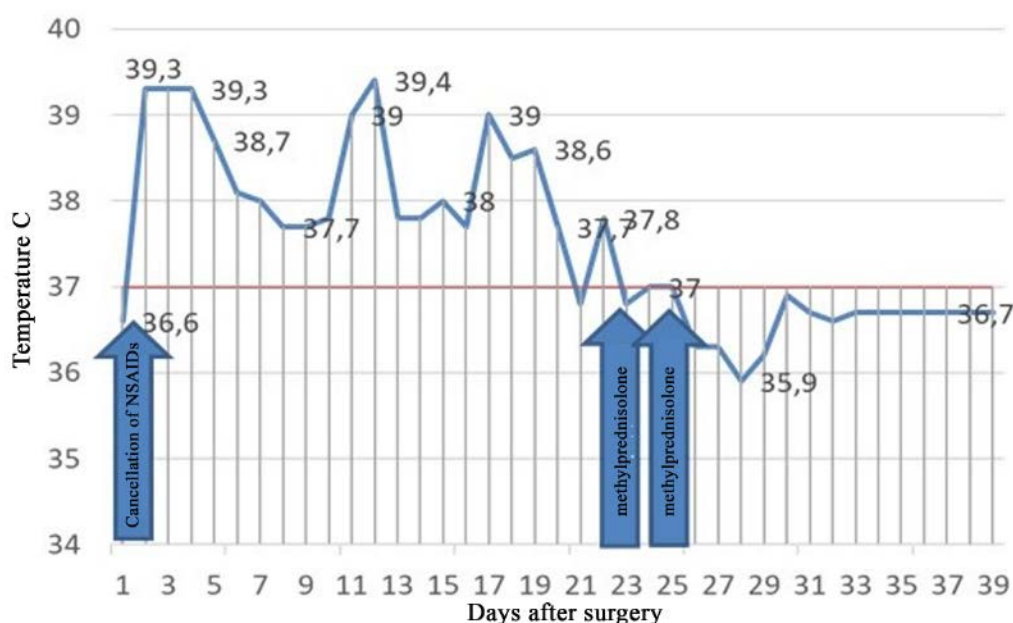


Figure 2. Clinical case. Thermometry data in the postoperative period

study, neutropenia was registered in all patients at the time of infection diagnosis. The presence of fever did not correlate with the wound process and often depended on steroids. Thus, the correct assessment of the local status is the main and often the only criterion for both diagnosis and subsequent monitoring of the infectious process. It is important to show that invasive diagnostic procedures (digital rectal examination and proctoscopy) in these patients are associated with the risk of dissemination of infection into tissues and

blood [4]. The clinical examination in this category of patients should be supplemented with objective imaging methods that exclude invasive effects on the focus of infection.

Currently, MRI is the method of choice for the diagnosis of anorectal abscesses and fistulas in patients with hemoblastoses [13,14]. In addition to high diagnostic accuracy and the absence of invasive effects, the advantage of MRI is a wide field of imaging, which allows for differential diagnosis when searching for foci of infection. In the

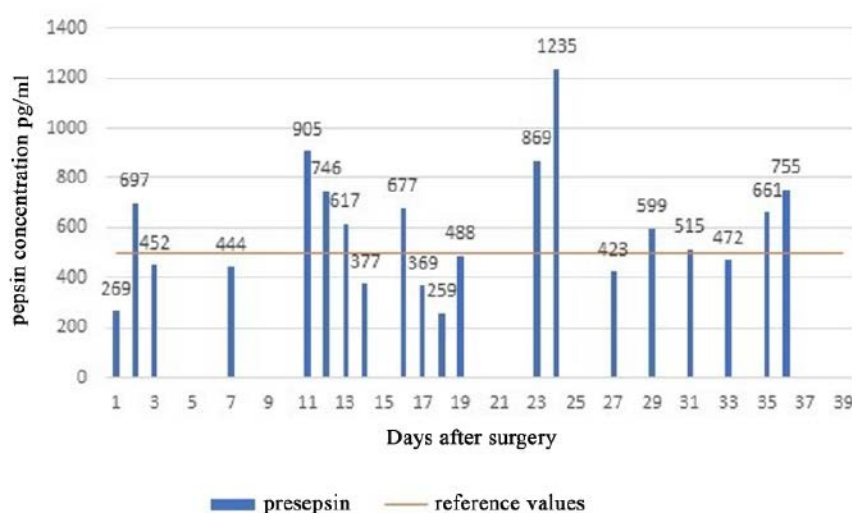


Figure 3. Clinical case. Prepsin concentration in the postoperative period

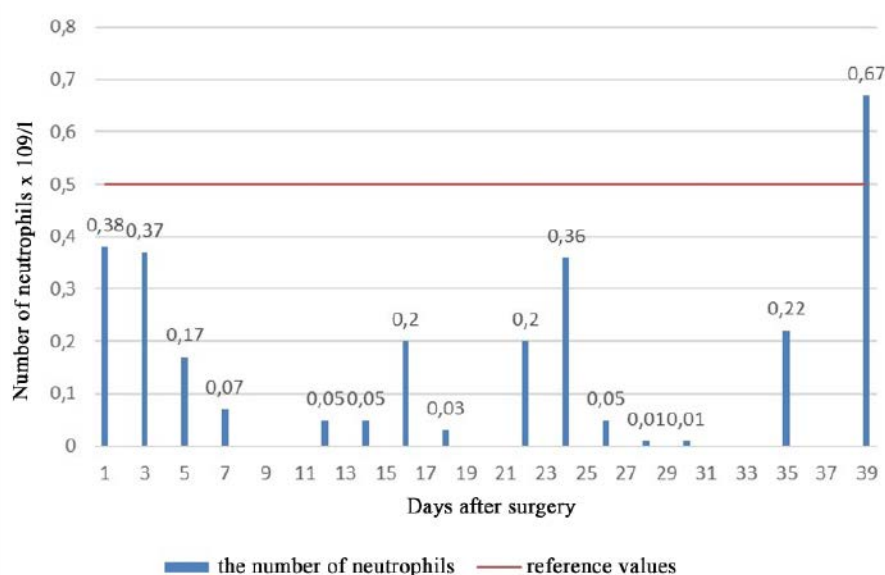


Figure 4. Clinical case. Hemogram dynamics in the postoperative period. Number of neutrophils

present study, MRI was a necessary tool for both diagnosis and assessment of the of the infectious process changes after surgery.

The development of CPA against the background of neutropenia is associated with an extremely serious condition of patients, a high incidence of sepsis, and the threat of septic shock. In all cases of the infectious process, diagnostics should be actively carried out aimed at identifying both the foci of infection and the pathogen. In patients with neutropenia, it is necessary to carry out both local isolation of pathogens and monitoring of hemoculture. According to the data of this study, the incidence of sepsis in CPA was 57.1%, which is significantly higher than in other forms of PI 20–30% [4,8]. Patients with a clinical and laboratory picture of sepsis should undergo treatment in the intensive care unit. In this study, the treatment in the ICU was 32 days. Despite the high incidence of blood infections, there was no mortality directly associated with PI.

The aim of surgical treatment for CPA remains unchanged — adequate drainage of cavities and collections, removal of necrotic tissues. However, in patients with neutropenia, drainage alone is not enough to stop the infectious. The most important factor in healing is adequate antibacterial therapy, which should be initiated before surgery and continued in the postoperative period until normothermy and regression of local signs of inflammation. Diverting stoma is not a routine surgery for PI. Marks, G. et al. analyzed 11 deaths associated with perianal abscesses and reported that the intestinal stoma does not prevent septic complications [15,16]. They showed that colostomy does not improve the results of treatment of rectovaginal fistulas [16,17]. Indications for colostomy in patients in this study were an extensive lesion area, severe pain syndrome, prolonged neutropenia, clinical and laboratory picture of sepsis and severe patient condition.

An important result of this study is to demonstrate the possibility and effectiveness of vacuum therapy for the treatment of pararectal wounds in patients with neutropenia. For self-healing of the

wound, the stages of purification from non-viable tissues and microorganisms, regeneration through the formation of granulation tissue with subsequent epithelization by means of epithelial migration from the margins of the wound lesion must pass. All these processes depend on the presence of granulocytes. Therefore, even when control over the infectious process is achieved, wound reparation in patients with neutropenia is a difficult problem.

The absence of the barrier function of granulations was the cause of prolonged periods of hyperthermia in the postoperative period. In such conditions, reducing the area of the wound surface is the most important factor in stopping the infectious process.

The method of applying negative pressure to the wound allows you to speed up the reparation processes and successfully treat wounds that cannot be cured by other methods. The main advantage of using negative pressure is to ensure constant drainage of the exudate, reduce bacterial contamination, reduce the area of the wound bed and stimulate reparative processes. Local negative pressure and micro deformation of tissues stimulate angiogenesis, cell proliferation, neurogenesis, granulation tissue and rapid reduction of the size of the wound [18]. In this study, a clinical case was used to demonstrate the wound process against the background of a constant form of neutropenia. In the absence of treatment, the extensive postoperative wound existed for more than two months, increasing in size, involving initially intact cellular spaces in the infectious process. Along with surgical sanitation and longtime antibacterial therapy, the use of a vacuum bandage made it possible to achieve the transforming of the wound process into the reparation phase. The study has also shown the possibility of performing plastic surgery: in one case, plastic surgery of a wound lesion with a skin flap; in the other, a rectovaginal septum with a split mucous flap. The effectiveness of the use of negative pressure in the treatment of perianal abscesses and fistulas is presented in a number of studies [19,20,21]. In

a randomized study by Chen, S.Q. et al. in 2019, it was shown that the use of negative pressure can accelerate the healing of a wound lesion, reduce postoperative pain syndrome, recurrence rate and fistulas [10]. It should be noted that VAC therapy is possible both in stoma patients and without stoma, with the use of stomadhesive fixators and gel dressings on the anal area [22].

The absence of remission of hemoblastosis determines a negative prognosis both due to the progression of the tumor process and due to the inability to restore bone marrow hematopoiesis and immune status. An important result of this study is the presentation of the possibility of chemotherapy for patients with CPA. Induction courses were done in two patients after the stop of the infectious process, in the presence of clean wounds, which made it possible to achieve remission of hemoblastosis.

CONCLUSION

MRI of the pelvic organs is a diagnostic method necessary to determine the extent of lesion in CPA in oncohematological patients. The development of CPA in patients with neutropenia is associated with a high incidence of sepsis. In all cases of detection of CPA, diagnostics should be actively carried out aimed at isolating the pathogen both at the inflammation locus and in the hemoculture.

REFERENCES

1. Harsh G, Guillem JG, Stuart HQ, et al. Anorectal Disease in Neutropenic Leukemic Patients. Operative vs. Nonoperative Management. *Dis Colon Rectum*. 1994;37:1095–1099.
2. Morcos B, Amarín R, Abu Sba A, et al. Contemporary management of perianal conditions in febrile neutropenic patients. *Eur J Surg Oncol*. 2013;39(4):404–7. doi: [10.1016/j.ejso](https://doi.org/10.1016/j.ejso)
3. Chen CY, Cheng A, Huang SY, et al. Clinical and microbiological characteristics of perianal infections in adult patients with acute leukemia. *PLoS One*. 2013;8(4). doi: [10.1371/journal.pone.0060624](https://doi.org/10.1371/journal.pone.0060624) <http://www.plosone.orghttp://www.pubmedcentral.gov/tocrender.fcgi?journal=440>
4. Solmaz S, Korur A, Gereklioglu Ç, et al. Anorectal

Treatment of patients with CPA and clinical and laboratory sepsis should be carried out in the intensive care unit due to the threat of septic shock. The main methods of infection control are abscess drainage and antibacterial therapy, which should be initiated before surgery and continued in the postoperative period until normothermy and regression of local signs of inflammation. Vacuum therapy is a safe and effective method in the complex treatment of extensive postoperative wounds in patients with neutropenia.

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Complications During Neutropenic Period in Patients with Hematologic Diseases. *Mediterr J Hematol Infect Dis*. 2016 Mar 1;8(1):e2016019. doi: [10.4084/MJHID.2016.019](https://doi.org/10.4084/MJHID.2016.019) eCollection 2016. PMID: 26977278

5. Chang H, Kuo M-C, Tang T-C, et al. Clinical Features and Recurrence Pattern of Perianal Abscess in Patients with Acute Myeloid Leukemia. *Acta Haematologica*. 2017, 138(1):10–13. doi: [10.1159/000475589](https://doi.org/10.1159/000475589)

6. Shtyrkova S.V., Klyasova G.A., Karagyulyan S.R., et al. Perianal infectious complications in patients with granulocytopenia and hematological malignancies. *Koloproktologia*. 2020;19(4):10–21. (in Russ.). doi: [10.33878/2073-7556-2020-19-4-10-3](https://doi.org/10.33878/2073-7556-2020-19-4-10-3)

7. Bolkvadze E.E., Egorkin M.A. Classification and treatment of acute perianal abscesses/ Fifteen years

- of single institution experience. *Koloproktologia*. 2012;2:13–16. (in Russ.).
8. Loureiro RV, Borges VP, Tomé AL, et al. Anorectal complications in patients with haematological malignancies. *Eur J Gastroenterol Hepatol*. 2018 Jul;30(7):722–726. doi: [10.1097/MEG.0000000000001133](https://doi.org/10.1097/MEG.0000000000001133)
9. Andreev A.A., Demyanov A.V. Method hyroimpulsive sanations in treatment of acute paraproctitis. System analysis and management of biomedical systems. 2014;13(3):677–683. (in Russ.).
10. Chen SQ, Liu WC, Zhang ZZ, et al. Application of closed negative pressure irrigation and suction device in the treatment of high perianal abscess. *Zhonghua Wei Chang Wai Ke Za Zhi*. 2019 Apr 25;22(4):364–369. doi: [10.3760/cma.j.issn.1671-0274.2019.04.009](https://doi.org/10.3760/cma.j.issn.1671-0274.2019.04.009)
11. Parovichnikova E.N., Troitskaya V.V., Klyasova G.A., et al. Treating patients with acute myeloid leukemias (AML) according to the protocol of the AML-01.10 Russian multicenter randomized trial: The coordinating center's results. *Terapevticheskii arkhiv*. 2014;86(7):14–23. (In Russ.).
12. Oken MM, Creech RH, Tormey DC, et al. Toxicity and response criteria of the Eastern Cooperative Oncology Group. *Am J Clin Oncol*. 1982;5(6):649–55.
13. Haliloglu N, Gulpinar B, Ozkavukcu E, et al. Typical MR imaging findings of perianal infections in patients with hematologic malignancies. *Eur J Radiol*. 2017 Aug;93:284–288. doi: [10.1016/j.ejrad.2017.05.046](https://doi.org/10.1016/j.ejrad.2017.05.046) Epub 2017 Jun 3
14. Plumb AA, Halligan S, Bhatnagar G, Taylor SA. Perianal Sepsis in Hematologic Malignancy: MR Imaging Appearances and Distinction from Cryptoglandular Infection in Immunocompetent Patients. *Radiology*. 2015 Jul;276(1):147–55. doi: [10.1148/radiol.15141662](https://doi.org/10.1148/radiol.15141662) Epub 2015 Mar 10. PMID: 25759970
15. Marks G, Chase WV, Mervine T.B. The fatal potential of fistula-in-ano with abscess: analysis of 11 deaths. *Dis Colon Rectum*. 1973;16:224–30.
16. Vogel JD, Johnson EK, Morris AM, et al. Clinical Practice Guideline for the Management of Anorectal Abscess, Fistula-in-Ano, and Rectovaginal Fistula. *Dis Colon Rectum*. 2016 ;59(12):1117–1133. PMID: 27824697
17. Mudrov A.A., Omarova M.M., Fomenko O.Y., et al. Surgical treatment of rectovaginal fistula with vaginal rectangular flap. *Pirogov Russian Journal of Surgery = Khirurgiya. Zurnalim. N.I. Pirogova*. 2021;07:5–11. (In Russ.). doi: [10.17116/hirurg-ia20210715](https://doi.org/10.17116/hirurg-ia20210715)
18. Shalaby M, Emile S, Elfeki H, et al. Systematic review of endoluminal vacuum-assisted therapy as salvage treatment for rectal anastomotic leakage. *BJS Open*. 2018 Dec 26;3(2):153–160. doi: [10.1002/bjs5.50124](https://doi.org/10.1002/bjs5.50124) PMID: 30957061; PMCID: PMC6433422.
19. Newton K, Pearce L, Briggs M, et al. Postoperative Packing of Perianal Abscess Cavities (PPAC2): randomized clinical trial. *Br J Surg*. 2022 Sep 9;109(10):951–957. doi: [10.1093/bjs/znac225](https://doi.org/10.1093/bjs/znac225) PMID: 35929816; PMCID: PMC10364677.
20. Schniewind B, Schafmayer C, Von Schönfels W, et al. Treatment of Complicated Anal Fistula by an Endofistular Polyurethane-Sponge Vacuum Therapy: A Pilot Study. *Dis Colon Rectum*. 2018 Dec;61(12):1435–1441. doi: [10.1097/DCR.0000000000001233](https://doi.org/10.1097/DCR.0000000000001233) PMID: 30399049.
21. Hermann J, Banasiewicz T, Kołodziejczak B. Role of Assisted Closure in the Management of Crohn Anal Fistulas. *Adv Skin Wound Care*. 2019 Jan;32(1):35–40. doi: [10.1097/01.ASW.0000547411.16017.58](https://doi.org/10.1097/01.ASW.0000547411.16017.58) PMID: 30540570.
22. Banasiewicz T, Hermann J, Krokowicz L, et al. “Sandwich technique” with bridging, a modification of negative pressure wound therapy for anal fistulas. *Tech Coloproctol*. 2015 Mar;19(3):173–5. doi: [10.1007/s10151-014-1247-4](https://doi.org/10.1007/s10151-014-1247-4) Epub 2014 Nov 18. PMID: 25403770.