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The Nature Of Surgical Interventions And Analysis Of The Causes Of Unsatisfactory Results Of Treatment Of Deep Paraproctitis In Patients With Diabetes Mellitus

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Abstract: In this scientific article the authors analyse the nature of surgical interventions and reasons of unsatisfactory results of treatment of deep paraproctitis in patients with diabetes mellitus depending on the forms of anatomical localizations. The volume of surgical interventions for deep paraproctitis in patients with diabetes mellitus, as well as the dynamics of septic manifestations in the postoperative period and the frequency of registration of risk factors for clinical outcomes are analysed. In general, the study of risk factors of unfavourable outcomes of traditional treatment indicates multifactorial and combined nature of unfavourable manifestations of the disease, which makes it necessary to adjust the tactics of therapy with emphasis on early diagnosis, aggressive surgical sanation and prevention of superinfection.

Keywords: Deep paraproctitis, diabetes mellitus, surgery, complication, outcome.

Introduction: Surgical treatment of deep paraproctitis, especially in patients with diabetes mellitus (DM), is a complex clinical problem requiring an individual approach. The main method remains the opening of the purulent centre with subsequent drainage, but in case of extensive forms, widespread congestion and the presence of necrosis, the standard scope of intervention is insufficient. In such patients the frequency of repeated operations reaches 40-60%, and lethality - up to 25%, especially in the conditions of late

diagnosis [4, 10].

One of the most important problems in the choice of surgical tactics in paraproctitis, especially deep paraproctitis, is the underestimation of the true depth of the inflammatory lesion and the volume of its spread. As emphasised by V.F. Kulikov et al. [2], in the absence of pronounced clinical symptoms, the surgeon may limit himself to superficial opening of the abscess, not suspecting the presence of leaks passing above the level of muscle levators or spreading into interfascial spaces. As a result, uninflamed purulent cavities persist, leading to the formation of recurrent abscesses, the transition of the process into a chronic form and a significant reduction in the effectiveness of primary treatment.

The risk of such unfavourable outcomes is also confirmed by foreign observations. Thus, in the study of M.A.J. Van den Broek et al. [11] showed that recurrences of perinatal abscesses are significantly more likely to develop in patients with insufficient primary surgical sanitation, especially in the presence of background pathology, such as DM, immunodeficiency states and repeated interventions in the history. The authors emphasise that adequate primary revision of all possible pathways of pus dissemination, even in the presence of seemingly limited inflammation, is a key factor in the prevention of recurrence.

A retrospective analysis conducted by V.K. Shukla et al. [9], also showed that the frequency of reoperations after primary opening of perineal and paraproctal abscesses reaches 20-30% with insufficient assessment of the process spread. This is especially often observed in decompensated DM, when against the background of multiple organ dysfunction syndrome (MODS) and anaerobic superinfection, inflammation rapidly progresses deep into the tissues, including along the course of neurovascular bundles and intermuscular spaces, which requires a more radical approach with the use of intraoperative ultrasound or magnetic resonance imaging (MRI) navigation if a deep lesion is suspected.

An equally significant factor in the failure of conventional treatment is the late application of an unloading colostomy. In severe forms of deep paraproctitis, constant contamination of the wound with intestinal contents promotes secondary infection, transition of serous inflammation to purulent inflammation and formation of putrefactive focus. Despite the presence of uncertain indications for colostomy (widespread necrotizing fasciitis (NF), Fournier's gangrene, superinfection), its prophylactic use remains rare, which reduces the effectiveness of sanitation [3, 6, 8].

Of particular clinical importance is the high frequency of postoperative septic complications in patients with deep forms of paraproctitis occurring on the background of DM. According to Russian clinicians [5], in such patients already in the first 72 hours after the operation it is possible to develop a systemic inflammatory response syndrome (SIRS), rapidly transforming into sepsis or septic shock, especially at decompensated course of DM (glycated hemoglobin HbA1c> 9%). The main pathophysiological mechanisms are considered to be high microbial contamination of the focus (>10^6 CFU/ml), impaired neutrophil response and delayed elimination of bacterial toxins due to severe tissue hypoxia and microangiopathy.

The guidelines of the American Surgical Infection Society (Surgical Infection Society) presented in the updated recommendations of J.E. Mazuski et al. Mazuski et al. [7], emphasises that patients with DM are at high risk for the development of infectious complications of soft tissues and cavities. The authors recommend not only early diagnosis and broad-spectrum antibiotic therapy, but also dynamic assessment of organ dysfunction using scales (sequential organ failure assessment (SOFA), quick sequential organ failure assessment (qSOFA)), especially in the presence of purulent processes in the anorectal zone associated with a high bacterial load.

Despite intensive therapy, the mortality rate in RRP form of paraproctitis in patients with decompensated DM remains high, reaching 25-30% in cases complicated by MODS.

Taking into account the above described risks, the scales for assessment of the severity of the condition, allowing to predict the course of the disease and to choose the volume of intervention reasonably, are becoming more and more important. However, generally accepted scales (SOFA, SIRS) do not always demonstrate high sensitivity in patients with DM due to impaired inflammatory response. This necessitates the development of specialised risk stratification algorithms that take into account microbiological, metabolic and anatomical parameters specifically in this category of patients [1, 12].

Thus, the traditional tactics of surgical treatment of deep paraproctitis in patients with DM is accompanied by a high level of inefficiency with late intervention, limited volume of sanation and absence of colostomy. New approaches based on severity prediction, early application of imaging and complex antiseptic surgery are needed.

The aim of the study was: to analyse the nature of surgical interventions and to identify the main reasons

for unsatisfactory results of traditional methods of treatment of deep paraproctitis in patients with diabetes mellitus.

METHODS

The work is based on the analysis of treatment results in 48 patients with deep forms of paraproctitis on the background of DM, who were treated and examined in proctology and purulent surgery departments Andijan Regional Multidisciplinary Clinic and Namangan City Hospital in the period from 2014 to 2024. All patients were operated on emergency indications and received complex therapy.

The methodological basis of the present study was based on a comprehensive clinical, laboratory and instrumental assessment of patients with deep forms of paraproctitis on the background of DM.

All patients underwent a standardised clinical examination with assessment of complaints, anamnesis, physical status. We performed: thermometry (2 times a day); assessment of consciousness, heart rate (HR), blood pressure (BP), respiratory rate; visual and palpatory assessment of perineum and pararectal tissues; palpebral rectal examination and anoscopy/rectoromanoscopy (as indicated).

Instrumental methods included: ultrasound of soft tissues of the perineum, pararectal space, pelvis (Mindray DC-60 apparatus, China); computed tomography (CT) of the pelvic organs with contrast when indicated (Toshiba Alexion apparatus, Japan); MRI - in case of complex forms or diagnostic difficulties (Siemens Magnetom Essenza apparatus, Germany).

RESULTS AND DISCUSSION

The analysis of surgical interventions in patients with deep paraproctitis on the background of DM showed that in all 48 patients opening and drainage of purulent foci was only the first step of surgical intervention (Table 1).

Table 1

Nature and volume of surgical interventions in deep paraproctitis in patients with diabetes mellitus

OBJECTIVE	FORMS OF PARAPROCTITIS		
	(IRP) (n=17)	PRP (n=19)	RRP (n=12)
Extended necrectomy, n (%)	8 (47,1 %)	14 (73,7 %)	12 (100,0 %)
Repeated surgical debridement of purulent focus (SDPF) , n (%)	5 (29,4 %)	11 (57,9 %)	10 (83,3 %)
Interval between SDPF (day)	4,5 ± 1,1	3,9 ± 0,9	3,2 ± 0,8
Frequency of Necrotizing fasciitis, n (%)	5 (29,4 %)	7 (36,8 %)	9 (75,0 %)
Lesion area (cm²)	72 ± 18	118 ± 25	156 ± 32
Lesion ≥3 areas, n (%)	4 (23,5 %)	6 (31,6 %)	9 (75,0 %)

Retrorectal (RRP) and pelviorectal (PRP) types of paraproctitis were not cured by standard intervention; in 100.0% and 73.7% of cases, respectively, necrectomy had to be performed, while even in ischiorectal (IRP) forms additional measures were required in almost half of patients (47.1%).

A clear indicator of the severity of the process was reoperation: it was performed in 83.3% of patients with RRP forms, in 57.9% of patients with PRP forms and in 29.4% of patients with IRP forms; the average number of necrectomies per patient ranged from 2.3 in IRP forms to 4.0 in RRP forms; the intervals between operations were 3.2-4.5 days. These data correspond to the progressive character of purulent-necrotic process, especially among patients with decompensated DM.

The incidence of NF during surgery was 43.8% (most often noted in RRP forms - 75%) with skin discoloration, subfascial gas bubbles, odour and tissue dissociation. It was also found that the infection spread to three anatomical zones (thigh, groin, buttock and lumbar) in 39.6% of patients. The mean lesion size was 156±32 cm² in RRP forms, which explains the tendency to perform repeated interventions over time, the prolonged open wound stay and the high probability of postoperative superinfection.

Already on the first postoperative day, only eight out of 48 patients (16.7 %) had a disease course without complications and signs of systemic inflammation (Table 2).

Table 2

Dynamics of septic manifestations in patients with deep paraproctitis in the postoperative period

SEPTIC MANIFESTATIONS	DYNAMICS OF THE POSTOPERATIVE PERIOD			
	1 day	3 day	7 day	14 day
Without signs of sepsis	8 (16,7 %)	10 (22,7 %)	15 (39,5 %)	24 (66,7 %)
Sepsis	28 (58,3 %)	26 (59,1 %)	17 (44,7 %)	8 (22,2 %)
Severe sepsis	10 (20,8 %)	8 (18,2 %)	5 (13,2 %)	2 (5,6 %)
Septic shock	2 (4,2 %)	4 (9,1 %)	2 (5,3 %)	0
MODS	0	2 (4,5 %)	4 (10,5 %)	2 (5,6 %)
Lethality	0	4 (8,3 %)	10 (20,8 %)	12 (25,0 %)

The majority (58.3%) of patients were diagnosed with sepsis (SIRS + infection) and an additional 10 (20.8%) had clinical signs of severe sepsis. Two (4.2%) patients were noted to develop septic shock, which required vasopressor support at this stage.

On day 3, some patients showed clinical signs of deterioration: 59.1% of the remaining patients were diagnosed with sepsis, 18.2% with severe sepsis, and 9.1% with septic shock. Hypotension, anuria and respiratory failure were observed in 2 patients (4.5%) with MODS.

By this time, 4 (8.3%) patients had died; all had proven NF and multiple lesions.

By day 7, the percentage of stabilised patients was slightly higher: 15 (39.5 %) patients were free of sepsis, but 44.7 % still had signs of sepsis, 13.2 % had severe sepsis, and 10.5 % had MODS (often with a history of septic shock). A further 6 patients had died by that time (a total of 10, or 20.8 %).

In most cases a "transient form" of the disease, clinically defined as "sepsis establishing with development/progression of MODS ", was detected, in which the lethal outcome was preceded by normalisation of temperature and improvement of the patient's general condition, despite laboratory signs of hypoperfusion, metabolic acidosis and leukopenia.

On day 14, most of the remaining patients had no confirmed signs of sepsis: 24 (66.7%) had no confirmed signs of sepsis, but in 22.2% clinical signs of disease persisted, and 5.6% were compensated for severe sepsis or MODS. A further 2 patients died by day 14, increasing the overall mortality in the group to 12 (25.0 %).

The study of indicators related to dissatisfaction with the course and outcome of therapy in patients in cases of deep paraproctitis in patients with DM allowed us to identify the leading causes of progression of infection, development of complications and mortality (Table 3).

Table 3

Distribution of frequency of risk factors registration on clinical outcomes in patients with deep paraproctitis

FACTOR	Without sepsis (n=24)	Sepsis (n=12)	Deceased (n=12)
Late diagnosis (>5 days)	5 (20,8 %)	7 (58,3 %)	10 (83,3 %)
Lesion area >100 cm²	4 (16,7 %)	7 (58,3 %)	11 (91,7 %)
Spread ≥3 anatomical areas	3 (12,5 %)	6 (50,0 %)	10 (83,3 %)

Confirmed NF (intraoperatively)	2 (8,3 %)	5 (41,7 %)	9 (75,0 %)
Need for ≥2 repeat necrectomies	3 (12,5 %)	6 (50,0 %)	10 (83,3 %)
Microbial contamination >10^6 CFU/ml	6 (25,0 %)	9 (75,0 %)	12 (100,0 %)
Wound putrefaction / signs of superinfection	2 (8,3 %)	6 (50,0 %)	10 (83,3 %)
≥2 signs of sepsis + organ dysfunction	1 (4,2 %)	7 (58,3 %)	11 (91,7 %)
HbA1c > 9.0 %	5 (20,8 %)	8 (66,7 %)	11 (91,7 %)

Late diagnosis of the disease (5 days or more) was more frequent in patients with a severe course of the disease: among those who did not show signs of sepsis by day 14, it was registered in 20.8% of cases (5 out of 24); among patients with clinically significant sepsis, the frequency of late diagnosis increased to 58.3% (7 out of 12). The finding of late diagnosis was most significant in those who died (83.3%, 10 of 12 patients), emphasising its significant impact on prognosis and the need for early active diagnosis.

A lesion area of more than 100 cm^2 was particularly considered when deciding on the extent of surgical intervention and the incidence of secondary infection. In the group without signs of sepsis, large lesion area was detected in 16.7% of cases (4 patients), but in the group with signs of sepsis this proportion increased to 58.3% (7 patients), and there were few survivors without significant wound defects (91.7%), indicating the association of large lesion area with unfavourable outcome.

The inflammation index for three or more anatomical sites showed a similar trend. Thus, in patients without sepsis, the index was 12.5% (3 patients); in cases of sepsis, 50% (6 patients); and among those who died, 83.3% (10 patients). This means that multiple foci of necrotised tissues significantly complicate adequate surgical intervention and contribute to the spread of the infectious process.

The presence of NF was also a powerful unfavourable prognostic factor. In the absence of sepsis, the detection rate was low (8.3%); but in the presence of sepsis, it increased to 41.7%; and among those who died, it was 75%. Thus, NF is a strong predictor of survival and should lead to more active and intensive therapy.

An important determinant was the indication for repeat surgery (more than two necrectomies). In patients with an uncomplicated (without sepsis) course of the disease, the need for reoperation was characteristic of 12.5%; in the groups with sepsis and deceased, there was a sharp increase in this rate to 50% and 83.3%, respectively.

This is an example of the failure of the conventional surgical strategy in severe disease course, requiring a multistage approach including bowel exclusion in the first stage.

High microbial wound contamination (> 10^6 CFU/ml) appeared to be a common predictor (100% died, 75% septic, much less frequently non-septic 25%). The importance of this symptom depends on its direct association with suppurative and obstructive complications and MODS.

The factor of putrefactive nature of the wound (signs of superinfection) is another factor to be emphasised, due to the constant contamination of the surgical wound with intestinal contents. This sign was weak in the group without sepsis (8.3%), frequent in sepsis (50%) and mostly in fatal cases (83.3%), indicating a relatively greater influence of superinfection on the unfavourable outcome.

Of interest was the presence of two or more signs of sepsis together with organ dysfunction (respiratory failure, acute renal failure, encephalopathy). The latter showed the greatest prognostic significance: among the group without sepsis it was present in 4.2% of cases; in sepsis - in 58.3% of cases; among the deceased patients - in 91.7%. This confirms the need for timely recognition of organ dysfunction and improvement of intensive treatment of patients with DM.

Finally, glycated haemoglobin level (HbA1c> 9.0%), which is an indicator to assess the degree of metabolic decompensation, showed a strong association with adverse outcome: minimal (20.8%) in patients without sepsis; moderate (66.7%) in patients with sepsis; and maximal (91.7%) in those who died.

In general, the study of risk factors of unfavourable outcomes of traditional treatment in patients with deep paraproctitis indicated multifactorial and combined nature of unfavourable manifestations of the disease, which makes it necessary to adjust the tactics of therapy with emphasis on early diagnosis, aggressive surgical sanation and prevention of superinfection.

Mechanism of treatment optimisation with emphasis on early diagnosis, surgical wound care and prevention of secondary infection.

The analysis of the results of traditional surgical treatment of deep paraproctitis in patients with DM showed that these methods have significant limitations and are accompanied by a high level of unsatisfactory outcomes. Despite the primary opening and drainage of purulent foci, more than half of patients (54.1%) needed repeated surgical interventions, and the average number of necrectomies reached 2-4 procedures per patient depending on the localisation of the process.

Intraoperative findings were of particular importance: in 43.8 % of cases NF was confirmed, characterised by rapid progression of inflammation and absence of biogenic capsule. The average lesion area in RRP forms was 156±32 cm², which was accompanied by a high risk of superinfection due to constant contamination of surgical wounds with intestinal contents, formation of putrefactive course and prolongation of healing time.

The postoperative period was characterised by high frequency of systemic complications: on the 7th day septic conditions of different severity were diagnosed in 60.5% of patients, MODS - in 10.5%, and the total mortality was 25.0% (12 out of 48 patients), reaching the maximum on the 3rd-7th day after the operation. The main risk factors for unfavourable outcomes of conventional treatment were late diagnosis (>5 days), spread of infection to three or more anatomical zones, high microbial contamination of the wound (>106CFU/ml), presence of signs of superinfection and putrefactive course of the wound, as well as marked metabolic decompensation (HbA1c >9.0%) and organ dysfunction.

The obtained results testify to the necessity of revision and optimisation of surgical tactics, namely - introduction of therapeutic and diagnostic algorithm including early diagnosis of complicated forms of paraproctitis, pathogenetically grounded surgical intervention with prophylactic bowel disconnection and active monitoring of metabolic and microbiological parameters.

CONCLUSIONS

1. It was found that ultrasound and rectoromanoscopy have limited informativeness in pelvio- and RRP forms, while the use of CT and MRI provides high sensitivity (up to 93-94%) in clarifying the localisation and prevalence of the purulent process. According to the results of primary microbiological sowing the predominance of facultative and obligate anaerobic flora including Escherichia coli, Klebsiella pneumoniae, Bacteroides fragilis, Peptostreptococcus spp. with high frequency of polymicrobial associations (56,3 %) and contamination level exceeding 10^7 CFU/ml in RRP forms was established.

2.Traditional methods of treatment of deep paraproctitis in patients with DM are accompanied by high level of unsatisfactory outcomes: frequency of repeated operations up to 54,1%, development of septic conditions (60,5%) and mortality in 25% of cases. The main reasons for unfavourable results were late diagnosis of the disease (83.3% among the deceased), spread of inflammation to several anatomical zones (83.3%), high microbial contamination of the wound (> 10(6) CFU/mL).106CFU/ml - 100%), intraoperatively confirmed NF (75%), superinfection of the wound with intestinal contents (83.3%), as well as marked decompensation of DM (HbA1c>9.0% in 91.7% of cases).

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