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Peculiarities of Early Clinical Diagnostics of Patients With Purulent-Necrotic Diseases of Soft Tissues Against the Background of Diabetes Mellitus

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Summary. The analysis of 291 cases of treatment of purulent-necrotic lesions of soft tissues has been carried out, when generalization of the process with the development of sepsis is noted in patients against the background of treatment. Patients in whom surgical infection developed against the background of diabetes mellitus are prone to it. The main reason is late diagnosis. The paper shows the main clinical signs that should be focused on in the diagnosis and treatment of patients with this pathology. This will allow to reduce the rates of late diagnostics and accordingly to improve the quality of treatment due to timely and adequate surgical treatment.

Key words: surgical soft tissue infection, diabetes mellitus, diagnosis.

Relevance. Purulent-necrotic surgical diseases of soft tissues are leading in the structure of primary treatment of patients in outpatient-polyclinic care, reaching 70% [1,2,4]. The structure of purulent-necrotic diseases of soft tissues is characterized by great diversity, many of them belong to the category of relatively easily diagnosed and in the vast majority are cured in outpatient clinics [5]. However, along with this, the development of surgical infection against the background of diabetes mellitus, when necrotic changes predominate, the clinical course is accompanied by special severity, atypicality and high lethality, reaching 76% [6,7].

Interest and constant attention to this problem are also explained by the increasing number of patients with diabetes mellitus. To date, this pathology is the most common endocrine disease in the world, which affects 4-5% of the world population [8,9,10].

Against this background, there is an increase in the number of patients with generalized forms of purulent necrotic soft tissue infection, in which the clinic of various forms of sepsis is registered in 62.5-77.6% of cases, with the share of severe sepsis ranging from 2% to 18%. The mortality rate in this pathology remains at a high level, ranging from 19% to 70%, and, according to modern data, sepsis is on the 11th place in the structure of total mortality [11, 12, 13, 15, 16].

In 1991 in Chicago at the International Conciliation Conference, the pathophysiological basis of sepsis was revised and a classification of septic conditions was adopted, which included: bacteremia, systemic inflammatory response syndrome, sepsis, severe sepsis, septic shock [17, 18, 20].

Despite the many proposed methods of diagnosis and treatment, the question of the timing and extent of surgical intervention in generalized forms of infection is still controversial. Generalization is a consequence of late diagnosis and adequate treatment measures. Late diagnosis of the disease, underestimation of the severity of the patient's condition leads to the appearance of advanced forms of purulent-necrotic processes, when septic shock develops [14,15,16,19]. Consequently, the key to successful treatment of this category of patients remains the timely analysis of anamnestic data and clinical symptoms.

The aim of the study was to analyze the diagnostic values of clinical signs of purulent-necrotic process of soft tissues against the background of diabetes mellitus, depending on the level of their lesion.

Material and methods of research. The results of treatment of 291 patients with purulent-necrotic processes of soft tissues undergoing inpatient treatment in the department of purulent surgery and surgical complications of diabetes mellitus of the TMA multidisciplinary clinic for the period from 2022 to 2023 are analyzed. Pathological processes characterized by frequent development of complicated course were taken from nosological forms (Diagram No.1).

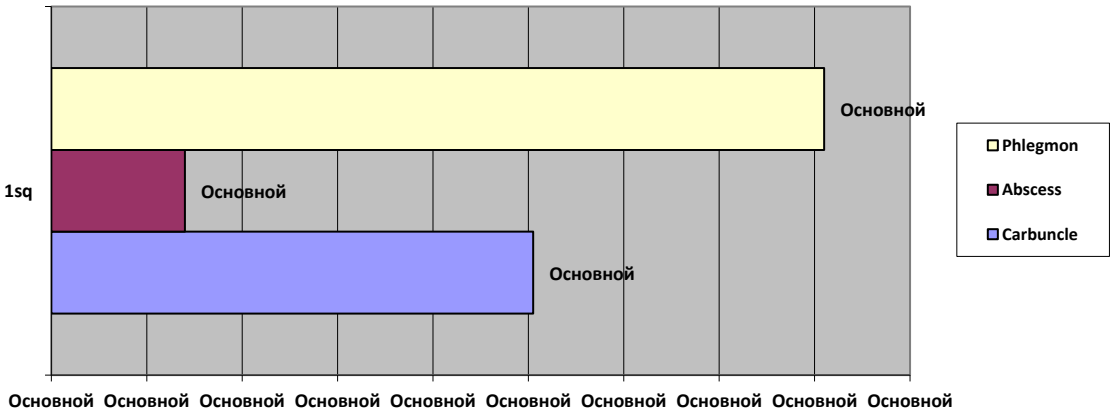

Diagram No. 1. Distribution of patients by nosology.

As can be seen from the presented diagram, the most frequent were phlegmons of different localization, which were revealed in 162 patients, making 55,7%, in the second place were carbuncles of different localization, noted in 101 patients (34,7%) and in 28 cases abscesses were diagnosed, making 9,6%. In most cases they were a complication of uncomplicated surgical infections of soft tissues, such as furuncle, hidradenitis, and swelling.

Results and their discussion. To unify the approach in the treatment of patients with purulent-necrotic lesions of soft tissues, the classification of Ahrenholz D. H. (17), according to the level of soft tissue lesions. This classification is convenient in practical application, as it makes it possible to specify the diagnosis of the lesion, the volume of surgery and therapeutic manipulations. According to this classification, patients were divided according to the level of soft tissue lesions (Diagram No. 2).

The results of the study showed that in patients with diabetes mellitus the infection most often develops at the II and III levels, so in 124 patients (42.6%) the process was limited within the subcutaneous fatty tissue, in 139 patients (47.8%) there was a lesion of superficial fascia and in 28 patients (9.6%) the process was localized in the thickness of muscles.

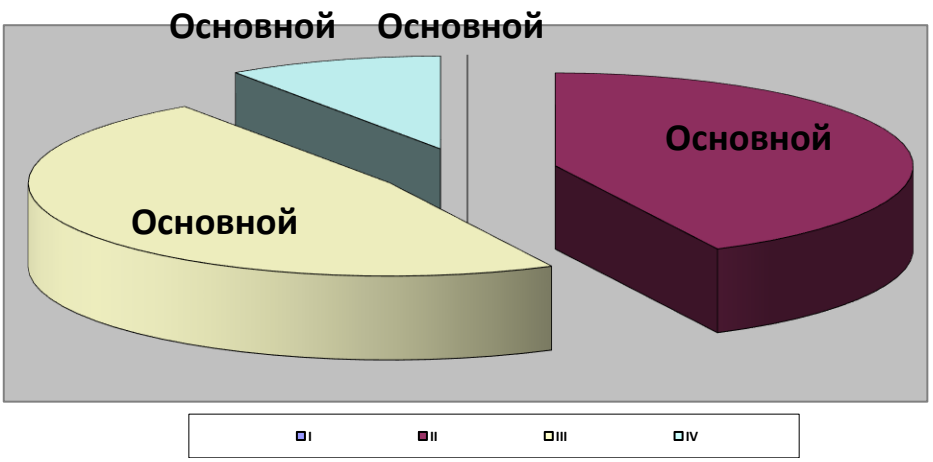

Diagram No. 2. Distribution of patients by the level of soft tissue lesions.

It would be desirable to note that the development of purulent-necrotic process in 27% of cases was isolated, with the lesion of one anatomical structure, most often, in 212 patients, in 73% of cases there was a combined lesion, at that the lesion had a widespread character, with the predominant development of necrotic changes, which was revealed in 87% of patients.

The study of pathological process localization showed their variability. Thus, the most frequent purulent-necrotic process was localized in several anatomical structures, detected in 43 patients, which was 14.8%. The same number of lesions was revealed in purulent-necrotic lesions of the chest area. Pathologic processes in the head region were detected in 42 patients. On the next place by frequency of occurrence were purulent-necrotic lesions of perineum and thigh, which were revealed in 30 and 31 patients, respectively. Quite often the process was localized in the buttocks area and in the upper and lower extremity, so in 30 patients (10,4%) the purulent-necrotic process was located in one of the buttock areas, in the lower leg area the process was detected in 25 patients (8,6%), purulent-necrotic diseases of the upper extremity were in 21 patients (7,2%). Less often the process was localized in the neck (3.4%) and lumbar region (1.7%).

The analysis of the severity of clinical signs in patients with purulent-necrotic lesions of soft tissues on the background of diabetes mellitus has shown that not all classical signs of inflammation are clearly manifested.

Table No. 1. Distribution of patients by localization of purulent-necrotic process.

Localization	**Quantity**	**(%)**
Head	42	14,4
Neck	10	3,4
Thigh	31	10,7
Tibia	25	8,6
Upper extremity	21	7,2
Abdominal wall	17	5,8
Chest cavity	43	14,8
Lumbar region	5	1,7
Gluteal region	24	8,2
Perineum and scrotum	30	10,4
Multiple anatomical structures are affected	43	14,8
Total	**291**	**100**

Thus, pain syndrome was detected in all cases in patients with level II lesions. At the III level of lesion pain was noted in 89 patients, and at the IV level of lesion it was expressed in 24.8% of 28 patients. In the remaining 66 patients only moderate pain was noted (Table No. 2).

Table No. 2. Distribution of patients of the group at admission by severity of clinical signs.

Symptoms	**Number of observations (%)**		
	II n=124 (42,6%)	III n=139 (47,8%)	IV n=28 (9,6%)
Pain	124 (100%)	89(64%)	12(42,8%)

Sickness		50(35,9%)	16(57,1%)
Edema	124(100%)	139(100%)	28(100%)
Hyperemia	103(83,1%)	74(53,2%)	11(39,3%)
Ischemic centers		21(15,1%)	
Necrotic patches		63(45,3%)	2(7,1%)
Bulls		27(19,4%)	
Crepitation		8(5,7%)	
“Lemon peel”	104(83,8%)	113(81,3%)	7(25,0%)
Dysfunction	124(100%)	135(97,1%)	24(85,7%)
Body temperature			
<36,0			
36,0-37,0	109(87,9%)	92(66,2%)	-
37,1-38,0	8(6,5%)	39(28,1%)	24(85,7%)
38,1-39,1	7(5,6%)	8(5,7%)	4(14,3%)
> 39,2	-		
Pulse			
≥ 90 beats per minute	124(100%)	139(100%)	28 (100%)
≤ 90 beats per minute			
Respiratory rate			
Up to 20 times a minute	35(28,2%)		
Over 20 times a minute.	89(71,8%)	139(100%)	28(100%)

The classic sign of purulent-necrotic process of soft tissues against the background of diabetes mellitus is edema, which was detected in 100% of patients. Even such a clinical sign as hyperemia was detected in 103 patients with II level of lesion, which was 83.1%. This clinical sign in patients with level III lesions was detected in 53.2% of cases, among 74 patients and only in 11 cases in 39.3% of patients with level IV soft tissue lesions. Other clinical signs such as necrotic spots, bullae, crepitation, “lemon peel” were the most pronounced in patients with III level of lesion, 45,3% had necrotic spots, 15,1% had ischemic foci, 19,4% had bullae, 5,7% had crepitation and 81,3% had “lemon peel”, which was determined not only by the depth of the lesion but also by the area of the affected zone.

It would seem that with a pronounced purulent-necrotic process there should be a corresponding temperature reaction, but this clinical sign was not detected in all patients. Subfebrile temperature was mainly observed in 109 patients (87,9%) of level II and 92 patients (66,2%) of level III. Fluctuations of the temperature curve within 37.1-38.00C were noted in 8 patients of level II, which amounted to 6.5%, in 39 (28.1%) of level III and in 24 patients of level IV lesions, which amounted to 85.7%. Less frequently in patients the temperature response was higher than 38.00C.

To summarize, retrospectively, according to the available extracts from the medical records of medical institutions where the patients underwent primary surgical intervention, we analyzed the nature and number of surgical interventions performed (Table 3).

All patients underwent surgical intervention, with the highest number of 81.1% of patients who underwent reoperation (236 patients).

Table No. 3. Nature and number of performed operations in patients of the control group before admission to the hospital.

Name of operation	Number of operations

	1	2	3	more than 3
Opening a pustule	21(7,2%)	149(51,2%)	3(1,0%)	1(0,35%)
Autopsy and drainage	13(4,5%)	31(10,6%)	7(2,4%)	
Autopsy and necrectomy		27(9,3%)	4(1,4%)	
Necrectomy		29(10,0%)	5(1,7%)	1(0,35%)
Staged necrectomies				
Extensive necrectomy				
Total	34(11,7%)	236(81,1%)	19(6,5%)	2(0,7%)

In terms of their nature, they were dissection of pustules, which were performed in 149 patients, accounting for 51.2%, and in 10.6% of cases they were dissection and drainage, which were performed in 31 patients. Less frequently, in 9.3% of cases, there were autopsies with necrectomy performed in 27 patients, with isolated necrectomy performed in 29 patients, which was 10.0%.

The second place was occupied by patients who underwent a single surgical intervention - opening of the abscess in 21 (7.2%) and opening of the abscess with drainage in 13 patients (4.5%). In 6.5% of cases, three surgeries were performed in 19 patients and more than three surgical interventions in 2 patients. The patients underwent small incisions aimed at emptying the abscess, which led to the persistence and progression of the pathologic process. Patients did not undergo extensive and stage necrectomies.

Thus, from the analysis we can conclude that the purulent-necrotic process developed against the background of diabetes mellitus runs atypically, when the pathological changes occurring do not correspond to the clinical picture developing in soft tissues. The classic sign of the beginning of the process is edema, detected in 100% of patients, the next in frequency of occurrence is pain, which is most pronounced in patients with II and III level of lesions, detected in 100% and 64% of patients, respectively. At IV level of lesion this symptom was detected in 42,8% of patients. Hyperemia is most manifested in level II, which was detected in 83,1%, among patients of level III it was manifested in 53,2% and in 39,3% of patients of level IV. Characteristic signs also include “lemon peel”, which is most manifested at level II and III of the lesion, detected in 83.8% and 81.3% of patients, respectively.

Conclusions:

1.For early diagnosis of purulent-necrotic lesions of soft tissues in patients with diabetes mellitus, special attention should be paid to such clinical signs as pain, swelling, hyperemia, “lemon peel” and impaired function;

2.Accession of other clinical signs indicates the beginning of the process progression and ineffectiveness of treatment;

3.Purulent-necrotic process tends to develop in the so-called “favorite” places, where the hair cover is expressed and there is no possibility of visual control of its integrity, with the implementation of sanitary-hygienic measures;

4.Most often several anatomical structures are affected, with the predominance of necrotic processes;

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