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Local Immunocorrection of Surgical Soft Tissue Infection in Patients with Diabetes Mellitus

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ABSTRACT

Background. Due to the decrease in the effectiveness of antibiotic therapy, the widespread use of multiantibioticresistant strains of infectious diseases in surgery and the possibility of their epidemic spread an increase in the number of postoperative complications, an increase in the number of immunocompromised persons (drug addicts, patients with chronic alcoholism and diabetes mellitus) - the problem of treating surgical infectious diseases remains extremely relevant. The study of local immunity is currently receiving a lot of attention.

Material and methods. The results of a comprehensive examination and treatment of 73 patients with surgical soft tissue infection in the department of surgical infection are analyzed. All patients had complaints, anamnesis, a general and local manifestation of the infectious process, the severity of the patient's condition and the presence of systemic inflammatory reaction syndrome were assessed, a comprehensive laboratory examination, a general blood and urine test, a biochemical blood test, and a coagulogram were performed.

Results. The study of the functions of phagocytes with a focus on inflammation (wound) using the autostrain of bacteria - the causative agent of the disease as an object of phagocytosis adequately reflects the level of local cellular anti-infective protection in patients with acute purulent diseases of soft tissues. In patients with acute purulent diseases of soft tissues in the acute period, violations of the effector functions of poly- and mononuclear phagocytes of peripheral blood and the focus of inflammation (depression or dysfunction) are detected. To a greater extent, expressed in patients against the background of concomitant diabetes mellitus. After drainage of the purulent focus against the background of traditional treatment, this imbalance persists for 13-14 days, which correlates with impaired wound healing.

Conclusion. Local application of the supernatant of activated autologous neutrophils eliminates the existing imbalance of effector functions of phagocytes of both the focus of inflammation and peripheral blood in patients with purulent diseases of soft tissues, however, in patients with concomitant diabetes mellitus, the effect of only local immunocorrection on systemic immunity is insufficient. Local immunocorrection with autologous neutrophylokines helps to reduce the first phase of the wound process, reduce the level of bacterial contamination and accelerate regenerative processes in the wound in patients with acute purulent diseases of soft tissues, including against the background of concomitant diabetes mellitus.

Keywords: Surgical infection of soft tissues, immunological reaction, diabetes mellitus

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INTRODUCTION

Surgical infection of soft tissues includes an extremely heterogeneous group of diseases characterized by inflammation of the superficial skin, sebaceous glands, subcutaneous tissue, muscles, and lymph nodes, as well as postoperative and post-traumatic wound infections, and diabetic foot ulcers [1].

The prevalence of purulent diseases of the skin and soft tissues is evidenced by the fact that they occupy the first place in the structure of surgical pathology of polyclinics and hospitals [2].

The likelihood of developing a wound infection, it's clinical severity and its final outcome depends not only on the virulence of pathogens, and the vastness of the array of necrotic tissues but also on the state of anti-infectious factors in the wound. From the standpoint of modern immunology, local anti-infective resistance is provided by a complex of protective adaptive reactions and has sufficient functional autonomy [3].

Studies by a number of authors have found that patients with acute and chronic infectious diseases have a weakening of the activity of some factors of local antimicrobial resistance [4].

The main cells in the wound discharge are neutrophils and macrophages, they act as an element of the "first line" of protection of the homeostasis surveillance system. The main function of these cells is the phagocytosis of microorganisms, but at the same time, the state of cellular mechanisms of anti-infective tissue protection during wound infection remains poorly understood [5].

Currently, much attention is paid to immunostimulating therapy for purulent inflammatory diseases. However, its use at the systemic level is not always justified, while local immunocorrection is currently a promising area of immunotropic therapy [6].

Neutrophilic granulocytes in inflammation function not only as phagocytes but also as a "secretory gland", when the cell is activated, substances (cytokine complex, enzymes, peptides) are synthesized with a variety of regulatory properties, with the help of which they can affect the functions of macrophages, lymphocytes, fibroblasts, the complement system, immunoglobulins [7].

Based on the results of experimental studies on the immunotropic activity of granulocyte mediators, it was found that the use of supernatants of neutrophils activated in various ways for local therapy increases the functional activity of phagocytes, accelerates the elimination of infectious agents, and stimulates reparative processes [8].

However, the function of wound phagocytes in relation to the autostrain of the causative agent of infection in patients with acute purulent diseases of soft tissues, in particular with concomitant diabetes mellitus, remains unstudied. The question of the effect of local use of activated auto-neutrophil supernatant on the course of the wound process in this category of patients remains poorly studied.

MATERIAL AND METHODS

The results of a comprehensive examination and treatment of 73 patients with surgical soft tissue infection in the surgical infection department of the multidisciplinary clinic of the Tashkent Medical Academy for the period 2021-2022 are analyzed. In the groups presented, there were 38 (52.1%) men and 35 (47.9%) women aged 16 to 75 years. All patients were hospitalized in the hospital for emergency indications. The period from the onset of the disease to hospitalization ranged from 2 to 15 days.

All patients had localized purulent-inflammatory diseases of soft tissues: purulent wounds resulting from complications of accidental open wounds - 9 (12.4%), independent diseases (abscesses, carbuncles) - 31 (42.5%), post-injection abscesses - 12 (16.4%) and wounds festering after surgery (postoperative suppuration of wounds) - 21 (28.8%).

The main concomitant somatic pathology in our patients was coronary heart disease - 1 8 (24.7%), hypertension - 8 (11.0%), and arterial hypertension - 7 (9.6%), which was observed mainly in older age groups The study did not include patients with concomitant pathology of other organs and systems in the stage of decompensation, which can affect the course of the underlying disease and the state of the immune system.

All patients were divided into 2 groups: the first - patients with purulent diseases of soft tissues (n = 47); the second - patients with purulent diseases of soft tissues on the background of diabetes mellitus (n = 26).

Each of the groups was randomly divided into 2 subgroups - the main group and the comparison group. The groups were comparable in sex, age, nosology and severity of the disease and differed only in the method of treatment.

In the two main groups, consisting of 16 patients without diabetes (1 main group) and 14 patients with concomitant diabetes mellitus (2 main group), in the treatment, along with generally accepted methods (surgical treatment, antibiotic therapy, physiotherapy and local application of antiseptics and proteolytic enzymes), local

immunocorrection with autologous neutrophylokines was additionally used.

In two comparison groups consisting of 31 patients without diabetes (1 comparison group) and 12 patients with concomitant diabetes mellitus (2 comparison group), only conventional treatment was performed, local immunocorrection was not used.

Upon admission to the hospital, complaints were detected, anamnesis was collected, general and local manifestations of the infectious process were recorded, the severity of the patient's condition and the presence of systemic inflammatory reaction syndrome were assessed according to the classification adopted by the Conciliatory Conference of the Societies of Pulmonologists and Resuscitators of the United States from 1991. The general condition of patients upon admission to the hospital was most often assessed as satisfactory - 65 (89.1%), in 8 (10.9%) patients it was regarded as moderate.

All patients underwent a comprehensive laboratory examination, a general analysis of blood and urine, a biochemical blood test, and a coagulogram. On the basis of a general blood test, the leukocyte index of intoxication and the nuclear index of neutrophils were calculated. Patients with diabetes mellitus underwent glycemic control at least 3 times a week (on an empty stomach and after meals).

The results of the research were subjected to statistical processing using the statistical software packages STADIA 63, Statistica for Windows 6 0, Excel 97. The data were expressed in the form of the arithmetic mean and its standard error (M±m), n - the number of observations in the sample. The reliability of the differences in indicators was judged using nonparametric criteria.

RESULTS

First of all, the function of phagocytes of wound discharge in patients with purulent diseases of soft tissues in the acute period (2-3 days after surgical treatment) was studied. This was done in order to identify the contingent of patients who had the most pronounced shifts in the effector functions of phagocytes and had the most severe course of the wound process.

In the analysis of average indicators, it was revealed that in patients with concomitant diabetes mellitus, the lysosomal activity of neutrophils and macrophages of wound exudate in the acute period is lower than that of patients without diabetes ($p>0.05$).

Since the cytoplasmic granules of neutrophils and macrophages contain antimicrobial agents that act in phagolysosomes without the presence of oxygen, a decrease in their number leads to a decrease in the oxygen independent bactericidal activity of the phagocyte, which in turn can create favorable conditions for the persistence of microorganisms in the wound, the addition of a secondary bacterial infection, and the formation of a chronic course of the wound process.

When studying the functional activity of peripheral blood phagocytes in patients in the acute period of the disease, a decrease in almost all indicators of the functional activity of neutrophils and peripheral blood monocytes in patients with purulent-inflammatory soft tissue diseases in both groups was found by 1.3-1.7 times, compared with patients with non-infectious surgical pathology ($p>0.05$).

Acting as the body's first line of defence against pathogens, mononuclear phagocytes and neutrophils themselves become their targets. At the beginning of the inflammation process, phagocytes are activated, but then their functional activity is inhibited due to intoxication, which manifests itself in a decrease in the level of phagocytosis.

When comparing the functional activity of blood phagocytes of patients with non-infectious surgical pathology and phagocytes of the wound of patients with acute purulent diseases of soft tissues in the first phase of the wound process, it was found that significantly lower levels of lysosomal activity of neutrophils and macrophages of the focus of inflammation were in both groups of examined patients with acute purulent-inflammatory diseases of soft tissues, compared with this indicator of neutrophils and monocytes peripheral blood of patients operated on for surgical pathology of non-infectious genesis (conditional "norm"). The bactericidal activity of macrophages of patients with purulent-inflammatory diseases of soft tissues against the background of diabetes mellitus was also characterized by a significant decrease and there was a clear tendency to reduce the bactericidal activity of wound phagocytes in the groups of examined patients with surgical infection of soft tissues, compared with the indicators of peripheral blood (control group).

One of the most important criteria for the effectiveness of local use of autologous neutrophylokines in patients with purulent-inflammatory diseases of soft tissues is the indicators of local immunity, namely the functional activity of wound phagocytes against the autostrain of the infectious agent. All patients were examined three times: on days 2-3, days 5-6 and on days 13-14 after surgery.

The initial indicators of lysosomal activity of neutrophils and macrophages of the wound in patients without diabetes were about 50% of the "norm", by 5-6 days

during treatment there was only a slight increase. By 13-14 days in the main group, there was a clear tendency to increase the indicators, their value increased to 85% of the "norm", while in the comparison group (patients receiving traditional local treatment) the indicators of the total luminescence of lysosomes were about 55% of the "norm". Similar changes in the dynamics of treatment were noted in the group of patients with concomitant diabetes mellitus. At the same time, the lower absolute values of the indicators attracted attention.

We also studied the frequency of changes in the lysosomal activity of neutrophils and macrophages in each group. To do this, each patient was determined by the index of the shift indicator. By changing the value of the indicator by 30% more or less from the initial level, the stimulating or inhibitory effect of treatment on the studied cell function was judged, respectively.

It was found that in the main groups of patients where auto-neutrophil supernatant was used topically in treatment, the lysosomal activity of wound neutrophils in 10 out of 16 patients in the first subgroup (without diabetes) and in 12 out of 14 patients in the second subgroup (with concomitant diabetes mellitus) significantly increased by 30% or more. At the same time, the values of the indicator by 13-14 days in these patients reached or exceeded the "norm". There was no noticeable decrease in this indicator in any patient.

In the comparison groups, where patients received traditional local treatment, the lysosomal activity of neutrophils significantly increased only in 6 patients out of 31 in the first subgroup and in 3 patients out of 12 in the second subgroup. The value of this indicator was initially very low and by the 13-14 days of treatment, this indicator, although it significantly increased, did not reach the "norm". In the majority of patients in these subgroups, the indicator of lysosomal activity of neutrophils during treatment did not change significantly, and in some cases - in 1/3 of patients of the 1st subgroup and 1/4 of patients of the 2nd subgroup significantly decreased. This pattern was observed in patients with an initially high value of this indicator. Similarly, the index of lysosomal activity of wound macrophages also changed in subgroups.

The activity rate of wound neutrophil phagocytosis (the percentage of cells involved in phagocytosis) in the 1st and 2nd comparison groups remained practically unchanged during treatment. In both main groups of patients, this indicator tended to increase and reached or exceeded normal values on days 13-14. One of the main indicators of phagocyte function is the bactericidal activity of the cell (the percentage of dead microorganisms inside the phagocyte), that is, this indicator expresses the completeness of phagocytosis, in our study, as mentioned earlier, it was determined in relation to the pathogenic auto strain of the causative agent of soft tissue infection.

The bactericidal activity of neutrophils and macrophages of wound discharge in the first comparison group (without diabetes) practically did not change throughout the treatment, and in patients with diabetes mellitus by 13-14 days it even decreased, despite the general and local therapy. In both main groups, the bactericidal activity of wound phagocytes significantly increased by 13-14 days and exceeded the bactericidal activity of neutrophils and blood monocytes.

When studying the frequency of changes in the bactericidal activity of neutrophils and macrophages in each subgroup of patients according to the shift index, it was revealed that in the groups of patients where autoneutrophil supernatant was used topically for treatment for 13-14 days in 8 out of 16 patients in the first subgroup and in 11 patients out of 14 in the second subgroup, the bactericidal activity of neutrophils increased by 30% or more. In these patients, the value of the indicator was initially very low, and by 13-14 days it significantly exceeded the norm. In 37.5% in the first subgroup and in 21.4% in the second subgroup, the values of the bactericidal activity of neutrophils did not change, and only in one case out of 30 treated patients we met a decrease in this indicator after the use of a supernatant, although clinically there was a positive trend in the wound.

In the comparison groups, the bactericidal activity of neutrophils significantly increased by the end of the second week only in 6 out of 31 patients in the first subgroup and in 2 out of 12 patients in the second subgroup of patients with concomitant diabetes mellitus. In most cases, this indicator did not change against the background of traditional therapy, and in a fairly large percentage of cases in these subgroups there was a significant decrease in the bactericidal activity of neutrophils by 13-14 days: in 1/4 of patients in the first subgroup, and in more than 1/3 of cases in the second subgroup (in patients with diabetes mellitus). Similarly, the bactericidal activity of wound macrophages changed.

Thus, the local application of secretion products of autologous neutrophils containing various biologically active substances had a beneficial effect on the effector functions of phagocytes of wound discharge, stimulating their lysosomal and bactericidal activity.

On days 1-2, microorganisms were sown from the wound in 86-94% of patients, in more than half of the cases in the groups of patients, the bacterial contamination of wounds exceeded the critical microbial number and was equal to 10^6-10^7 CFU.

With the inclusion of local treatment of immunocorrection with the help of autologous neutrophylokines, the bacteriological state of the wound changed. By the end of the second week, only 18.8% of the wound had microorganisms isolated from the wound in the first main group (93% in the comparison group). In all cases, it was a monoculture of Staphylococcus aureus. In this group, not a single case of discharge of gram-negative flora from the wound was recorded, in contrast to the comparison group. In the second main group of patients, by 13-14 days, the number of patients in whom microorganisms were isolated from wound exudate during repeated bacteriological examination also significantly decreased - 42.8% (100% in the comparison group). In most cases, it was a monoculture of Staphylococcus aureus (28.6%). Only 14.2% of the wounds continued to isolate opportunistic flora (50% in the comparison group). None of the crops did not show an increase in gram-negative infectious agents. In 57.2% of cases, by the end of the second week in this group of patients, the wound was sanitized. The differences between the groups by days 13-14 are statistically significant.

In the process of conventional treatment in the comparison groups for 13-14 days, with a repeated study of the quantitative content of microorganisms in 25% of patients, the level of bacterial contamination of the wound equal to 10^5 CFU or more was registered. After immunocorrection in the first main group of patients, not a single case was registered when the bacterial contamination of the wound exceeded the critical microbial number, and in the group of patients with diabetes mellitus, a single case was registered (7.1%). The differences between the groups by days 13-14 are statistically significant.

Faster elimination of microorganisms, and the absence of a change in the pathogenic microflora of wound discharge during treatment in patients of the main groups, testified to the positive effect of local immunocorrection by autologous neutrophylokines on the microbial landscape of purulent wounds.

One of the criteria for the effectiveness of local use of autologous neutrophylokines in patients with acute purulent-inflammatory diseases of soft tissues was a change in the cellular composition of the wound discharge. In the wound, the quantitative cellular composition and the ratio of cells of the wound discharge (neutrophil/macrophage) were studied. The indicators were determined twice - 2-3 and 13-14 days after surgical treatment.

It was revealed that in patients with purulent-inflammatory diseases of soft tissues of both groups without diabetes, the number of leukocytes in 1.0 ml of wound discharge during treatment significantly decreased by 13-14 days by 1.6 times in the group of patients who received traditional local treatment and more than 3 times in the group where local immunocorrection was additionally performed.

The ratio of neutrophils/macrophages in the imprint on the glass in patients in the comparison group to 13-14 days of treatment practically did not change (16.8/1 - in the acute period, 17.2/1 - on the 13-14th day of treatment), that is, a high content of neutrophils in the wound remained. At the same time, in the main group, against the background of immunocorrection by autologous neutrophylokines, this ratio changes - the number of neutrophils decreases by almost 2 times and the content of macrophages in the wound discharge increases.

Eliminating the imbalance of the functional activity of phagocytes of wound discharge, improving the bacteriological state in the wound and changing the cellular composition of the wound, the secretory products of neutrophils also affect the indicators that characterize the course of the purulent wound process and the general condition of patients.

In patients without concomitant diabetes mellitus, the first phase of the wound process, as a rule, proceeded before the onset of local immunocorrection, therefore, there were no significant differences in clinical signs (subsidence of perifocal inflammation, appearance of granulation tissue, cessation of purulent exudation) in the groups (main and comparison). In the group of patients with concomitant diabetes mellitus, perifocal inflammation was clinically stopped at a later date and the second regenerative phase of the wound process began. The inclusion of local immunocorrection in the treatment complex in this group reduced the duration of exudative inflammation by 1.2-1.5 times.

Against the background of standard local treatment, the rate of wound healing did not differ from normal indicators and the daily decrease in the wound area averaged 4.1±0.97%. In the second group of patients with purulent soft tissue diseases against the background of concomitant diabetes mellitus, the daily decrease in the wound surface was slightly lower than normal: 2.4±0.5%. As a result of the method of local immunocorrection in both main groups, there was a significant increase in the rate of reduction of the wound defect by 1.8-1.9 times (up to 7.5±1.3% and 4.7±0.9%, respectively).

The calculated leukocyte index of intoxication in the acute period of the disease was equal to 1.51±0.86 conv. units (at a rate of 0.4-0.6). By days 13-14, it decreased in both groups, but in the comparison group, it decreased by 1.6 times, while in the main group by 3 times. The nuclear neutrophil index at admission to the hospital was 0.143±0.057 conventional units. units (at a rate of up to 0.051), by 13-14 days in the comparison group decreased by 1.5 times, and in the main group by 2.5 times, almost reaching the norm.

The average duration of inpatient treatment in the group of patients with acute purulent inflammatory diseases of soft tissues, where local immunocorrection with autologous neutrophylokines was additionally performed, decreased by an average of 4.4±2.4 days, and in patients with concomitant diabetes mellitus by 4.6±2.8 days.

The study of the function of blood phagocytes was carried out in parallel with the study of local immunity. We found an upward trend in the functions of neutrophils and peripheral blood monocytes in the first main group (receiving topically auto-neutrophil supernatant), while in the comparison group, many indicators remained reduced. This can probably be explained by a more rapid elimination of infectious agents from the wound due to an increase in the functional activity of phagocytes in the wound and a decrease in the level of endogenous intoxication.

In patients with purulent soft tissue diseases against the background of concomitant diabetes mellitus, the functional activity of blood phagocytes (especially monocytes) during treatment remained low in both groups, which apparently required the appointment of these patients and general immunoprotective therapy.

Thus, local immunocorrection with autoneutroylokins was an effective addition to the complex treatment of patients with acute purulent diseases of soft tissues, as it stimulated the inhibited effector functions of wound phagocytes or eliminated their imbalance, contributed to a more rapid elimination of microorganisms from the wound and prevented the attachment of nosocomial pathogenic microflora, thereby contributing to the full regeneration of the wound defect, reducing the level of endogenous intoxication, stabilization of the general condition, reduction of treatment time. This method is available and does not require the use of expensive drugs and equipment, eliminates the possibility of infection with vector-borne infections (HIV, hepatitis B, C, etc.), avoids the development of allergic and cytotoxic reactions observed with the use of foreign leukocytes or pharmacological drugs.

DISCUSSION

Based on the studies carried out, it was found that in patients with purulent diseases of soft tissues in the acute period there are dysfunctions of poly-, mononuclear phagocytes of peripheral blood and the focus of inflammation, manifested by depression or severe dysfunction. This indicates the inferiority of the early phase of the inflammatory response of damaged tissue, in which neutrophils and macrophages play an important role. To a greater extent, the deficiency of the phagocytic system is expressed in patients with concomitant diabetes mellitus, which leads to a decrease in tissue resistance and an increase in the body's sensitivity to opportunistic (opportunistic) microorganisms [9].

A decrease in the functional reserve of wound cells could indicate a decrease in the concentration of mediators in the wound that stimulate the activity of phagocytes, in particular pro-inflammatory cytokines [10].

In this regard, the question of the possibilities of topical application of immunocorrective therapy is undoubtedly important and relevant. Therefore, it was this category of patients that attracted our attention when studying the effectiveness of topical application of autologous neutrophilokines for the purpose of immunocorrection, since neutrophil supernatants activated in different ways (adhesion to plastic or latex) include, among other things, pro-inflammatory cytokines [11].

Wound infection is the result of the interaction (confrontation) of the microbial flora and the body's defenses [12]. In this regard, one of the objective criteria for the course of the wound process is the bacteriological state of the wound. In the acute period of the disease, in 67.1% of cases, the causative agent of soft tissue infection was gram-positive microflora and only in 21.9% - gram-negative, which did not contradict the literature [13].

Against the background of traditional local treatment, by 13-14 days with repeated bacteriological examination in patients with acute purulent-inflammatory diseases of soft tissues in the first comparison group, in 93.6% of the wound discharge, microflora continued to stand out, gram-positive flora - in 38.7% of cases, in all cases it was Staphylococcus aureus. By the end of the second week, the proportion of gram-negative microorganisms increased to 51.6% (Pseudomonas aeruginosa and enterobacter). As you know, this often indicates nosocomial reinfection of the wound, since it is these pathogens, due

to the presence of virulence factors, that are most resistant to many widely used antibacterial drugs [14].

In the second group of comparison, in patients with acute purulent diseases of soft tissues against the background of concomitant diabetes mellitus by 13-14 days of treatment with repeated bacteriological examination, the microbial flora was isolated in 100% of patients, the proportion of Staphylococcus aureus slightly decreased, but the number of patients in whom opportunistic (epidermal and saprophytic staphylococcus) and gram-negative flora continued to stand out from wound exudate increased significantly.

Neutrophylokines obtained from patients in the acute period of purulent-inflammatory disease from neutrophils activated in different ways are different in composition, but the final clinical effect is approximately the same. They include oxygen-dependent metabolic products - hydrogen peroxide, lipid peroxidation products, as well as proteolytic enzymes, and lysozyme, which have a direct bactericidal effect, damaging the membranes of microorganisms. In addition, supernatants contain pro-inflammatory cytokines - IL-1 and IL-8, TNF, which have an indirect effect on immune and inflammatory responses, being powerful chemoattractants and stimulants for neutrophils and macrophages, which ultimately contribute to the elimination of infectious agents [15-33].

In patients with concomitant diabetes mellitus, there is a higher content of leukocytes in the wound exudate, against the background of traditional local therapy by 13-14 days it does not change, whereas in the main group, there is a significant decrease in leukocytes after local immunocorrection. Attention is drawn to the very high content of neutrophils in the wound discharge in the acute phase of inflammation (1.6 times higher than in the group without diabetes). Against the background of traditional treatment, by 13-14 days in the comparison group, although there is a decrease in this indicator, its numerical value remains high, which indicates an ongoing inflammatory process in the wound, and the inferiority of regeneration. In fact, this forms the prerequisite for the occurrence of a chronic inflammatory process, since the acute process remains incomplete [16-24]. In the main group of patients, local application of autologous neutrophylokines led to the normalization of this ratio, the number of neutrophils decreased by 3 times and amounted to 9.1/1.

Supernatants of autologous neutrophils have a positive effect on changes in the cellular composition of wound discharge. A decrease in the total number of leukocytes in 1 ml of wound discharge indicates the relief of the inflammatory process. A change in the neutrophil/macrophage ratio, due to an increase in macrophages, in both main groups indicates the usefulness of repair and acceleration of wound healing processes since under the influence of macrophage mediators (growth factors), angiogenesis, proliferation of endothelial and mesenchymal cells are enhanced and the extracellular matrix is restored [17-22].

The wound process is a combination of local changes and numerous common reactions associated with them involving all body systems, and, first of all, the immune system, through the interaction of pro-inflammatory and anti-inflammatory cytokines [18-43], so the next task of our study was to study the effect of autologous neutrophylokines applied topically to the wound on the functional state of phagocytes (neutrophils and monocytes) of peripheral blood.

CONCLUSION

Improved methods for studying the functional activity of wound phagocytes and peripheral blood using autostrains of pathogens as an object of phagocytosis adequately reflect the level of nonspecific anti-infective protection in patients with acute purulent diseases of soft tissues, which correlates with the clinical course of the wound process. Effector functions of poly- and mononuclear phagocytes of the focus of inflammation and blood in patients with acute purulent diseases of soft tissues in the acute period (2-3 days) are characterized by a decrease in lysosomal and bactericidal activity, most pronounced in patients with concomitant diabetes mellitus.

The imbalance of effector functions of wound phagocytes with inhibition of lysosomal and bactericidal activity in patients with acute purulent diseases of soft tissues persists by 5 to 6 days after drainage of the purulent focus, despite the general and local traditional treatment. Local application of autologous neutrophylokines in patients with acute purulent diseases of soft tissues stimulates the functional activity of wound phagocytes and eliminates their imbalance, reduces the level of bacterial contamination of wounds, promotes full regeneration of the wound defect and is an effective addition to complex treatment. Local immunocorrection with autologous neutrophylokines contributes to an increase in the lysosomal and bactericidal activity of peripheral blood phagocytes in patients with acute purulent soft tissue diseases without concomitant diabetes mellitus.

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Ethics approval and consent to participate - All patients gave written informed permission to participate in the study.

Consent for publication - The study is valid, and recognition by the organisation is not required. The authors agree to open the publication.

Availability of data and material - Available

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QANDLI DIABET BILAN OG'RIGAN BEMORLARDA YUMSHOQ TO'QIMA INFEKTSIYASINI MAHALLIY IMMUNOKORREKSIYASI

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Dolzarbligi. Antibiotik terapiya samaradorligining pasayishi tufayli, operatsiyada yuqumli kasalliklarning ko'p antibiotiklarga chidamli shtammlarini keng qo'llash va ularning epidemiya tarqalishi ehtimoli, operatsiyadan keyingi asoratlar sonining ko'payishi, immunokomromlashgan shaxslar sonining ko'payishi (narkomanlar, surunkali alkogolizm va diabet bilan og'rigan bemorlar) - jarrohlik yiringli kasalliklarini davolash muammosi nihoyatda dolzarbligicha qolmoqda. Mahalliy yiringli kasalliklarni o'rganish hozirda immunitetga ko‘p e’tibor qaratilmoqda.

Material va usullar. Jarrohlik infektsiyasi bo'limida yumshoq to'qimalari infektsiyasi bilan og'rilgan 73 nafar bemorni kompleks tekshirish va davolash natijalari tahlil qilinadi. Barcha bemorlarda yuqumli jarayonning shikoyatlari, anamnezi, umumiy va mahalliy namoyon bo'lishi, bemor holatining og'irligi va tizimli yallig'lanish reaktsiya sindromining mavjudligi baholandi, kompleks laboratoriya tekshiruvi, umumiy qon va siydik tekshiruvi, biokimyoviy qon sinovi, koagulogramma amalga oshirildi.

Natijalar. Fagotsitozning o'tkir yallig'lanish (yara) bilan bog'langan funktsiyalarini fagotsitoz ob'ekti sifatida kasallikning qo'zg'atuvchisi - yumshoq to'qimalarning o'tkir yiringli kasalliklari bo'lgan bemorlarda mahalliy infektsiyaga qarshi himoya darajasini etarli darajada aks ettiradi. O'tkir davrda yumshoq to'qimalarning o'tkir yiringli kasalliklari bo'lgan bemorlarda periferik qonning poli- va mononuklear fagotsitlarining ta'sir etuvchi funktsiyalarining buzilishi va yallig'lanish (depressiya yoki disfunksiya) markazida aniqlanadi. Ko'proq darajada, bemorlarda bir-biridan diabetning kelib chiqishiga qarshi ifodalanadi. An'anaviy davolanish fonida yiringli fokusni drenajlashdan so'ng, bu muvozanat 13-14 kun davom etadi, bu esa yara shifosi bilan bog'liq.

Xulosa. Faollashtirilgan autolog neytrofillarning supernatantini mahalliy qo'llash, yumshoq to'qimalarning yiringli kasalliklari bo'lgan bemorlarda yallig'lanish va periferik qonning markazida fagotsitlarning ta'sir etuvchi funktsiyalarining mavjud muvozanatini yo'q qiladi, biroq, diabet bilan bir xil diabet bilan og'rigan bemorlarda faqat mahalliy immunokorreksiyaning tizimli immunitetga ta'siri etarli emas. Autolog neytrofilokinlar bilan mahalliy immunokorrektsiya yara jarayonining birinchi bosqichini kamaytirishga yordam beradi, kamaytiradi yumshoq to'qimalarning o'tkir yiringli kasalliklari bo'lgan bemorlarda, shu jumladan diabet bilan kasallangan bemorlarda yaradagi bakterial ifloslanish va regenerativ jarayonlarning tezlashishi darajasi.

Tayanch iboralar: Yumshoq to'qimalarning xirurgik infeksiyasi, immunologik reaksiya, qandli diabet

МЕСТНАЯ ИММУНОКОРРЕКЦИЯ ХИРУРГИЧЕСКОЙ ИНФЕКЦИИ МЯГКИХ ТКАНЕЙ У БОЛЬНЫХ САХАРНЫМ ДИАБЕТОМ

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Актуальность. В связи со снижением эффективности антибиотикотерапии, широким распространением в хирургии устойчивых ко многим антибиотикам штаммов возбудителей инфекционных заболеваний и возможностью их эпидемического распространения, ростом числа послеоперационных осложнений проблема лечения хирургических инфекционных заболеваний остается чрезвычайно актуальной.

Материал и методы. Анализируются результаты комплексного обследования и лечения 73 больных с хирургической инфекцией мягких тканей в отделении хирургической инфекции.

Результаты. Изучение функций фагоцитов очага воспаления с использованием в качестве объекта фагоцитоза аутоштамма бактерий - возбудителя заболевания адекватно отражает уровень местной клеточной противоинфекционной защиты у больных с острыми гнойными заболеваниями мягких тканей.

Заключение. Местное применение супернатанта активированных аутологичных нейтрофилов устраняет имеющийся дисбаланс эффекторных функций фагоцитов как очага воспаления, так и периферической крови у больных с гнойными заболеваниями мягких тканей, однако у больных с сопутствующим сахарным диабетом влияние только локальной иммунокоррекции на системный иммунитет оказывается недостаточным.

Ключевые слова: Хирургическая инфекция мягких тканей, иммунологическая реакция, сахарный диабет.