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FEATURES OF VASCULAR ENDOTHELIAL INDICES IN PATIENTS WITH PURULENT-NECROTIC COMPLICATIONS OF DIABETIC FOOT SYNDROME

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Annotation. This article presents the results of a study of vascular endothelial parameters and cytokine status before and after treatment in patients with purulent-necrotic complications of diabetic foot syndrome**.**

Keywords. interleukin-4 (IL-4), interleukin-8 (IL-8), ET-1, NO, VEGF-A and TGF-β.

Relevance. The development of clinical immunology has acquired great importance for understanding the pathogenesis of diseases of various etiologies (1,3,5,7,9,11,22,24,26,31,33,35,37). And knowledge of the pathogenesis of the disease ensures its early diagnosis and timely treatment, increases medical, social and economic efficiency (2,4,6,8,10,12,14,16,18,20,28,30,32,34,36,39,40,41,42).

To date, there are purulent-necrotic complications in patients with diabetic heel syndrome in different nosological units, the effect on quantitative and qualitative indicators of cellular immunity of the body, the degree of changes in them is sufficient, characteristics have been studied and determined, but the levels of changes in vascular endothelium and cytokine concentrations in patients are not fully adjusted and are waiting (13,15,17,19,21,23,25,27,29,38,43,44).

Material and methods. In the course of our study, we set ourselves the goal of determining and evaluating the parameters of vascular endothelial parameters and the status of cytokines in patients with this disease in order to study the importance of diabetic heel syndrome in clinical immunology in determining the prospects for the course and end of purulent necrotic processes.

To do this, patients who had been verified (18-69 years old) with the diagnosis of purulent-necrotic processes of diabetic heel syndrome were given blood serum and the parameters of vascular endothelium parameters and cytokine status in it were evaluated.

In order to make the research results easy to analyze comparatively, the general indicators of patients with purulent-necrotic complications of diabetic heel syndrome at the initial stage in comparison with the control group were given.

The results and their discussion. The results showed that in all examined patients it was found that the concentrations of vascular endothelium indices in the blood serum of patients were significantly higher in the observation groups and compared with the control group, and were presented in the form of a table 1.

Table 1.

Indications for determining the concentration of vascular endothelium indices in the blood serum of patients with purulent-necrotic complications of diabetic heel syndrome during the study

Concentration of vascular endothelial parameters	The main group (n=272)	The control group (n=30)
ЭТ-1, pg/ml	8,22±1,04*	2,24±0,08
NO, mmol/l	16,32±1,12*	35,02±0,09
VEGF-A, pg/ml	1042,25±5*	225,02±0,21
TGF-β, pg/ml	192,78±2,5*	85,65±1,05

In particular, it was found that et-1,PG/ml was significantly higher in the group of patients with purulent–necrotic complications of diabetic heel syndrome by 0.32 times compared with the control parameters - 2.24±0.08 PG/ml versus 8.22±1.04 PG/ml (p0. 05), respectively. Considering that et-1 accounts for 10% of all vascular endothelial parameters involved in the primary and secondary immune response against it, its primary role in providing local immunity, it can be justified that they increase quantitatively. The presence of Et-1 in large quantities in the patient's blood serum ensures that the amount of production on the surface of the mucous membrane is high. This acquisition of et-1 is a target for activation of vascular endothelial parameters, including local immune factors.

In patients with purulent-necrotic complications of diabetic heel syndrome, an increase in serum no concentration, mmol/l in the observation groups was also observed during the study – 35.02±0.09 mmol/l versus 16.32±1.12 mmol/l, respectively. If we take into account that NO, mmol/l is the first among the indicators of protection of the vascular endothelium from foreign agents entering the blood, then this infection can be considered a sign of vascular endothelial indicators indicating a recent onset.

During the study, VEGF-A, which accounts for 75% of vascular endothelial parameters, provides mainly a secondary immune response and is produced after VEGF-A, PG/ml, thus, the role of these vascular endothelial indicators is enormous in determining the prospects for stopping the infectious process. In our opinion, purulent-necrotic complications of diabetic heel syndrome VEGF-A,PG/ml differ convincingly with an increase of 0.80 times compared with the indicators of the control group of existing patients - 225.02±0.21 PG/ml versus 1042.25±5 PG/ml, respectively.

During our study, the patient was shown the fact that serum TGF-β, PG/ml, occurs in humans differently than other indicators of vascular endothelium, provides an individual immune response of the body to an antigen (pathogen) that has entered the body, has a certain biological activity (allergy), is not involved in primary and secondary immune reactions reactions, such as other indicators of vascular endothelium, the patient is characterized In most cases, the presence of other infections in the body was also denied on the basis of clinical and laboratory tests, taking into account that the level of TGF-β, PG/ml is also high.

The results showed that in patients, the level of TGF-β in blood serum, PG/ml, was 6.94 times higher than in the control group - 85.65±1.05 PG/ml versus 192.78±2.5 PG/ml, respectively. Thus, patients with purulent-necrotic complications of diabetic heel syndrome belong to the control group according to the main indicators of vascular endothelium in blood serum, healthy people who did not have a history of this pathology differed in a convincing increase relative to the parameters, during the study et-1 was shown at 0.32 times, No. 0.15 times, VEGF-A 0.80 times ($p<0.01$) and TGF-β 6.94 times (05) became plausible. The abundance of Et-1, no, VEGF-A and TGF-β was explained by the increased activity of the general local parameters of the vascular endothelium in relation to the infectious agent with an increased primary and secondary immune response.

It is known that cytokines are molecules of a small peptide nature with a high informational content, transferring information between special and non-specific cells of the immune system, providing primary and secondary immune responses, as well as controlling. Quantitative changes in anti-inflammatory and decongestant cytokines indicate the level of development of the inflammatory process, acquired pathology in the body and pathological conditions.

Among the anti-inflammatory cytokines, we found it necessary to identify interleukin-4 (IL-4), which induces the differentiation of Th0 cells (initial T helper cells) into Th2 cells, which is important for eliminating this pathological process, as well as one of the cytokines that cause inflammation, interleukin-8 (IL-8).

The results showed that the levels of IL-4 and IL-8 were within the generally accepted norm or reference values in people of the control group (Table 3.2), demonstrating a result close to unity in practical terms - 4.82±0.25 ng/ml and 4.31±0.08 ng/ml, respectively, according to the studied parameters.

Table 2

Indicators of the cytokine status of blood serum of patients with purulent-necrotic complications of diabetic heel syndrome in the main group

The concentration of immunoglobulin	The main group (n=272)	The control group (n=30)
IL-4, pg/ml	10,41±2,52*	4,52±0,25
IL-8, pg/ml	109,77±6,49*	56,11±0,12

In the case of patients, in the continuation of the study in patients, these parameters were manifested by a convincing increase in blood serum (p0.01). If patients with IL-4 had a 2.46-fold increase in healthy people belonging to the control group compared with those belonging to the control group (up to an average of 17.12±0.71 ng/ml), then IL-8 was disproportionate with a multiple increase in cytokine - up to 109.77±1.59 times (in on average up to 100.61±6.49 ng/ml) – ($p<0.01$).

In the case of both cytokine increases, it is noteworthy that the figures differ statistically significantly. It is worth noting that in comparison with the anti-inflammatory cytokine (IL-4), the concentration of cytokine (IL-8), which determines the immunological status, prevailed in terms of prevalence.

During the study, the concentration of cytokines in the patient's blood serum, which cause and against inflammation, changes in accordance with the course of the inflammatory process in the body, when the concentration of one of them outweighs the others, this result indicates a strong course of the inflammatory process. The fact that in the course of our study, the cytokine IL-8, which determines the immunological status, quantitatively exceeds the anti-inflammatory IL-4, indicates a clear development of this pathological condition. So, at the stage of obtaining biological materials from patients, it turned out that inflammation is highly developed. In conclusion, taking into account the above, IL-4 against nausea and IL-8, which determines the immunological status, were recommended as additional diagnostic and prognostic immunological criteria for cytokines.

Conclusions.

1. The concentration of cytokines in the blood serum of patients who change in accordance with the course of the inflammatory process in the body, when the concentration of one of them exceeds the others, this result indicates a strong course of the inflammatory process.
2. Compared with the anti-inflammatory cytokine (IL-4), the concentration of cytokine (IL-8) has a determining immunological status in sensitivity.
3. VEGF-A and TGF-β have increased activity in the detection of vascular endothelial dysfunction.

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