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Assessment of the Level of Neopterin in Oral Fluid and Blood Plasma in Patients with Rheumatoid Arthritis

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Abstract:

It is known that neopterin is a metabolite of nucleic bases, similar in structure to a folic acid molecule. It is synthesized mainly by cells of the macrophage-monocyte pool under the influence of gamma interferon and reflects the synthesis of this cytokine, which plays a significant role in the immune response. It is the synthesis of gamma interferon that distinguishes most cytotoxic cellular immune reactions in the course of an antiviral or antitumor immune response. And also in autoimmune diseases – and specific immune inflammation [1.3.5.7.9.11].

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Elevated concentrations of neopterin are characteristic of the cytotoxic immune response that occurs in autoimmune diseases, including. Since the immune antibacterial response is directly related to other mechanisms of immunity, an increase in the production of neopterin in most bacterial infections does not take place. However, aggressive and chronic forms of dental diseases are often accompanied by autoimmune reactions expressed to varying degrees. The question of the primacy of etiological factors in the progression of the underlying disease in RA is debated [2.4.6.8.10.12]. Nowadays, modern biochemical and immunological analysis allows us to study more deeply the mechanism of the body's responses to changes occurring in RA in the oral cavity. Therefore, it seemed necessary to compare the levels of neopterin in the RV and blood plasma of RA patients, which would help clarify the pathogenesis of periodontal diseases in such patients and develop methods of adequate immunocorrection as part of complex periodontal treatment.

The purpose of the study. Comparative analysis of the level of neopterin in oral fluid and venous blood plasma in RA patients.

Material and methods of research. The study involved 35 RA patients (main group), as well as dental patients without identified concomitant general somatic pathology (n=15) (control group).

The clinical examination included the collection of analyzes, complaints, clarification of possible

causes of the disease, the nature of its course and frequency of exacerbations, the effectiveness of previous treatment.

During the examination, special attention was paid to the hygienic condition of the oral cavity, the presence of carious teeth, dentures and dissimilar metals.

Examinations of patients included gender, age, characteristics of the underlying disease, frequency and duration of relapses, evaluated therapeutic and preventive measures offered to patients for the treatment of the disease.

Mathematical methods are implemented using Microsoft Excel for Windows 2010. Generally accepted methods of variation statistics were applied. To determine the reliability of the difference in average values, the values of the Student's criterion were used, a correlation analysis was carried out.

Results and discussion. In the main group of RA patients, catarrhal gingivitis was observed in only twelve patients. All the other examined patients were found to have CGP: mild severity – in 13 patients, moderate severity – in 14, and severe – in 11 people. It was accompanied by varying degrees of suppuration from periodontal pockets, the presence of lesions of root furcations, noticeable mobility of teeth. On average, the rate of unstimulated salivation in the main group was 0.19 ± 0.088 ml/min, in the control group – 0.42 ± 0.114 ml/min [11.13.15.16].

We determined the level of neopterin in Russian Railways and blood plasma in all persons included in the second stage of the study (Fig.1).

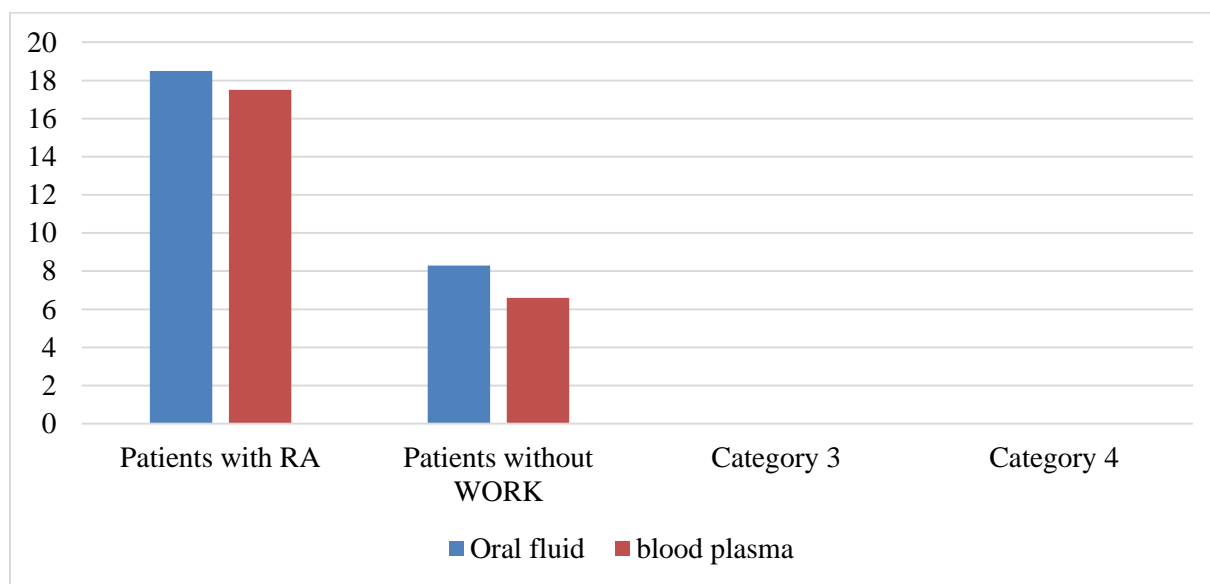


Fig.1. Assessment of the level of neopterin (nmol/l) in the oral fluid and blood plasma of the examined patients

It was revealed that the level of neopterin in the RV in RA patients was on average 1.4 times higher than in patients without RA and exceeded that in practically healthy individuals.

A high level of neopterin was also detected in the blood plasma of RA patients. In them, it turned out to be statistically significantly higher than in the examined individuals of the control group by an

average of 2.6 times.

It seemed interesting to us to analyze the relationship between the level of neopterin and the presence of Sjogren's syndrome in patients of the main group. It turned out that this indicator reacts quite clearly to the presence of dry syndrome in the RV. Therefore, we believe that determining the level of neopterin in the RV may be an additional diagnostic and prognostic symptom of Sjogren's syndrome.

Interestingly, there was a statistically significant difference between the average values obtained in patients, the differences between the indicators in the main and the control group were, respectively, 1.9 and 2.8 times ($p < 0.05$).

In general, in the main group, the level of neopterin in the blood plasma was higher than in the RV and significantly higher than in the blood plasma of the comparison group. This suggests that the body of RA patients is configured in a certain way to fight viral infections, but in the oral cavity this protection is weaker than in the bloodstream [12.14.16].

The comparison of the levels of neopterin in the RV and blood plasma showed that in RA patients its content is on average 32.0% lower in the RV compared to the level in the blood plasma ($p < 0.05$), and in patients of the comparison group, on the contrary, its content is 19.3% higher in the RV ($p > 0.05$). That is, there is an inverse interdependence of the indicators of neopterin in the RV and blood plasma in these two subgroups.

This suggests that in RA patients, immune defense disorders are more characteristic on the scale of the entire macroorganism, and they are less pronounced in the oral cavity, although more significantly than in patients with dental diseases of inflammatory etiology without somatic pathology. This indicator, estimated in blood plasma, is not informative enough in comparison with that in RV ($p = 0.03$).

Summarizing the results of the comparative study, the following conclusions can be formulated:

1. Against the background of hyposalivation and impaired self-cleaning of the oral cavity, RA patients have a 100% prevalence of inflammatory periodontal tissue diseases. Evaluation of the level of neopterin in the RV makes it possible to identify violations in the immune response of the body in VZP and, in particular, in concomitant RA.
2. The level of neopterin in blood plasma in RA patients is significantly higher than in RV. This is most likely due to the peculiarities of immunological processes in the body with the manifestation of cytotoxic reactions in this systemic disease.
3. In RA patients undergoing or having already undergone rheumatological treatment, the level of neopterin, both in RV and in blood plasma, is less than in primary RA patients. However, according to this indicator, no statistically significant differences were found in RV, while such differences were found in blood plasma.
4. Dental preventive and therapeutic measures in patients with RA should be planned taking into account their existing violations of general and local immunity. Such disorders are promoted by reduced salivation, impaired self-cleaning of the oral cavity and cytotoxic immune response of the macroorganism. By the immune response, we understand the possibilities of cellular and humoral immunity, primarily in the oral cavity) to resist the onslaught of pathogenic microflora.

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