To determine the prevalence and improve the effectiveness treatment of dental diseases in patients with COVID-19.

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ABSTRACT

Purpose: The article presents the results of a study of the state of local immunity in the oral cavity in 30 patients with COVID-19, depending on the severity.

Materials and methods: Immunological studies were carried out on 30 saliva in patients with moderate and severe COVID-19 at the Republican Specialized Center No. 2 for coronavirus infection in 2020. All studies were carried out in the laboratory of immunocytokines of the Institute of Immunology of the Academy of Sciences of the Republic of Uzbekistan.

Results: a significant decrease in the production of secretory IgA and IFN-α in saliva in patients with COVID-19 was revealed, and the analysis of IL-1 beta and TNF-α cytokines in patients with COVID-19 showed that their concentration was significantly increased.

Conclusion: Decreased values of secretory IgA and IFN-α in saliva in patients with COVID-19 prove depletion of the main antiviral proteins in the oral cavity, and increased values of cytokines IL-1 betta and TNF-α in saliva in patients with COVID-19 prove the presence of a current inflammatory process in the oral cavity.

Keywords: immunity, secretory IgA, IFN-α, saliva, COVID-19, cytokines, interleukin-1 beta, TNF-α.

Introduction: The interaction of SARS-CoV-2 with ACE2 receptors can also impair taste receptor sensitivity, which can cause dysfunctional taste responses [3,4,5,12]. The available data have not yet identified an effective and safe pharmacological therapy against COVID-19, and the available potential antiviral drugs lead to adverse reactions [1,5,9,10,12]. Therefore, acute COVID-19 infection and associated therapeutic measures may contribute to adverse oral health outcomes. Oral signs and symptoms associated with COVID-19 are known to include taste disturbances, non-specific mouth ulcers, desquamative gingivitis, petechiae, and coinfections such as candidiasis [5,8,9,11,12,15]. However, it is still not clear whether these manifestations may be a true clinical presentation resulting from direct infection with SARS-CoV-2, or systemic consequences, given the possibility of coinfections, weakened local immune reactivity, and adverse reactions to therapy [1,2 ,4,5,9,12,14,15,20].

In recent years, much attention has been paid not to the study of cellular and humoral factors of systemic immunity, but most of all, emphasis is placed on factors of local immunity, especially depending on the clinical features of the course of the disease, which gives a broader and more correct understanding of changes in local immunity, especially against the background of the course of an infectious disease. pathology [1,6,7,12,15,20,21,25,27].

Therefore, the aim of this work is to investigate the clinical oral manifestations in patients with COVID-19 and to study the local immunity of the oral cavity. To solve these goals and objectives, we used modern approaches in diagnostics, especially in laboratory immunodiagnostics.

The aim of the study was to study the features of local immunity of the oral cavity and systemic

immunity in patients with coronavirus infection, depending on the severity.

Research materials: Immunological studies were carried out on 30 saliva in patients with moderate and severe COVID-19 at the Republican Specialized Center No. 2 for coronavirus infection in 2020.

Immunological research methods determination of cytokines determination of the level of cytokines and the level of secretory immunoglobulin was carried out by enzyme immunoassay using commercial test systems "Human", Germany. The test systems are based on the sandwich method of enzyme-linked immunosorbent assay using horseradish peroxidase as an indicator enzyme. The reagent kits are a kit, the main reagents of which are mAb to the studied cytokines, adsorbed on the surface of the wells of a collapsible polystyrene plate. The kits are designed for the quantitative determination of human cytokines in peripheral blood serum and biological fluids. Measurement of optical density in each well was performed using an automatic microplate photometer at a wavelength of 450 nm. The determination of interferon-alpha was carried out by ELISA on the analyzer "Stat-Fax" (USA). For research, we used sets of enzyme immunoassay test systems "Human" made in Germany, 2020. Both methods were carried out in the laboratory of immunocytokines of the Institute of Immunology of the Academy of Sciences of the Republic of Uzbekistan.

Statistical processing of the results was carried out using the Excel-2018 program, reflecting the dependence of optical density on concentration for the standard antigen.

Results and discussion: The content of secretory IgA in saliva in the control was 12.45±0.41 g/l, while in persons with moderate COVID-19 it was 5.42±1.5 g/l, and in severe patients it was 1 .22±0.11 g/l, which was significantly reduced in both study groups of patients with COVID-19. It can be seen that in the group of moderate patients, the level of secretory IgA was suppressed by 2.3 times, and in the group of severe patients, the level was reduced by 10 times compared to the control values. Next, the concentration of IFN-α, which is a potent antiviral cytokine protein, was studied. Therefore, according to our data, there is a depletion of the main antiviral IFN-α in patients with moderate and severe COVID-19, especially in the group of patients with severe course. As can be seen from the table, the content of IFN-α in saliva in the control was 24.27±1.50 ng/ml, while in persons with moderate COVID-19 it was 14.7±2.13 ng/ml, and in severe patients - 3.36±0.82 ng/ml, which was also significantly reduced in both study groups of patients with COVID-19. It can be seen that in the group of moderate patients, the level of IFN-α is suppressed by 1.7 times, and in the group of severe patients, the level of IFN-α is reduced by 7.2 times compared with the control value.

Table 1.
The content of the main humoral factors in salivary fluid in patients with COVID-19, M±m

Groups of examined	IFN-α, ng/ml	Secretory IgA, g/l	IL-1β, ng/ml	TNF-α, ng/ml
Moderate COVID-19	14,7±2,13*	5,42±1,5*	6,7±0,32*	6,52±1,24*
Severe COVID-19	3,36±0,82*^	1,22±0,11*^	8,75±2,2*	11,7±2,6*^
Control	24,27±1,50	12,45±0,41	3,22±1,65	2,36±1,14

Note: * - reliability of differences with the data of the control group, ^ - differences between the studied groups.

Cytokine TNF-α, it should be noted that this cytokine has damaging properties, therefore, we took exactly that cytokine to study damage in the oral mucosa. Thus, TNF-α was increased in the group of people with moderate and severe COVID-19. Table 1 shows that in the control, the level of TNF-α was 2.36±1.14 ng/ml, while in persons with moderate COVID-19 it was 6.52±1.22 ng/ml, and in severe patients - 11.7±2.6 ng/ml, the values of the patients were

significantly different from the data of the control group. It can be seen that in the group of moderate patients, the level of TNF-α was increased by 2.8 times, and in the group of severe patients, it was increased by 4.9 times compared with the control value.

Next, the concentration of IL-1β in saliva was studied. As can be seen from the table, the content of IL-1β in saliva in the control group was 3.22±1.65 ng/ml, while in persons with moderate COVID-19 it was 6.7±0.32 ng/ml, and in severe patients - 8.75±2.2 ng/ml. It can be seen that the values of IL-1β in saliva were increased in groups of individuals with moderate and severe COVID-19. Differences were significant with the data of the control group. Thus, in the group of moderate patients, the level of IL-1β was increased by 2 times, and in the group of severe patients, it was increased by 2.7 times compared with the control value. It can be seen from the table that there are also differences between the groups of patients, but they are not significant. It is a fact that in groups of people with severe COVID-19, the level of IL-1β was elevated, which once again proves the current inflammatory process in this case in the oral cavity.

Conclusions.

1. Thus, the humoral immunological factors of the salivary fluid have been studied. It was found that the content of secretory IgA in saliva in persons with moderate COVID-19 was significantly reduced by 2.3 times, and in the group of severe patients it was significantly reduced by 10 times compared to control values. The content of the powerful cytokine IFN-α in saliva in persons with moderate COVID-19 was significantly suppressed by 1.7 times, and in the group of severe patients it was reduced by 7.2 times compared with the control value. Consequently, there is a depletion of key antiviral proteins such as secretory IgA and IFN-α in patients with moderate to severe COVID-19.

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