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The Treatment of Changes in the Oral Mucosa of a Patient with Coronavirus

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Relevance. In addition, in the postcovid period, due to a decrease in the local immunity of the oral cavity, the risk of re-infection with oral diseases increases, the duration of the course and recovery increases. To date, these studies are of great interest in terms of long-term observations and symptomatic. Infectious inflammation of the mucous membrane of the upper respiratory tract, including and pharynx, are a variety of representatives of probable infectious agents, the inability to accurately and quickly determine the spectrum of pathogens of the pathological process, the existence of about 99% of bacteria in the form of biofilms attached to the substrate, resistant to immune system factors and resistant to the action of antimicrobial drugs, inhibition of the composition of the normal microbiota and, as a consequence, a decrease in mucosal immunity, as well as the risk of developing superinfection and complications during treatment with chemical antiseptics and antibacterial drugs.

In the oral cavity, patients with COVID-19 most often experience dysgeusia (taste disorder), petechiae (spot hemorrhages in the form of red bumps), candidiasis, traumatic ulcers, plaques and cracks, dry mouth, as well as enlarged lymph nodes. The most common complication of the disease is viral pneumonia, which can lead to acute respiratory distress syndrome and subsequent acute respiratory failure. Multiple organ failure, septic shock and venous thromboembolism are also complications of coronavirus infection. It is possible to develop long-term complications, called postcovid syndrome. Postcovid syndrome is a pathological condition of the body after a coronavirus, accompanied by a variety of symptoms that can manifest themselves constantly or in waves.

Symptoms include: - weakness, shortness of breath, heaviness behind the sternum; - loss of sense of smell, change in smell/taste; - pain (headache, myalgic, articular, neurological); - sudden changes in blood pressure and pulse; - disorders of the gastrointestinal tract; - cognitive disorders; - dermatological manifestations; - violation of thermoregulation; - and many other manifestations. More than half of the patients who have had a coronavirus infection have signs of damage to the oral cavity. The most frequent manifestations include: - ulcers, plaques, cracks, rashes on the mucous membranes of the oral cavity; - darkening or discoloration of enamel; - inflammation, bleeding gums; - carious lesions, stomatitis; - loosening and loss of teeth; - candidiasis. Widespread lesions are weakness of the masticatory muscles and an increase in the size of the salivary glands.

Patients aged and in a group of patients with diabetes and chronic obstructive pulmonary disease. Symptoms of aphthous stomatitis, the phenomenon of candidiasis, as well as disorders and changes in taste may be observed. Papillae of the tongue have a more pronounced character. For young patients, weakness of the masticatory muscles is more characteristic. In addition, lesions such as facial pain and paresthesia may occur. Some patients indicate violations of the temporomandibular joint. [1] Some of the complications that arise are associated with drug therapy used in COVID-19, in particular with antibiotic therapy, which is indicated when a bacterial infection is attached. The predominant subjective manifestations of the negative effects of antibiotics: dryness in the oral cavity, changes in taste sensitivity,

Immunity leads to the adhesion of pathogens to the cells of the ciliated epithelium and microbial contamination (viruses, viral-bacterial associations, bacteria), which leads to damage to the cells of the mucous membrane and the development of inflammation. The most common form of acute

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inflammation of the pharyngeal mucosa is viral tonsillopharyngitis. The cause of the development of catarrhal inflammation in the pharynx may be representatives of various respiratory viruses. Viral-bacterial associations are often detected (in children up to 60% of cases of upper respiratory tract infections). Acute mycotic pharyngeal lesion is extremely rare, usually against the background of significant immune disorders [2.3.5]. Bacterial inflammation in the pharynx is diagnosed in 30-40% of children and up to 15% of the adult population.

Among them, the detection rate of beta-hemolytic streptococcus group A is about 12%. The development of acute bacterial inflammation in the pharynx due to the invasion of beta-hemolytic streptococcus group A requires mandatory administration of systemic antibiotics. It is known that against the background of systemic antimicrobial treatment, such undesirable effects as antibiotic-associated diarrhea, allergic reactions, hepato-, neuro- and ototoxic effects, negative effects on the blood system, photosensitization, negative effects on the microbiome are not uncommon [1].

It is recommended to use express diagnostic methods (for example, the method of immunochromatography) for unjustified prescribing of antibiotic therapy, allowing with a probability of more than 95% to detect a specific antigen of group A streptococcus. With OTF of non-streptococcal etiology, the main drug direction is topical etiopathogenetic and symptomatic therapy. The advantages of this type of treatment are the targeted delivery of the active substance to the pathological focus, the absence or minimal systemic effect, reducing the risk of selection of resistant strains of microorganisms, as well as the softening, moisturizing and enveloping effect of auxiliary components. At the same time, it is necessary to take into account the absence of antiviral action in a number of topical preparations, contraindications to the use of herbal ingredients in patients with allergies, the possible presence of microbial resistance.

Resistance of some strains of Staphylococcus aureus to furacilin is 85.2%, to iodinol 73.9%, miramistin 61.2%, chlorhexidine 0.02—53.8%; resistance of Candida albicans to miramistin 0.01% is 89.6%, the frequency of contamination of furacilin solution by fungi reaches 58.8% [4.5]. Ineffective therapy contributes to the persistence of pathogenic pathogens on the mucous membrane of the oropharynx and in the crypts of the tonsils, an increased risk of recurrence of acute tonsillopharyngitis, a longer and more severe course of banal respiratory diseases, an increase in the frequency and chronization of pathology of ENT organs. Based on the above, local drugs for the treatment of infectious and inflammatory diseases of the pharynx should have a wide range of effects on pathogens, including in the form of microbial communities (biofilms), do not contribute to the growth of resistance, reduce the risk of superinfection and the development of complications, quickly stop clinical symptoms and restore the quality of life, have good tolerance and high safety.

Acute inflammatory disease of the upper respiratory tract, including the pharynx, is the insufficiency of mucosal immunity. Mucosal immunity realizes its protective effect through the microbiome, protective epithelium, mucus formation, keratinization, salivation, as well as innate and acquired immunity [5]. The factors of acquired immunity include secretory IgA and IgG and B- and T-lymphocytes. Innate immunity is represented by phagocytosis, interferons, complement system, innate lymphoid cells (NK cells, natural killers), as well as antimicrobial peptides (lysozyme, defensins, lactoferrin, properdin). The insufficiency of mucosal immunity is based on a decrease in the synthesis of secretory IgA, immaturity of immune processes (incomplete phagocytosis, low ability to synthesize interferons), imperfection of mucosal and skin barriers, high suppressor activity of regulatory T cells, the development of a primary immune response to most antigens with the formation of IgM without the formation of persistent memory [3].

The immune response increases the elimination time of pathogens, including viruses: thus, according to the literature, the average elimination time of rhinovirus with normal immunity is 11 days, whereas with general variable immunodeficiency it is 41 days [4]. The results of the study by other authors show that the causes of a decrease in mucosal immunity in children may be a physiological delay in the maturation (immaturity) of the immune system, a decrease in the production of interferon, IgA and lysozyme, bacterial and viral infections, unfavorable environmental conditions, irrational use of

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drugs, frequent stress. Unrecognized partial immunodeficiency occurs in 13-22% of clinical cases of respiratory infections in the population [4]. Lysozyme is a factor of nonspecific (innate) immunity, contained in saliva, tears, breast milk, respiratory tract secretions, forming nonspecific protection.

Lysozyme has antiviral, antibacterial and antifungal effects. Antiviral action is carried out by reducing the absorption of the virus and its penetration into target cells, binding to viral DNA / RNA and suppressing viral replication. Antibacterial and antifungal action is carried out by an enzymatic mechanism due to the hydrolysis of the cell wall of bacteria and fungi, in which muramylpeptide is formed – a powerful natural stimulator of immunity. The antimicrobial effect is due to and the cationic mechanism during the incorporation of lysozyme into the cell membrane and the formation of pores, which increases the permeability of membranes to other antibacterial and antifungal agents. In addition, lysozyme has an anti-filmlike effect, suppressing the adhesion and growth of biofilms of Staphylococcus aureus, Escherichia coli, Klebsiella pneumoniae, Candida albicans and anti-inflammatory effect, suppressing excessive activation of macrophages and neutrophils, restraining the migration of pro-inflammatory cells to the focus of inflammation and oxidative stress, binding and neutralizing extracellular inflammatory mediators [3.5].

Local immunity in inflammatory diseases of the oropharynx is the drug Lysobact ® produced by the pharmaceutical company "Bosnalek" (Bosnia and Herzegovina). Lysobact ® is a natural antiseptic for the treatment of infectious and inflammatory diseases of the mucous membrane of the oral cavity and pharynx, increases the nonspecific immune protection of the oral cavity and throat, and also has a directed antiviral and antibacterial effect. Lysobact ® contains in its composition as active active substances substances corresponding to those that are present in the human body. The lysozyme in the composition of the drug is similar in its action, amino acid sequence and molecular weight to the human lysozyme produced in the human body. In addition to lysozyme, Lysobact ® contains pyridoxine (vitamin B6), which contributes to the repair of damaged mucous membranes, has an antiaphthotic effect, and also participates in the synthesis of amino acids, including cysteine, which provides antioxidant protection and limits inflammatory reactions in viral and bacterial infections. The results of the study given in the literature show that the content of endogenous lysozyme in pharyngeal flushes in patients with various forms of chronic pharyngitis is reduced compared to healthy individuals.

Containing lysozyme helps not only to make up for the lack of an endogenous antimicrobial substance, but also to activate the synthesis of its own lysozyme according to the principle of a peptide regulatory cascade. According to the team of authors, in children with chronic adenoiditis (HA) and exudative otitis media (ESO), when using the drug Lysobact ® , there is a marked decrease in the number of pathogenic microorganisms on the nasopharyngeal mucosa compared with patients of the control group who received traditional treatment. When using the drug Lysobact ® , the growth rates of the obligate microflora of the nasopharyngeal mucosa in the main group significantly exceed those of the control group receiving traditional therapy [2.4.5].

Glossitis often occurs due to mechanical injuries of the tongue, chemical and thermal damage. Also, glossitis may indicate the presence of a concomitant disease or allergy in the patient's body. Glossitis can also develop against the background of another oral disease. Let's highlight the most common causes of glossitis: injury to the tongue with sharp pieces of food, a dental prosthesis; exposure to hot water and food, burns; improper and unstable oral hygiene; smoking, addiction to alcohol, poisoning with heavy metal salts; allergy to toothpaste, components of mouthwashes, materials of orthopedic structures; the presence of herpes viruses, staphylococci, yeast-like fungi in the body. Glossitis can be a symptom of the presence of a common disease in the body. The most common cases of glossitis as a symptom of concomitant disease are observed in the following diseases: infectious diseases (scarlet fever, measles and others); diseases of the gastrointestinal tract; blood diseases; hypervitaminosis; oral diseases (especially stomatitis). Also, different forms of glossitis can manifest themselves differently in different conditions of the body. Thus, diamond-shaped median glossitis often

accompanies chronic diseases of the gastrointestinal tract, especially a reduced degree of acidity of gastric juice.

Nasopharyngeal mucosa, which is significantly higher in patients of the main observation group, with the rate of reduction of clinical symptoms of HA and ESO: after 14 days from the start of therapy in the main group using the drug Lysobact ® , there is a marked decrease in clinical symptoms of HA and ESO, especially rhinorrhea and hearing. So, in the main group, 10 days after the start of treatment, there were 3.6 times more patients with a normalized tympanogram compared to the control group. Also, in the main group, a decrease in indications for surgical treatment was revealed. No undesirable side effects were detected in any observed patient. In the work of other researchers, it was noted that in children from 3 to 7 years old with acute respiratory pathology who received Lysobact, there was a significant increase in the level of secretory IgA and a decrease in the duration of catarrhal phenomena compared with the control group. According to our clinic, in patients with inflammatory diseases of the pharynx, the dynamics of relief of pain, discomfort and dry cough on the 9th day after the course of treatment with Lysobact ® was twice as pronounced as in the comparison group. 8 days after the start of treatment, no new pathogens (superinfection) were detected in 77% of cases in the main group, and in the control group after a course of antiseptic use – only in 53% of patients. No adverse events were observed in any clinical case.

Microflora and maintaining the balance of obligate microflora against the background of the treatment of acute infectious and inflammatory diseases of the upper respiratory tract are becoming increasingly important: the role of the microbiome in the dynamics of recovery, reducing the duration of treatment and recovery after the disease, as well as reducing the number of complications when choosing biocenosis-sparing therapy has been proven. Along with the dynamics of clinical symptoms, the choice of therapy should also take into account the factor of the influence of microbiocenosis: the need for systemic antibacterial treatment is available only in a certain group of patients, and frequently used topical antimicrobial chemotherapy and antiseptics can cause a violation of the microflora, leading to a decrease in local immunity, and cause bacterial superinfection due to a violation of the microbiome. The drug Lysobact, providing biocenosis-sparing and reparative action, occupies one of the leading places in the arsenal of medicines for the treatment of patients with pharyngeal pathology. Lysobact ® has a wide spectrum of action, does not cause resistance and increases mucosal immunity. The drug can be taken for children from 3 years old, and the age restriction is only due to the fact that the tablets need to be absorbed.

Lysozyme is actively used in the modern food industry, as it is a natural preservative. Due to its effectiveness in eliminating oily bacteria, it is most often used in the manufacture of cheeses, the production technology of which requires long maturation. Therapeutic and prophylactic cheeses. They contain, in addition to lysozyme, bifidobacteria and a prebiotic from lactulose. These cheeses are used in the treatment of dysbiosis in children with gastroduodenitis and intestinal dysfunctions, as well as in children with acute myeloblastic and lymphoblastic leukemia in remission. In combination with chemotherapy, lysozyme prevents a sharp decrease in the content of bifidobacteria and promotes the elimination of opportunistic intestinal microflora [2.3].

Conclusions. Lysozyme is able to inactivate isoantigens that contain glycoproteins and glycosaminoglycans. Isoantigens in vivo are all types of tumors. Their inactivation occurs by cleavage of the muramine polysaccharide chain of cell membranes, including the cytolemma. A decrease in the level of lysozyme, which is able to inactivate isoantigens, contributes to the development of the tumor process. In oncological diseases, the deficiency of an endogenous enzyme is determined in the blood serum during the differential diagnosis of pigmented neoplasms of the eye. In an experiment on rats with lymphosarcoma, a decrease in the level of lysozyme in peripheral blood was observed, and in most cancer patients there was a decrease in all indicators of phagocytic activity. The deficiency of endogenous lysozyme, despite the multifactorial development of the oncological process, serves as one of the conditions contributing to the occurrence and progression of tumor formation. After applying the stimulus, the activity of lysozyme in peripheral blood increases

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after 2 minutes, and a slow decrease is observed 3 hours after the start of the experiment. This can be explained by a surge in lysozyme activity as a response to pain irritation, and subsequently a stage of refractory producer cells and catabolism of lysozyme in the blood occur.

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