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THE MAIN ROLE OF THE NASAL MICROBIOME IN THE DIAGNOSIS AND TREATMENT OF CHRONIC RHINOSINUSITIS

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Abstract: *microbiota is a group of microorganisms (not only bacteria, but also fungi, viruses, bacteria, protozoa, bacteriophages) living in a certain ecological space. The microbiome is understood as the sum of the genetic material of all the microorganisms that make up the microbiota. In relation to the human microbiome, it is a whole set of nucleic acids (NC) of all representatives of the microcosm located on the surface of the skin, mucous membranes or in the tissues of the human body. The aim of our study was to determine the role of the sinuses in the formation of the microbiome of the respiratory tract and the presence of polyps. We have already shown that proteobacteria in childhood are present in the nasal sinuses, they are also present in samples taken from the lower respiratory tract. Proteobacteria are crucial in reducing the biological diversity of the microbiomes of the lungs and sinuses, which is associated with deterioration of lung function.*

Keywords: *chronic rhinosinusitis, microbiome, nasal cavity, treatment, diagnosis.*

ОСНОВНАЯ РОЛЬ МИКРОБИОМА НОСА В ДИАГНОСТИКЕ И ЛЕЧЕНИИ ХРОНИЧЕСКОГО РИНОСИНУСИТА

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Аннотация: *микробиотой называют состав микроорганизмов (не только бактерий, но и грибков, вирусов, архей, простейших, бактериофагов), обитающих в той или иной экологической нише. Под микробиомом понимают совокупность генетического материала всех микроорганизмов, входящих в состав микробиоты. Применительно к микробиому человека — это весь набор нуклеиновых кислот (НК) всех представителей микромира, находящихся на поверхности кожи, слизистых оболочек или в тканях человеческого тела. Выяснение роли пазух носа и наличия полипов в формировании микробиома дыхательных путей стало целью нашего исследования. Мы показали, что уже в детском возрасте в пазухах носа присутствуют*

протеобактерии, обнаруженные также в образцах из нижних дыхательных путей. Протеобактерии являются определяющими в снижении биоразнообразия микробиомов легких и пазух носа, что коррелирует с ухудшением показателей функции легких.
Ключевые слова: *хронический риносинусит, микробиома, носовой полость, лечения, диагностика.*

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Relevance. The presence of a physiological microbiome (i.e., microbial colonization of the surface of the skin and mucous membranes) is vital for human growth and development, the correct formation of metabolic and immune homeostasis [8].

The development of many diseases, such as asthma, diabetes, obesity, some malignant tumors, rheumatoid arthritis, and even such as autism, multiple sclerosis, Alzheimer's and Parkinson's diseases, is associated with microbiome disorders, including sinonasal. Autoimmune diseases that are inherited in families are now explained not by the inheritance of the genetic information of the person himself, but by the inheritance of pathological features of the microbiome [2, 6].

Bacteria that inhabit the intestines are involved in the process of digestion of food, in the regulation of the immune system, protect a person from pathogenic microorganisms, and participate in the synthesis of vitamins (thiamine, riboflavin, B12, K). Almost all components of the human immune system are formed under the influence of the microbiome of the upper respiratory tract (URT). It is known that the microorganisms themselves, vegetating in the nasal cavity and pharynx, or their metabolic products directly or through epithelial cells affect dendritic cells and macrophages. The composition of the intestinal microbiome determines the functions of CD4 and CD8 T cells and the production of antibodies in respiratory infections, in particular influenza A [1, 4, 7].

The number of microorganisms that inhabit the surface of our skin and hollow organs significantly exceeds the number of the body's own cells. According to rough estimates, the total number of cells in the human body is 1013, while the number of bacteria reaches 1014, viruses - 1015, fungi - 1012. The number of microorganisms vegetating in the human body is 100 times more than the population of the Earth, their total mass reaches 2 kg , while the main part inhabits the large intestine [2, 3].

Pathogenetic aspects of the development of CRS are widely studied, however, it has not been possible to identify the mechanism and sequence of biological processes leading to the formation of polyposis structures. The main condition for the development of CRS is the violation of biological processes at the cellular level of the macroorganism in combination with the influence of various environmental factors [5].

In the pathogenesis of chronic polyposis rhinosinusitis, disorders in the immune system play an important role, but data on its condition in patients are contradictory. Modern research is carried out in various directions: a search is being made for genetic, environmental, individual characteristics of the clinical course of the disease [4].

One of the unresolved problems is the recurrence of CRS, which is stated in 30–60% of cases, while there are still no clear prognostic criteria for the risk of recurrence of the pathological process [3, 6].

The primacy of conservative treatment of CRS, the minimal invasiveness of surgical intervention and its mandatory combination with preoperative drug preparation are generally accepted positions throughout the world, but at present there is no clearly developed algorithm of actions in relation to various forms of CRS [4].

The search for patterns of endo- and phenotopic features of the clinical course of CRS with the determination of significant diagnostic criteria and the development of differentiated treatment tactics for various clinical forms of the disease led to the present research.

Purpose of the study. Improving the surgical treatment of chronic rhinosinusitis through a complex effect on the main pathogenetic links of the disease.

Materials and methods of research. The object of the study was human material, the microbiota of the nasal cavity. The material was obtained from female and male patients aged 40 to 70 years, a total of 70 people (50 patients in the study group and 20 patients in the control group).

Inclusion criteria: the study group consisted of patients with a clinically verified diagnosis of chronic polypous rhinosinusitis without concomitant inflammatory (purulent maxillary rhinosinusitis) pathology.

The control group was represented by patients without polyposis and concomitant inflammatory and allergic pathology of the mucous membrane, operated on for rhinoseptoplasty. The inclusion of patients in the study and control groups was carried out with the documented consent of the patient.

Results of the study. All patients underwent a complete clinical preoperative examination, including endoscopic examination of the nasal cavity, computed tomography in the axial and coronary projection, to assess the severity and extent of the disease.

Clinical manifestations of chronic rhinosinusitis are the result of functional disorders of the mucociliary transport system, calorific function, local immunity of the mucous membrane of the nasal cavity and paranasal sinuses, and nasal breathing disorders due to obstruction of their lumen by polyposis growths.

Chronic rhinosinusitis develops against the background of a moderate T-cell immunodeficiency; in patients with a recurrent course of the disease, they are more pronounced and are not corrected, do not normalize after surgical treatment.

Changes in the enzymatic activity of peripheral blood neutrophil granulocytes in patients with chronic polyposis rhinosinusitis are associated with exacerbations of the inflammatory process; in the postoperative period, phagocytic activity is normalized in the absence of relapses of the disease, so a long-term decrease in succinate dehydrogenase activity can serve as a prognostic marker for the likelihood of recurrence of the disease.

The results of a morphological study of removed polyps make it possible to make adjustments to the treatment complex and can be used to predict the outcomes of treatment of chronic polyposis rhinosinusitis.

Endoscopic endonasal methods of surgical treatment in combination with pathogenetically substantiated drug treatment with simultaneous and sequential local application of sorbents, surface-acting pharmaceuticals, intra-sinus low-energy laser phoresis and enterosorption, in comparison with the results of traditional treatment, can achieve a significant improvement in the health and quality of life of operated patients.

The developed methods of complex treatment of chronic polyposis rhinosinusitis are effective both in the primary and in the recurrent form of the disease.

Conclusion. Analysis of the results of combining surgical treatment with new sorption drugs of general and local action, surface-active drugs shows that the proposed complex method of treatment can significantly increase the effectiveness of the treatment of patients with chronic polypous rhinosinusitis and the prevention of its recurrence.

Thus, the results of our study convincingly confirm one of the key roles of eosinophils in the development and progression of chronic rhinosinusitis. Histological analysis of polyposis tissue showed that in the early stages, eosinophils, accumulating under the mucous membrane of the nasal cavity, infiltrate it and participate in the formation of cystic transformation of glands filled with a fluid rich in protein component (inflammatory detritus).

Reducing or eliminating the effect of eosinophils on the nasal mucosa can be of significant strategic importance in the prevention of growth and recurrence, as well as the choice of treatments for XP.

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ОСОБЕННОСТИ ПРОЯВЛЕНИЙ АРТЕРИАЛЬНОЙ ГИПЕРТЕНЗИИ У БОЛЬНЫХ ПОДАГРОЙ

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Аннотация: *ведущей причиной смерти больных подагрой являются сердечно-сосудистые заболевания (ССЗ), обусловленные атеросклеротическим поражением сосудов. На основании анализа данных литературы показано, что тщательный мониторинг артериального давления и поражения органов-мишеней служит основой профилактики развития у больных подагрой ССЗ и кардиоваскулярных катастроф. Данная статья основана на изучении литературы по данной ситуации. Вся информация, представленная в статье, была тщательно проанализирована в ходе изучения литературы.*

Ключевые слова: *подагра, сердечно-сосудистые заболевания, артериальная гипертензия.*