

Immunological Parameters in Patients with Chronic Cystic Sinusitis

Khayitov A.A., Nasretdinova M.T., Ziyadullayev S.X., Shadiev A.E.

Abstract. Diseases of the paranasal sinuses (DPN) are the most common pathology in otorhinolaryngology. According to the literature, it is known that cystic sinusitis is an infectious and allergic disease, and the formation of cysts is considered as the result of an allergic reaction to infection in sensitized patients. Adverse environmental impact on the immunological system of the human body, reducing natural resistance, increasing the degree of allergization of the population contributes to increased rate of respiratory diseases. In this regard, it is relevant to study the indicators of immunity in patients with chronic cystic sinusitis. We examined 138 patients with chronic cystic sinusitis aged 17 to 64 years. Conducted immunological study of the state of cellular and humoral immunity in accordance to recommendations of the Institute of Immunology. A comprehensive immunological examination revealed a sharp imbalance of immunological parameters in serum, nasal flushes and cystic fluid in patients with chronic cystic sinusitis. In addition to etiological and pathogenetic treatment in patients suffering from chronic cystic sinusitis, it is necessary to include immunomodulators and immunostimulators.

Introduction. Diseases of the paranasal sinuses (DPN), sinusitis-are among the most common pathologies in otorhinolaryngology[3,6]. This is facilitated by changes in the environmental situation in the world, the wide prevalence of both allergic and viral respiratory diseases, the irrational use of antibacterial drugs, and decline of immunological mechanisms of defence. According to the literature, it is known that cystic sinusitis is an infectious and allergic disease. The formation of cysts is considered as a result of an allergic reaction to infection in sensitized patients[10]. To date, the causes of cysts have not been clarified, so further in-depth study of various factors that may affect the course of the inflammatory process remains relevant. In a modern city, people exposed to a complex of environmental factors that adversely affect their health. The leading one is multi-factoral air pollution, which occurs as a result of intensive development of industry and transportation [2]. We have identified an adverse effect of environment on the immune system of the human body - the formation of secondary immunosuppression, reduced natural resistance, increased the degree of allergization of the population, resulting in high rates of overall morbidity and primarily affecting the respiratory tract that is characterized by high radiation, dust and fumes in the environment.

Currently, the influence of three factors - dust, carbon monoxide and sulfur dioxide-on the incidence of acute respiratory infections, bronchitis and pneumonia has been reliably proven. These agents and their various combinations affect the incidence of laryngitis, pharyngitis, rhinitis, and sinusitis [5,8]. The increased content of harmful substances in the inhaled air has not only a general adverse effect on the body, but also leads to a degradation of normal functions of the nasal cavity, i.e. weakens its protective capabilities, which increases the risk of rhinitis and sinusitis. In connection with the above, it was considered important to study the indicators of immunity in patients with chronic cystic sinusitis [2,4,7,9]. The aim of the study was to observe the state of immunological reactivity in patients with chronic cystic sinusitis.

Materials and methods of research. 138 patients with chronic cystic sinusitis aged 17 to 64 years were examined, including 65 women (47%) and 73 men (53%) who applied to the clinic No. 1 of the Samarkand State Medical Institute. For examination, patients with chronic cystic sinusitis were selected with a prescription of this pathology for at least 2 years and there were no concomitant inflammatory diseases. The diagnosis was made on the basis of patient complaints, anamnesis data documented in outpatient records, clinical manifestations of the disease, x-ray, computed tomography examination of the paranasal sinuses (PNS) and the results of maxillary sinus puncture. To determine the regional physiological norm, all the indicators used were determined in 54 clinically healthy donors aged 17 to 50 years of both sexes from the number of volunteers with no history of chronic inflammatory diseases. Immunological indicators of the physiological norm in flushes from the maxillary sinuses were determined in 23 healthy persons from the number of military conscripts. Immunological study included a detailed determination of 3 links of the immune system: all stages of phagocytosis (% of phagocytic cells, phagocytic number and phagocytosis completion index - PCI) and nst-test, rosette formation reactions - active, spontaneous, and with loads of levamisole and theophylline, concentrations of immunoglobulins of classes A, M, G and secretory IgA (sIgA), as well as the content of lysozyme and circulating immune complexes (CIC).

We studied the state of cellular and humoral immunity according to the recommendations of the Institute of Immunology. Blood for research was taken in the morning on an empty stomach from the ulnar vein. To determine the cellular level of immunity, blood was placed in a heparinized test tube at the rate of 20 units of heparin per 1 ml of blood. The isolation of immunocompetent cells was performed by a conventional method using a ficol-verografin gradient. Mononuclear suspension was studied in a cell concentration of at least 1 million cells per 1 ml.

To study the state of local immunity, cystic fluid was used, which was obtained by means of a diagnostic puncture of the maxillary sinus and was aspirated into a sterile syringe. Further calculation took into account the 1:10 dilution.

Results and discussion. A comprehensive immunological examination revealed a sharp imbalance of immunological parameters in serum in patients with chronic cystic sinusitis. First of all, attention is drawn to the marked decrease in all indicators of serum immunoglobulin content, as well as secretory Ig A (table 1). It should be noted that the physiological norm of the content of immunoglobulins in serum is located within a fairly wide range. For example, the range of "normal" values for Ig A is from 1.7 to 2.55 g / l, and for sIgA - from 1.65 to 2.65. The same significant fluctuation in their indicators is observed in patients with chronic cystic sinusitis. It seems more convenient to use this indicator in the form of the Ig A/ sIgA index in practical health care. In healthy patients, it is equal to 1, i.e. 1: 1, and in patients with chronic cystic sinusitis, it changes significantly and is 3:1. In all the examined patients, this index was the most constant value, i.e. its fluctuations were minimal.

Table 1. the content of immunoglobulins A, M, G and sIgA in blood serum in patients with chronic cystic sinusitis and in healthy individuals.

Subject	The concentration of immunoglobulins (M+m)			
	Ig A	Ig M	Ig G	sIgA
Ill	1,25+0,23	0,66+0,073	7,93+0,87	0,91+0,41
Healthy	1,89+0,19	1,55+0,061	9,76+0,7	2,1+0,3

Analyzing the phenomenon of a sharp decrease in the content of immunoglobulins of all classes in the examined patients, it can be assumed that this is the manifestation of a fairly common genetic immunodeficiency condition in all classes of immunoglobulins. In the literature, this category of patients is described as a group of frequently admitted and long-term care patients. In most cases, the anamnesis data corresponds to this description.

When further analyzing the results of immunological examination of individuals with chronic cystic sinusitis, the following origin of the phenomenon of deficiency in all classes of immunoglobulins seems more likely, namely: characterizing the indicators of the macrophage system, it should be noted that the percentage of phagocytic cells is usually increased, which is quite consistent with the classical course of the inflammatory process, but the ability of phagocytes to capture and digest the pathogenic object is reduced (table 2).

In this case, we are probably dealing with a genetic defect of the a-link of the immune system, which entails to the theory of the three-link immune system, a weak immunological signal to the B-link. Thus, the decrease in serum levels of immunoglobulins of all classes in patients with chronic cystic sinusitis appears to be mediated.

This assumption is supported by increase in the value of the nst test to 56.5 ± 3.4 (with a norm of 22.5 ± 2.3).

Table 2 Indicators of phagocyte activity in patients with chronic cystic sinusitis in healthy

Subject	The studied indicators (M+M)			
	%f. K	f. number	NRF	Nst-test
Ill	71,97+7,8	2,4+0,32	0,433+0,046	56,5+3,4
Healthy	55,2+2,04	6,84+0,35	0,76+0,01	22,5+2,3

Defect A-link - poor recognition, capture and digestion of pathogen - creates conditions for the transition of the inflammatory process in chronic, since it entails a high concentration of this agent in the patient's body, i.e., a high degree of sensitivity, as manifested in the examined in the reaction of immunoparalysis. The high percentage of phagocytic cells and the increased values of the nst test are obviously compensatory. Describing the indicators of the T-system in chronic purulent sinusitis (table 3), it should be noted that the number of active test on the formation of the rosette in the resection reaction in these patients is slightly increased compared to the norm, but statistically unreliable.

Table 3 Indicators of the functional ability of the T-system in patients with chronic cystic sinusitis

Patients	The studied indicators (M+M)			
	test on the formation of the rosette active	test on the formation of the rosette spontaneous	test on the formation of the rosette (theophylline)	test on the formation of the rosette (levamisole)
Ill	59,85+3,1	53,77+2,1	43,26+3,6	50,35+3,8
Healthy	52+2,8	55+2,0	53,5+5,2	54,3+4,5

During stress tests, a decrease in test on the formation of the rosette with theophylline was detected, while the indicators of spontaneous tissue-forming test on the formation of the rosette cells with levamisole almost coincide with the lower limit of the norm, i.e. they are statistically unreliable.

The most interesting indicator here is already known and actively used by immunologists is index-the ratio of T-helper /T-suppressor: normally in healthy people, it is 0.5+0.03 or 1:2, and in patients with chronic purulent sinusitis, its indicator was significantly changed to the value of 1.16+0.04, which corresponds to the ratio of 1:1 .

Analyzing the state of non-specific resistance, we noted a significantly increased concentration of CIC in serum of patients with chronic cystic sinusitis (98.7+8.2 units of opt.pl) compared to the norm (25:3.2 units of opt. pl). A high level of CIC corresponds to the immunological manifestations of chronic inflammation in the body and may reflect the failure of the phagocytosis process.

The detected decrease in the lysozyme index in blood serum - 3.28+0.18 mkg/l (at the norm of 3.7±0.09 mkg/l) may be a sign of exhaustion of this system due to the age and severity of the inflammatory process occurring against the background of a defect in the a-link of the immune system. The immunological characteristics of patients with chronic cystic sinusitis are supplemented by a study from the maxillary sinuses, the results of which are presented in table 4.

Table 4 Content of AMG class immunoglobulins from cystic fluid and in flushes in patients with cystic sinusitis and healthy individuals (M+m)

Patients	The concentration of immunoglobulins (M+m)			
	Ig A	Ig M	Ig G	sIgA
Ill	0,713+0,09	0,102+0,013	0,219+0,02	0,265+0,018
Healthy	0,36+0,001	0,195+0,009	0,143+0,017	0,29+0,015

In cystic fluid in chronic cystic sinusitis, there is an almost double increase in the content of serum Ig A, Ig G and a noticeable decrease in serum Ig and secretory IgA compared to the same indicators in healthy volunteers. This ratio of serum immunoglobulins is quite consistent with the reaction of the B-link immunity to chronic inflammatory process, but a significant decrease in the content of sIgA, apparently, pathognomonic for this category of patients, because it reflects the initial weakness of the local immune system of the nasal cavity and paranasal sinuses.

In flushes, as in blood, with a wide range of values of IgA and sIgA. The ratio of IgA/sIgA was the least subject to fluctuations and at the same time the most constant. In healthy patients, it was 0.98+0.032, and in patients-1.86-0.04. For convenience, we have expressed this ratio in the form of an "immunoglobulin" index, which is 1:1 in healthy people and 2:1 in patients.

Indicators of non-specific resistance in cystic fluid from the maxillary sinuses in chronic cystic sinusitis are presented in table 5.

Table 5 indicators of non-specific resistance of cystic fluid and in flushes in patients with cystic sinusitis and healthy individuals.

Patients	The studied indicators (M+M)	
	CIC(unitopt. pl)	Lysozyme (mkg / l)
Ill	51,27+5,2	2,06+0,06
Healthy	28+4,6	3,36+0,07

An increase of almost twice the normal CIC content in flushes from inflamed maxillary sinuses corresponds to immunological manifestations of the inflammatory process.

The fact that in the body of patients with chronic cystic sinusitis, the level of CICs is increased both in the blood serum and in sinus flushes, suggests a possible participation of the autoimmune process in the pathogenesis of this disease.

The content of lysozyme in flushes from the maxillary sinuses, as well as in the blood serum is reduced. Obviously, this phenomenon is still systemic. It is possible that the reduced antibacterial capabilities of immunological factors in the maxillary sinus-secretory immunoglobulin and lysozyme are a predisposing factor in the formation of a chronic process in this organ.

Conclusions

1. Chronic cystic sinusitis develops against the background of a significant immunological imbalance - a decrease in the indicators of immunoglobulins and lysozyme in both blood serum and exudate from the maxillary sinuses.

2. The most accurate immunoglobulin imbalance characterizes the ratio of IgA/sIgA, which is normally 1:1 both in the blood serum and in sinus flushes, and in patients suffering from chronic cystic sinusitis it is 3:1 in the blood serum and 2:1 –from the cystic contents of the maxillary sinuses.

3. Patients with chronic cystic sinusitis, disturbed the ratio T-helper/T-suppressor = 1:1 (in healthy individuals - 1:2).

4. The complex etiologic and pathogenetic treatment of patients suffering from chronic cystic sinusitis you need to include immunomodulators and immunostimulants, particularly active against A-of the immune system.

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