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Diagnosis and treatment of chronic tonsillitis in children at the present stage. (Literature review)

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Abstract. The high prevalence of chronic tonsillitis among children, the lack of consensus on the occurrence and development of the disease, the lack of effectiveness of conservative methods of treatment, as well as the adverse effect of the pathology of the palatine tonsils on the course of some diseases of the internal organs indicate the need for further research in this area. Given the extreme urgency of this problem, it is quite understandable to pay close attention to it from national and international scientific medical associations. In assessing the health status of the population, indicators of the prevalence of chronic ENT diseases play an important role. Timely study of the prevalence and structure of chronic tonsillitis allows planning and improving specialized ENT care, developing not only specific treatment and prevention tactics, measures for each patient who applied, but also evidence-based measures to improve the organization of the ENT service.

Keywords: chronic tonsillitis, pharyngoscopy, tonsillitis, modern treatment approaches

Despite numerous studies and a variety of treatment methods, the incidence of chronic tonsillitis (CT) does not decrease and, according to various authors, ranges from 4 to 15%, CT accounts for 23.7% of all diseases of the pharynx [15, 17]. In addition, chronic tonsillitis (CT) remains a very common problem at the present stage [1,2], especially taking into considiration that the main group of patients with CT are people of working age [14]. There is a trend towards an increase in the number of patients with CT, with the highest incidence observed in the age group of 16–20 years [16,20].

CT classification according to B.S. Preobrazhensky and V.T. Palchuna explains the toxic-allergic nature of the disease, which is mainly due to the most studied etiological factor of this disease - group A beta-hemolytic streptococcus [20,24,49, 54,55]. Most of the described and proven metatonsillar complications are associated with this pathogen: rheumatic fever, myocarditis and diseases of the valvular apparatus of the heart, nephropathy caused by immunoglobulin (Ig) A [3,8,9,12,13,14].

In the development of CT, viral-bacterial-fungal associations are often of predominant etiological significance [12,28]. So, in 38.9% of patients with chronic tonsillitis, along with bacterial microflora, the presence of yeast-like fungi of the genus Candida is noted . At the same time, the resistance of bacteria to antibiotics and other chemotherapy drugs in the presence of fungi of the genus Candida increases several times [12].

Upper respiratory tract infections are among the diseases frequently encountered in outpatient practice. In this case, the most significant bacterial pathogen, as indicated by previous authors, is group A β-hemolytic streptococcus (GABHS) . It is well known that GABHS infections of the pharynx may develop early purulent (abscesses, phlegmon) and late immune-mediated (acute rheumatic fever (ARF), post-streptococcal glomerulonephritis) complications that can be successfully prevented by timely administration of adequate antibiotic therapy (ABT).This microorganism can also produce numerous invasive factors that make it possible to penetrate into tonsillar epithelial and lymphoid cells. In the human body, the main reservoir of GABHS is the pharynx. In childhood, adenoviruses and other respiratory viruses are often revealed in the removed tonsils, the place of which in the etiology and pathogenesis of CT has not yet been finally determined [1,2,4,7,8,12,13,14,17,18].

Taking into account the extreme urgency of this problem, it is quite clear that national and international scientific medical associations pay close attention to it. Thus, over the past 5 years, updated versions of the recommendations were prepared by expert groups of the American Heart Association (American Heart Association (AHA) and the American Academy of Pediatrics (American Academy of Pediatrics (AAP)), as well as the American Society for Infectious Diseases (Infectious disease Society of America (IDSA)) [41]. Accurate official statistics on the epidemiology of GABHS infections is not available. However, according to the results of American researchers, almost every child who has reached the age of 5 has a history of GABHS infection of

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the pharynx, and a 13-year-old - up to 3 episodes of the disease. The cost of direct and indirect expenditure associated with each case of GABHS tonsillitis /pharyngitis is $205, and when extrapolated to the entire US population, from $224 million to $539 million annually. [1,4,7,8,12].

Among the foci of chronic infection in the body, chronic tonsillitis occupies one of the first places in terms of frequency and variety of pathogenic effects and complications on other organs and systems [7]. Recent studies have shown that the primary link in the pathogenesis of chronic tonsillitis is the immunodeficient condition state of the body, due to the genetic regulation of the immune response [6,9].

At present, there are many controversial and unclear questions regarding the pathogenesis of HT. Since there are lymphogenous connections of the palatine tonsils with other organs, the spread of toxic, metabolic, immunoreactive , allergic factors from the palatine tonsils is not excluded [2,4].

The problem of inflammatory diseases of the lymphoid pharyngeal ring (LPR) of Pirogov - Valdeira does not lose its relevance, despite significant advances in clinical medicine, and is the area of responsibility not only of the otorhinolaryngologist , but also of therapeutis, pediatricians and general practitioners. This is largely due to the widespread prevalence of this pathology among children and young and middle-aged people, fairly frequent episodes of exacerbations and a high risk of negative effects on the other human organs and systems. Such a significant impact on the human body of the lymphoid tissue (LT) of the pharynx is predetermined by its active participation in the formation of local and general immunity [2,21,22]. LHA is part of the body's lymphoid system associated with mucous membranes - the MALT system (mucosa associated lymphoid tissue).

In the pharynx, the MALT system is represented by the palatine, tubal, pharyngeal (nasopharyngeal), and lingual tonsils, as well as accumulations of LT on the walls of the pharynx, piriform sinuses, and larynx. The MALT system differs from other organs of immune protection by constant contact with the external environment, lymphoepithelial symbiosis (permeability of the epithelium for lymphocytes and antigens), and the presence of immunoregulatory effects. In the last decade, Toll-like receptors (TLR is a class of cellular receptors that recognize stable structures of microorganisms and activate cellular immune response) have been found in the reticular epithelium of the palatine and pharyngeal tonsils and the mucous membrane of the respiratory tract , which have become an important link in the study of the functional features of LHA [4, 19].

Antigenic stimulation of LHC structures is realized sequentially step by step with the participation of lymphocytes - at the 1st stage, the antigen is presented by cells of peripheral lymphoid organs, including regional lymph nodes draining LHC; the 2nd step is the stimulation and expansion of those B- and T-effector clones that respond to this antigen; subsequently , the immune response is maintained and regulated. [4,19].

It should be noted that the pharyngeal LT does not have afferent vessels in the presence of a significant network from leading collectors; from the structures of the pharynx, depending on their location, the lymph enters the cervical and submandibular lymph nodes. An important feature is the presence of lymphatic outflow from LHC formations to a number of brain centers, for example, to the region parahypophysis , as well as to the ganglia of the autonomic nervous system, including the vagus nerve [4,13].

The central link of the Pirogov -Valdeira LHA is the palatine tonsils (NM), which play a leading role in the pharynx in normal and pathological conditions, due to their location at the intersection of the respiratory and digestive tracts and the presence of branched lacunae that increase the area of the surface in contact with antigens. The functional participation of NM in the protective and adaptive reactions of a person is represented by lymphopoiesis , the formation of antibodies and secretory Ig , the regulation of phagocyte migration processes, exocytosis and phagocytosis, the production of natural antibiotics (defensins , lactoferrin), proteolytic enzymes (protease, lipase, glycosidase , phosphatase) and lysozyme, as well as a number of other processes. NM actively produce lymphocytes; perform a hematopoietic function, especially marked in childhood [4,19].

Microorganisms are constantly present in the lacunae of the NM ; it is on the surface of the epithelium of lacunae that recognition, phagocytosis, and presentation of antigens to LT cells occur, where an adequate immune response is induced, antigen-specific T- and B-cell reactions. Under normal conditions, microorganisms living on the mucous membrane of the NM cannot penetrate into the deep layers of the tissue and provoke the formation of an inflammatory process. The presence of regional foci of infection, suppression of specific and nonspecific factors of the natural resistance of the human body, and other unfavorable moments cause the development of mucosal dysbiosis , which leads to an increase in the synthesis of invasive enzymes, a decrease in the barrier function of the epithelium, and the introduction of pathogens. [4,19,20].

Acute infectious processes play one of the important roles in the development of pathological changes in LT [4,19,21]. The development of a chronic inflammatory process in the NM, as a rule, is preceded by pectoris; the patient may know exactly the day of its onset or it develops imperceptibly against the background of frequent acute respiratory diseases (ARI) and regional foci of infection. NM, being an organ of immune defense, are secondarily involved in the inflammatory process. Repeated episodes of inflammation lead to desquamation of the epithelial layer in the lacunae and the accumulation of detritus in them, proliferation of connective tissue in the thickness of the tonsil and an attempt to limit the focus of infection in this way. Adhesions and scars appear in the parenchyma and on the surface of the LT, which block the lumen of the lacunae and prevent the evacuation of their contents, which leads to the development of an inflammatory process in the structure of the tonsils in the form of consecutive lacunar, parenchymal atous and sclerotic stages of chronic tonsillitis (CT).

Against the background of a chronic pathological process, a delayed hypersensitivity to microbial antigens is formed in the tissue of the tonsils, which contributes to the aggravation of the course of tonsillitis. Long-term interaction of the infectious factor with lymphoid structures causes an increase in the proteolytic activity of macrophage enzymes, followed by destruction of the tonsil tissue; while the damaged proteins are converted into autoantibodies . Already with the initial manifestations of CT, an infectious-allergic inflammatory process occurs in the LHC zone, which indicates the need to consider this disease as a focal infection, the successful treatment of which is an urgent task of medicine at the present stage [4,12,19].

The effect of chemotherapy on the formation of pathology of the heart, joints and kidneys is well studied and described, however, there is evidence of a more global impact of tonsillar pathology on the human body. Thus, CT creates real prerequisites for the development of dermatoses; in a certain way affects the occurrence and course of collagenoses (systemic lupus erythematosus, scleroderma, hemorrhagic vasculitis , periarthritis nodosa, dermatomyositis, polyarthritis); has an adverse effect on the formation of the reproductive system in girls; can significantly weaken the accommodative apparatus of the eye. The infectious-toxic mechanism of liver damage, neuroendocrine disorders, weakening of the pancreatic islet tissue function, and paroxysms of loss of skeletal muscle tone in CT are described. Modern studies have proven the pathogenetic role of apudocytes (APUD cells) of the tonsils in the development of immunodeficiency states [4,12,19].

ChT is not a focal pathology [22]. The literature on otorhinolaryngology related to laboratory diagnostics mainly covers the issues of determining the levels of immunoglobulins, cytokines in the secretion of the mucous membrane and blood, indicators of a general clinical blood test, antistreptolysin-O , rheumatoid factor, C-reactive protein (CRP) (pentamer) [2, 4, 6].

Not every laboratory in a city or district hospital performs a blood test for cytokines . Indicators of a general blood test are informative only with an obvious purulent process. With sluggish chronic inflammation in the palatine tonsils, such an analysis is not informative [9]. For example, the level of antistreptolysin-O increases in response to an infection, the reaction manifests itself only on the 7–9th day of the disease [10]. As for acute -phase indicators of inflammation, usually confirming a bacterial infection, they are often guided by the levels of fibrinogen, CRP (pentamer) [10, 11]. But the method for determining these indicators is not entirely accurate compared to enzyme immunoassay methods for studying, for example, highly sensitive CRP

(monomer). The level of highly sensitive CRP in the blood increases after 6–8 hours from the onset of the disease and decreases quite quickly, which indicates the effectiveness of the prescribed treatment and can contribute to early diagnosis, differential diagnosis in these nosological forms [12].

Activation of blood coagulation is closely associated with inflammation and is necessary to limit the focus of infection or infectious agents by surrounding them with fibrin . microclots [13–15].

Disturbance of hemostasis in the purulent-septic process is accompanied by an increase in fibrin formation , a decrease in the activity of natural anticoagulants, as well as suppression of the fibrinolytic potential system [10–15]. At the same time, there is also a certain dynamics of mediators and markers of inflammatory reactions - cytokines . Pro-inflammatory cytokines , among other functions, stimulate the activation of hemostasis due to the expression of tissue factor and inhibition of anticoagulant and fibrinolytic blood systems [13–15].

Features of the course of hemostatic reactions in chronic pathologies of the paranasal sinuses and palatine tonsils are not sufficiently covered in the literature, there are no guidelines to predict the severity of the course of this pathology. There are no works devoted to early and sensitive diagnosis, prediction of the course of CS, including chronic purulent sinusitis (CS), CT, PA simultaneously in terms of CRP and D-dimer . [2,5].

The problem of treating patients with CT remains extremely relevant in otorhinolaryngology [3–8,14,15]. This is due to the general trend of increasing incidence of CT , treatment failure, high recurrence rate , as well as a small number of studies on the role of conjugation of hemostatic reactions and inflammation in the genesis of the disease [3–8, 15–18,].

Miramistin is a drug capable of exerting antibacterial, antifungal, antiviral and immunomodulatory effects , which prompted some researchers to use this drug for the treatment of chronic nonspecific compensated tonsillitis by washing the lacunae of the palatine tonsils.

A method for determining the functional activity of the palatine tonsils, developed at the St. Petersburg Research Institute of Ear, Throat, Nose and Speech by E. L. Popov and I. P. Pushchina in 1987, is based on the quantitative assessment of lymphocytes, epithelial cells and microorganisms in a suspension obtained by flushing from the depths of the lacunae of the palatine tonsils with a fixed volume of sterile saline [2,9]. Using this method, a standardized drop of material was sown on blood agar and after 24 hours the number and type of bacterial colonies grown were counted. The second drop was used to fill the Goryaev chamber, where lymphocytes and epithelial cells were counted. Thus, the use of this method makes it possible to quantitatively and objectively evaluate the immunomodulatory and antibacterial effects of the studied solutions.

After using this drug, the authors came to the conclusion that the drug miramistin in the treatment of chronic tonsillitis makes it possible to achieve subjective and objective improvement in the patient's condition on average 3-4 days earlier than in the treatment with furacilin . The data obtained indicate that the use of miramistin increases the effectiveness of the treatment of chronic tonsillitis, as evidenced by the functional activity of the palatine tonsils and the data of the clinical picture. At the same time, the drug Miramistin favorably combines immunomodulatory and sanitizing properties.

The following conclusions were made on the basis of the obtained data on ELISA methods in the diagnosis of chronic sinusitis and chronic tonsillitis. The patterns of changes in the indices of CRP and D-dimer during CT, which reflect the reactions and interaction of the two most important systems (inflammation and hemostasis), revealed in the work, can be attributed to general pathological reactions of the human body. Timely study of the level of CRP and D-dimer in the blood of CT patients will allow early and sensitive diagnosis, predict the course of the disease, and ultimately improve the effectiveness of treatment of patients with these nosologies. [12,16].

One of the priorities of public health is the health of the nation, and all forecasts and prospects for the social and economic development of a high standard of living, science and culture are determined by the successes achieved in reducing the incidence, prevalence and maintaining the working capacity of the population. [14,17].

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ENT diseases , being one of the most common among the population of all age groups, are among the priority problems of modern healthcare. The treatment of these patients presents great difficulties, since the percentage of recurrence ENT diseases and their transition to chronic forms not only does not decrease, but also tends to increase. In the structure of outpatient care, 15% are patients with ENT pathology. In the structure of the reasons for all visits to the clinic, otorhinolaryngological diseases occupy the 5th place. At the same time, the majority (94%) of those who applied are people of working age, i.e. that part of the population, on the shoulders of which lie the development and maintenance of the state.[2,12].

In a megapolis, a person is often subject to stressful situations, the ecology of a large city also contributes to the occurrence of ENT diseases , aggravation and chronicization of existing ones. The high prevalence of otorhinolaryngological diseases often leads to the development of complications, leads to a significant decrease in the quality of life, the general level of health of the population, and an increase in the number of primary disability [16].

In assessing the health status of the population, indicators of the prevalence of chronic ENT diseases play an important role. Timely study of the prevalence and structure of diseases of the ear, throat and nose allows planning and improving specialized ENT care, developing not only specific treatment and prevention tactics, measures for each patient who applied, but also scientifically-based measures to improve the organization of the ENT service . [2,4].

In order to carry out measures to prevent otorhinolaryngological pathology, improve medical care for patients, medical specialists, healthcare organizers need to have information about the prevalence of diseases of the ear, throat and nose, as well as the degree and nature of the influence of various medical and social factors on the occurrence, recurrence and chronicity of this pathology. One of the main methods of statistical survey of the prevalence of focal infection of the population is to determine it according to the data on the appeal to outpatient clinics. [15].

Chronic tonsillitis remains the most common focal pathology. Some researchers indicate that the number of cases of this pathology during the study period increased by 3.1% (2009 - 29.5%; 2013 - 32.6%). Undoubtedly, the increase in the incidence of chronic tonsillitis and the increase in both local and general complications depend on the state of the preventive direction in the work (primarily dispensary observation) of the outpatient service. [14]. The study of the adequacy of dispensary observation of patients with chronic tonsillitis in the city's polyclinics showed that the dispensary registration groups are undoubtedly small, and patients who require radical sanitation of the inflammatory focus in chronic tonsillitis are not promptly referred for surgical treatment, which is a gross violation of the existing diagnostic and treatment algorithm.

One should also take into account the fact that in such a large metropolis as Moscow, a large number of medical and preventive institutions of federal and departmental subordination, self-supporting medical institutions, as well as private, commercial ones, where a certain part of the urban population appeal for medical help, are concentrated. Information about the work of these institutions is not amenable to statistical accounting and is not available in the Bureau of Medical Statistics [15]. It should be noted that the monitoring of the health status of the population, the creation of specialized data banks of ENT morbidity are the main components in determining the tasks and ways to improve ENT care in large industrial cities of the country.[14].

CT is currently interpreted as an infectious-allergic disease with local manifestations in the form of a persistent inflammatory reaction of NM, morphologically expressed by alteration, exudation and proliferation, leading to inhibition of nonspecific factors of the body's natural resistance , impaired humoral and cellular immunity, characterized by periodic exacerbations in form of pectoris. In 2-4% of patients, CT has a " anginless " form. According to the literature , 5-10% of adults and 10-15% of children suffer from HT, but its real prevalence in the population has not been studied enough.

Local signs can be a significant amount of caseous masses and liquid pus in the lacunae, hyperemia of the anterior palatine arches and thickening of their edges, adhesion of the palatine arches to the tonsils, regional (maxillary) lymphadenitis. More than 2 signs in any combination are required to make a diagnosis. Patients with CT may also complain of constant or periodic

discomfort and pain in the pharynx at rest and when swallowing, in the region of the lymph nodes - located along the anterior edge of the upper tertiary sternocleidomastoid muscle, a feeling of "fullness" in the tonsils, bad breath, coughing up purulent plugs. Common manifestations of tonsillogenic intoxication include malaise, subfebrile condition, more often in the afternoon, sweating,early fatigue [2,5,6,7].

The evidence of local signs of HT does not always correlate with the severity of the disease; changes in the pharyngoscope picture are not associated with the functional activity of the tonsil tissue. In some cases, the symptoms of CT practically do not bother the patient, which does not exclude the negative impact of tonsillar pathology on the body and the formation of diseases associated with it.

Diagnosis of CT is based on the data of anamnesis, pharyngoscopic picture and the results of clinical and laboratory studies. Laboratory methods for diagnosing CT are not essential for confirming the presence of the disease, however, they play a certain role in assessing the impact of a chronic focus of infection in the tonsils on various organs and systems and on the whole organism. The choice of treatment method depends on the form of chemotherapy, the general condition of the patient, the presence of concomitant diseases [2,5,26,8,9].

At present, CT classification made by B.S. Preobrazhensky, V.T Palchun and I.B. Soldatov is widely used. The first is based on the frequency of exacerbations and local symptoms of tonsillar infection , as well as on the presence and severity of toxic-allergic reactions and associated diseases. This classification considers 2 forms of CT - simple and toxic-allergic form (TAF), in which 2 degrees are distinguished (TAF 1 and TAF11).

Classification by I.B. Soldatova, based on an assessment of the state of the body's reactivity and the barrier function of the tonsils, also distinguishes 2 forms of CT - compensated and decompensated, which are not strictly stable. If a decompensated form of CT is diagnosed, it is necessary to indicate how decompensation manifests itself in this case [13,14,15,19,20].

In the absence of absolute indications for the removal of the tonsils, conservative treatment seems to be the most appropriate, preserving the immunological functions of RT. Criteria for the effectiveness of conservative treatment of CT are disappearance of pus and pathological contents of the lacunae of the NM; decrease in the severity of local signs of the disease; decrease in the frequency of pectoris or their absence; improvement in general condition. CT therapy, as a rule, involves the use of a complex of local and systemic therapeutic effects: sanitation of regional foci of infection, washing the lacunae of NM, physiotherapy, the appointment of adaptogens, antioxidants, phytopreparations , homeopathic medicines. One of the most important directions in the treatment of patients with CT is immunocorrection [2,3,4,5].

Among the domestic immunomodulators is the original drug Galavit ® (LLC " Salvim ", Russia), the active substance of which is sodium aminodihydrophthalazinedione , which mainly affects the cellular link of immunity and has a fairly marked anti-inflammatory, as well as antioxidant and regenerative effect. [17,31] . The main effect of Galavit ® is its selective effect on the functional and metabolic activity of phagocytic cells, primarily monocytes/macrophages, neutrophils, NK cells, which is manifested by an increase or decrease in their activity depending on the initial values. Galavit ® regulates the proliferation of T- and B-lymphocytes, stimulates the synthesis of endogenous α- and γ-interferon, normalizes the level of IgG, IgM and IgA and their affinity.

Tonsillectomy (TE) is a routine operation in the practice of an otorhinolaryngologist . And although this operation is considered to be very safe, nevertheless, it is associated with such possible complications as bleeding, infections, swelling of the tongue, trauma to the glossopharyngeal nerve, carotid artery. Very rare complications of TE are subcutaneous emphysema of the face and neck, pneumomediastinum, and pneumothorax [5,6,7,8,9].

Removal of the tonsils, tonsils and adenoids in childhood increases the long-term risk of respiratory allergic and infectious diseases, is shown in the study published in the Journal of the American Medical Association "Otolaryngology - Head and Neck Surgery" (JAMA) shows. Otolaryngoloy - Head and Neck surgery).

The palatine and nasopharyngeal tonsils, strategically located in the nose and throat, respectively, are the first line of defense to recognize airborne pathogens (bacteria and viruses) and to cause an immune response to destroy them. Pathological growths of the nasopharyngeal tonsils are called adenoids, and inflammation of the palatine tonsils is well known as tonsillitis.

The wide prevalence and global impact of tonsillar pathology on many human organs and systems predetermine the relevance of the problem of chronic tonsillitis (CT). In connection with the extremely important role of the palatine tonsils in the processes of immunogenesis, indications for tonsillectomy should be strictly defined. In the absence of absolute indications for the removal of the tonsils, conservative treatment seems to be the most appropriate, preserving the immunological functions of the tonsil lymphoid tissue. The use of immunotropic therapy with the use of the drug Galavit ® makes it possible to increase the effectiveness of the treatment of patients with CT - to reduce the frequency of exacerbations (tonsillitis) and increase the duration of remission. [11,16,17].

Scientists from Australia, Denmark and the US offer an updated assessment of alternatives to common pediatric surgeries to remove the tonsils (tonsillectomy) to treat chronic tonsillitis or to the adenoids (adenoidectomy) to treat recurrent middle ear infections [10,12,15].

A team of researchers followed the health of 1,189,061 children born in Denmark between 1979 and 1999 for 30 years. Of these, during the first 9 years of life (this is the time when these tissues are most active in the developing immune system), 17,460 people underwent adenoidectomy, 11,830 tonsillectomy , and 31,377 adenotosillectomy (both tonsils and adenoids were removed). The children had no other diseases. The analysis showed the following:

Based on the statistics, scientists have calculated that one in five patients after a tonsillectomy develops an upper respiratory tract infection that would otherwise not occur otherwise.

Thus, some of the short-term benefits of the operation do not offset the long-term risks, which either increase significantly after the operation or do not change significantly [5].

More and more information is emerging about the function of immune tissues and the consequences of their removal. They are especially expressive during periods when the body develops, so researchers note the need to remove the tonsils and adenoids only if there are serious problems.

The scientists conclude that in many cases the operation should not be rushed; in mild cases, dynamic observation would be a reasonable choice.

Summarizing the review of literary sources, we came to the coclusion that the interest of scientists in CT in the modern world remains high due to the high prevalence, frequent complications, which leads to significant social and material damage. Due to the active implementation of modern diagnostic methods, pathogens have been discovered and characterized, as well as a number of immunopathological patterns, but despite this, the complexity of the multifaceted problem of chemotherapy determines the need to find ways to optimize both the diagnosis and treatment of this disease [5, 19,20].

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