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Diagnosis and Treatment of Adenoiditis in Children

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RESUME. Chronic inflammation of the lymphoid structures of the nasopharynx is often found in the practice of an outpatient and inpatient doctor, has a tendency to relapse and complications from the middle ear.

Most often, this pathology occurs in pediatric practice due to the peculiarities of the nasopharyngeal microbiome, virulence and invasiveness of microorganisms; anatomical and physiological features of the structure and proximity of the pharyngeal tonsil (GM) to the pharyngeal mouths of the auditory tubes, which provide aeration of the tympanic cavity and maintain normal tubotympanic pressure and the immunobiological state of the body.

In the treatment of chronic inflammation of the adenoids, numerous methods and means are used, but their effectiveness is still insufficient.

One of the causes of long-term, sluggish, recurrent, difficult to treat chronic diseases is a decrease in the body's resistance. Such changes occur primarily due to the frequent and unjustified use of systemic antibiotic therapy, including against the background of a reduced reactivity of the immune system in frequently ill children.

KEYWORDS: recurrence of inflammatory diseases, exudative otitis media, polymerase chain reaction, upper respiratory tract, acute, chronic.

Relevance. Currently, it is believed that respiratory viruses play a special role in the occurrence and recurrence of inflammatory diseases in the nasopharynx, in addition to the bacterial flora, the formation of biofilms and herpes infections. However, their occurrence in patients with GM pathology has been little studied, diagnostic and prognostic criteria, including the complicated course of this pathology, have not been defined.

An analysis of the frequency of visits of children with complaints of difficulty in nasal breathing and hearing loss after adenotomy shows that the surgical intervention, unfortunately, does not always guarantee against recurrence of the growth of the lymphoid tissue of the brain and the development of exudative otitis media (ESO). In many cases, relapses of lymphoid tissue hypertrophy are associated with its incomplete removal, since surgery is still often performed without visual control; may be due to the anatomical features of the structure of the nasopharynx in children and the prolapse of lymphoid tissue into the nasal cavity. The presence of concomitant allergic diathesis and replication of viruses on the lymphoid tissue of the brain can also contribute to the development of the disease, the formation of a cicatricial adhesive process in the nasopharynx and tubal zone, and compensatory hypertrophy of the tubal tonsils.

A number of foreign authors have shown that at least one respiratory pathogen is detected in the intraoperatively obtained GM tissue by polymerase chain reaction (PCR). However, there are practically no such studies in children who received conservative treatment (outpatient). Clarification of the characteristics of the nasopharyngeal microbiome in patients with inflammation of the GM can increase the effectiveness of treatment, including reducing the frequency of recurrence of GM tissue growth and complications from the middle ear.

Purpose of the study. To improve the efficiency of diagnosis and treatment of chronic inflammation of the pharyngeal tonsil, relapses and related complications based on determining the role of respiratory viruses in the pathogenesis of the disease in childhood..

Materials and research methods. We examined 36 children suffering from this disease in order to perform the task, assess the condition of adenoiditis, treat it, and make a diagnosis.

Research results. In recent decades, there has been a significant increase in diseases of the upper respiratory tract (URT) (both acute and chronic), including those associated with the environmental situation, especially in large cities. The prevalence and growth of this pathology is a serious medical and social problem associated with an increase in the economic costs of treatment. Especially in the pediatric population, among all diseases of the upper respiratory tract, the frequency of adenoiditis (inflammation of the pharyngeal tonsil) is maximum. Chronic adenoiditis is noted in 20% - 50%, and in frequently ill children, the frequency of its occurrence reaches 70%. From the position of modern immunology, the Pirogov-Waldeyer lymphoid ring (which includes the pharyngeal tonsil) is assigned the role of mucosal immunity, which monitors the state of immunity of the upper and lower respiratory tract and the gastrointestinal tract. Upon contact of the mucous membrane of the



pharyngeal tonsil with various antigens (endo - and exogenous), an immune response develops, leading to the development of an inflammatory process, which can also take a chronic / recurrent course.

To date, adenoiditis is considered as a polyetiological inflammation of the pharyngeal tonsil, which is based on a violation of immune processes, often accompanied by its hyperplasia.

In the international classification of the ICD - 10, there is no allocation of adenoiditis to a separate nasological group. Doctors use the following codes.

Acute nasopharyngitis is characterized by seasonality, mainly in the autumn-winter and spring periods, the etiological cause of it is the variety of viruses that are tropic to the epithelium of the upper respiratory tract, and is often accompanied by a diagnosis of acute respiratory viral infection (ARVI). In Russia, influenza and SARS account for up to 90% of all morbidity. Quite often, repeated SARS provoke a local inflammatory process in the nasopharyngeal tonsil, which, with frequent contact with respiratory viruses that cause SARS and influenza, can take a chronic course. It is believed that chronic inflammation of the pharyngeal tonsil with its concomitant hyperplasia is associated with a violation of local and immaturity of systemic immunity in children.

Analysis of the results of microbiological examination of nasopharyngeal swabs showed that the main aerobic bacterial pathogens are *Streptococcus Pneumoniae*, *Hemophilia influenzae* and *Moraxella catarrhalis*, and anaerobic - *Peptostreptococcus spp.*, *Prevotella spp.*, and *Fusobacterium*.

There are works that propose to identify the bacterial flora using mass spectrometry rather than culture of microbial markers, as this reveals additional changes in the microbiome of the nasopharyngeal mucosa.

In any case, if the microbial balance (normobiome, individual for each person) is disturbed, commensal microorganisms become pathogenic and are able to induce and maintain inflammation and, as a result, hypertrophy of the pharyngeal tonsil.

Chlamydial infection also plays a role in the formation of hypertrophy and chronic inflammation of the pharyngeal tonsil. There is evidence of a role for *Chlamydia pneumoniae* in upper respiratory tract disease and pharyngeal tonsil hypertrophy.

To clarify the role of leukotrienes in the development of pharyngeal tonsil hypertrophy, a study was conducted to evaluate the expression of cysteinyl leukotriene-1 (CysLTR-1) and cysteinyl leukotriene-2 (CysLTR-2) receptors in lymphoid tissues in children with pharyngeal tonsil hypertrophy. The presence of CysLTR-1 and CysLTR-2 in the removed lymphoid tissue was determined by immunofluorescence. CysLTR-1 and CysLTR-2 were most pronounced in patients with pharyngeal tonsil hypertrophy, which allowed us to conclude that they are involved in the development/maintenance of pharyngeal tonsil hypertrophy.

It is necessary to take into account the complexity of the interaction of the immune, nervous and endocrine systems at the cellular, tissue, organ levels, due to both genetic and environmental factors acquired under the influence of adverse environmental factors. The features of the influence of environmentally unfavorable factors on changes in the immunity of children have been established. In the course of the studies, it was proved that in practically healthy children living in conditions with a moderate level of environmental pollution, there is a significant inhibition of the phagocytic activity of neutrophils, which was combined with a decrease in the level of CD8+ cells and an increase in CD25+ cells. At a very high level of environmental pollution, immunity is characterized by a deficiency of mature T-lymphocytes and the release of immunocompetent cells with markers of activation (CD25+) and apoptosis (CD95+) against the background of pronounced inhibition of interferon, which contributes to the development of frequent recurrent diseases of the respiratory tract. A decrease in the synthesis of immunoglobulin A (IgA) in children contributes to a slowdown in the elimination of etiologically significant pathogens, which is one of the foundations of the etiopathogenesis of the formation of chronic infections of the upper respiratory tract.

It has been proven that the upward trend and frequency of patients with allergic diseases, including those of the nose and paranasal sinuses, over the past decades, is associated with environmental pollution with pollutants, with the development of agriculture, tobacco smoking and chemicalization of the industry, uncontrolled use of medicines by the population, in particular having antimicrobial activity (systemic and topical antibiotics, antiseptics).

Histomorphological examination of the tissue of the pharyngeal tonsil reveals signs of allergic inflammation: increased permeability of the walls of blood vessels, vasculitis, accumulation of eosinophils, macrophages, plasma and mast cells. In children, allergic rhinitis and chronic adenoiditis are more often combined with each other, and in this situation it is rather difficult to separate the symptoms of these two diseases. In such patients, a vicious circle occurs: with hypertrophy of the



adenoids, a violation of nasal breathing occurs, resulting in a violation of the ventilation of the paranasal sinuses (SNP), an increase in the amount of mucus and a blockage of the lumen of the sinuses with an edematous mucosa; while maintaining the outflow from the SNP, the secret, being transported, covers the surface of the pharyngeal tonsil, contributing to the formation / maintenance of its inflammation and even greater hypertrophy of the pharyngeal tonsil, which leads to a decrease in the aeration of the paranasal sinuses and the progression of sinusitis.

There are works proving the role of gastroesophageal reflux (GER) in the development of inflammation in the nasal cavity and paranasal sinuses, nasopharynx, larynx and middle ear. With GER, acidic chyme is thrown into various parts of the pharynx and reflux-induced damage to the ENT organs (nasal cavity, paranasal sinuses, various parts of the pharynx and middle ear. It was believed that hydrochloric acid causes protein denaturation and necrosis of the esophageal mucosa, however, recent studies show reflux of hydrochloric acid in combination with bile acids has the most damaging effect. A number of authors have suggested the possibility of intracellular penetration of bile acids, which have a cytotoxic and mutagenic effect. At the same time, the frequency of endoscopically confirmed reflux esophagitis ranges from 5% to 12% of cases. Therefore, the influence of this pathology on the formation of inflammation/hypertrophy of the pharyngeal tonsils was not considered in our work. From the above, it follows that there are various mechanisms for the formation of inflammation of the pharyngeal tonsils and there is no consensus on the causes of the onset and development of the chronic process and hypertrophy of the pharyngeal tonsil at the present time..

Conclusion. The clinical picture of inflammation of the pharyngeal tonsil (adenoiditis) is associated with the severity and duration of inflammation of the pharyngeal tonsil, as well as with the possible spread of inflammation to the mucous membrane of the auditory tube and tympanic cavity. Given that the starting point in the development of inflammation of the pharyngeal tonsil is respiratory viruses against the background of a respiratory infection, the clinical picture is characterized by the presence of fever (subfebrile / febrile), nasal discharge, sore throat / sore throat, sneezing, coughing. After a viral infection, children or their parents complain of difficulty in nasal breathing of varying severity, mucous / mucopurulent discharge from the nose, night / morning coughing, sleep disturbances, sleep apnea syndrome, stuffy ears, sometimes hearing loss. Cough is an important clinical sign of postnasal syndrome. Subjective sensations in children are expressed, as a rule, weakly, and are associated with difficulty in interpreting complaints. With rhinoscopy, one can see in the acute period swelling and / or hyperemia of the mucous membrane of the nasal cavity, the presence of discharge in the nasal cavity of a different nature. In the lumen of the choanae during rhinoscopy, one can see adenoid tissue, the surface of which can be covered with a discharge of various nature. With pharyngoscopy, there is a draining of mucous or mucopurulent discharge along the posterior walls of the pharynx, the presence of hyperemia, injection and granulomatous hypertrophy of the mucous membrane of the posterior pharyngeal wall. With otoscopy, the retraction of the tympanic membrane is determined, the shortening of the light reflex, and sometimes the accumulation of fluid in the tympanic cavity. With a long-term process in the nasopharynx and tympanic cavity, there is a persistent violation of the patency of the auditory tube. An adhesive process develops with the formation of scars and adhesions in the tympanic cavity and the formation of retraction pockets.

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