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# Chronic Tonsillitis: Modern Perspectives On Etiology, Pathogenesis, Diagnosis, and Treatment

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**Abstract:** Chronic tonsillitis is one of the most common diseases in modern otorhinolaryngology and represents a long-term infectious-inflammatory process in the palatine tonsils accompanied by local and systemic toxic-allergic manifestations. The disease is characterized by a recurrent course, frequent episodes of tonsillitis, impaired immune response, and the development of complications affecting the cardiovascular, renal, and musculoskeletal systems. The pathogenesis is based on the prolonged persistence of pathogenic microflora, the formation of chronic infection foci, and autoimmune inflammatory mechanisms. This article discusses current data on the functions of the palatine tonsils, the causes of chronic tonsillitis, diagnostic methods, and treatment principles. Particular attention is paid to modern approaches to antibacterial therapy, immunocorrection, and surgical treatment.

**Keywords:** Chronic tonsillitis, palatine tonsils, tonsillitis, Streptococcus pyogenes, immunity, tonsillectomy, inflammation.

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## Introduction

Chronic tonsillitis is a persistent chronic inflammation of the palatine tonsils accompanied by periodic exacerbations in the form of tonsillitis and the development of a general toxic-allergic reaction of the body. The disease occupies one of the leading positions among chronic ENT disorders and has significant clinical importance due to its high prevalence and the risk of systemic complications[1].

The palatine tonsils are part of the Pirogov-Waldeyer lymphoepithelial ring and perform an important protective function. They serve as the first immunological barrier against the penetration of infectious agents through the upper respiratory tract. The lymphoid tissue of the tonsils participates in the synthesis of immunoglobulins, activation of T- and B-lymphocytes, and the formation of local immunity.

With prolonged exposure to pathogenic microflora, the protective function of the tonsils becomes impaired, leading to the development of a chronic inflammatory process. Over time, cicatricial changes of the lacunae are formed, drainage is disrupted, and favorable conditions are created for bacterial persistence and the maintenance of chronic infection[2].

## Materials and Methods

Etiology and Pathogenesis of Chronic Tonsillitis

Chronic tonsillitis is a polyetiological infectious-allergic disease characterized by persistent chronic inflammation of the palatine tonsils, impairment of local and systemic immunity, and the development of toxic-allergic reactions in the body. According to modern epidemiological studies, the prevalence of chronic tonsillitis among the adult population ranges from 5% to 12%, while among children and adolescents it reaches 15–25%, making this pathology one of the most common diseases within the structure of ENT disorders[3].

The palatine tonsils are part of the Pirogov–Waldeyer lymphoepithelial ring and perform important barrier and immunological functions. They participate in the formation of local immunity of the upper respiratory tract mucosa, the synthesis of immunoglobulins, the activation of T- and B-lymphocytes, and the protection of the body against pathogenic microorganisms. Under prolonged exposure to infectious agents, the protective function of the tonsils gradually becomes impaired, contributing to the development of a chronic inflammatory process[4].

The main etiological factor of chronic tonsillitis is considered to be group A  $\beta$ -hemolytic streptococcus (*Streptococcus pyogenes*), which is identified in 30–60% of patients with the decompensated form of the disease. This microorganism possesses pronounced virulence properties due to the production of streptolysin O, streptokinase, hyaluronidase, DNase, and erythrogenic toxins. It has been established that *Streptococcus pyogenes* plays a key role in the development of rheumatism, myocarditis, infective endocarditis, and post-streptococcal glomerulonephritis.

In addition to  $\beta$ -hemolytic streptococcus, the following microorganisms also play a significant role in the pathogenesis of chronic tonsillitis: *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*, anaerobic microorganisms, Epstein–Barr virus, adenoviruses, herpes simplex virus, and cytomegalovirus[5].

According to modern data, an important mechanism of chronic inflammation is the formation of microbial biofilms. A biofilm is an organized colony of microorganisms surrounded by a protective polysaccharide matrix. The presence of biofilms significantly reduces the sensitivity of microorganisms to antibiotics and contributes to the long-term persistence of infection within the tonsillar lacunae. According to Passàli, microbial biofilms are detected in more than 70% of patients with chronic tonsillitis.

Predisposing factors that disrupt the normal functioning of the lymphoid tissue of the tonsils are also of considerable importance. These include:

frequent recurrent tonsillitis; chronic rhinitis and sinusitis; deviated nasal septum; impaired nasal breathing; chronic infectious foci in the oral cavity; dental caries and periodontal diseases; hypothermia; decreased immunological reactivity; smoking; unfavorable environmental factors; occupational hazards; and chronic viral infections[6].

Under normal conditions, the tonsillar lacunae provide self-cleansing of tissues through the evacuation of microorganisms, desquamated epithelium, and tissue detritus. In chronic inflammation, cicatricial changes of the lacunae occur, their drainage function becomes impaired, and favorable conditions are created for the accumulation of caseous-purulent masses and the active proliferation of pathogenic microflora.

### Results and Discussion

The pathogenesis of chronic tonsillitis includes several interrelated components: chronic infectious inflammation, impairment of local immunity, formation of autoimmune reactions, and the development of a toxic-allergic syndrome.

Long-term bacterial persistence leads to constant stimulation of the immune system. In the tonsillar tissue, macrophages, neutrophils, T- and B-lymphocytes become activated, and the production of pro-inflammatory cytokines increases, including:

interleukin-1 $\beta$  (IL-1 $\beta$ ); interleukin-6 (IL-6); tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ); and interferon- $\gamma$ [7].

The increased production of cytokines maintains chronic inflammation, contributes to damage of the tonsillar tissues, and disrupts microcirculation.

Autoimmune mechanisms are of particular importance. Antigens of  $\beta$ -hemolytic streptococcus possess molecular similarity to the tissues of the heart, joints, blood vessels, and kidneys. As a result of the phenomenon of "molecular mimicry," the immune system begins to produce antibodies not only against bacterial antigens but also against the body's own tissues. This mechanism underlies the development of rheumatic complications, myocarditis, endocarditis, and glomerulonephritis[8].

Morphological changes in chronic tonsillitis are characterized by:

hyperplasia of lymphoid tissue; lymphocytic and plasmacytic infiltration; sclerosis of the tonsillar stroma; scarring of the lacunae; dilation of the crypts; formation of caseous-purulent plugs; impaired microcirculation; and dystrophic changes in the epithelium.

Histological studies demonstrate that during the prolonged course of the disease, the number of functioning lymphoid follicles gradually decreases, and the lymphoid tissue is progressively replaced by connective tissue, leading to a reduction in the immune activity of the palatine tonsils[9].

Clinical Presentation:

The clinical manifestations of chronic tonsillitis depend on the form of the disease, the activity of the inflammatory process, and the severity of toxic-allergic changes.

The most characteristic complaints of patients include:

recurrent tonsillitis; persistent or periodic sore throat; a sensation of throat irritation and dryness; bad breath (halitosis); a feeling of a foreign body in the throat; difficulty swallowing; subfebrile temperature; chronic weakness; increased fatigue; and reduced working capacity[10].

According to clinical observations, more than 80% of patients with chronic tonsillitis complain of halitosis caused by the accumulation of caseous masses in the tonsillar lacunae.

In most patients, enlargement and tenderness of the regional cervical lymph nodes are observed.

According to the classification of B.S. Preobrazhensky and V.T. Palchun, the following forms are distinguished:

- simple form of chronic tonsillitis;
- toxic-allergic form of degree I;
- toxic-allergic form of degree II.

The toxic-allergic form is accompanied by systemic manifestations such as:

tachycardia; cardialgia; joint pain; prolonged subfebrile condition; cardiac rhythm disturbances; electrocardiographic changes; and signs of chronic intoxication[11].

In the toxic-allergic form of degree II, pronounced functional and organic disorders of the cardiovascular system, kidneys, and joints develop.

Diagnosis of Chronic Tonsillitis

The diagnosis of chronic tonsillitis is based on a comprehensive assessment of clinical symptoms, medical history data, and laboratory and instrumental examination methods[12].

The main diagnostic methods include:

pharyngoscopy; bacteriological culture of lacunar contents; determination of microbial sensitivity to antibiotics; complete blood count; determination of C-reactive

protein levels; investigation of antistreptolysin-O (ASO); determination of rheumatoid factor; as well as immunological studies and immunogram analysis[13].

An increase in the ASO level above 200 IU/mL indicates a previous streptococcal infection and an increased risk of rheumatic complications.

Modern diagnostic methods include:

PCR diagnostics; investigation of microbial biofilms; determination of pro-inflammatory cytokine levels; and immunohistochemical examination of tonsillar tissues.

To assess systemic complications, the following methods are used: electrocardiography, echocardiography, general urinalysis, biochemical blood analysis, ultrasound examination of the kidneys, as well as consultations with a rheumatologist and cardiologist.

Modern Methods of Treatment:

Treatment of chronic tonsillitis should be comprehensive, staged, and individualized. The main objectives of therapy are the elimination of the chronic infection focus, restoration of the immunological function of the tonsils, and prevention of systemic complications.

Conservative therapy is most effective in the compensated form of chronic tonsillitis.

The main directions of treatment include:

sanitation of the tonsillar lacunae; antibacterial therapy; anti-inflammatory treatment; immunocorrection; and physiotherapy.

Antibacterial therapy is prescribed according to the results of bacteriological examination and the sensitivity of microorganisms.

The duration of antibacterial therapy usually ranges from 7 to 10 days.

Physiotherapeutic methods include: laser therapy, ultrasound therapy, ultraviolet irradiation, magnetotherapy, and low-frequency ultrasound treatment[14].

Surgical Treatment

In cases of decompensated chronic tonsillitis and the absence of effectiveness of conservative therapy, tonsillectomy is indicated.

Absolute indications for surgery include:

frequent tonsillitis (5 or more episodes per year); paratonsillar abscess; rheumatism; myocarditis; glomerulonephritis; septic complications; and toxic-allergic form of degree II.

Modern methods of surgical treatment include:

classical tonsillectomy; laser tonsillectomy; radiofrequency surgery; coblation; and cold plasma ablation.

Coblation is considered one of the most minimally invasive methods of surgical treatment, as it allows reduction of damage to surrounding tissues, decreases the severity of postoperative pain syndrome, and accelerates postoperative recovery.

Chronic tonsillitis is a source of persistent infection and may lead to severe local and systemic complications, including:

rheumatic heart disease; myocarditis; infective endocarditis; glomerulonephritis; infectious polyarthritis; sepsis; paratonsillar abscess; and mediastinitis.

According to the World Health Organization, streptococcal infection remains one of the leading causes of acquired rheumatic heart disease in young patients[15].

Thus, chronic tonsillitis is not only a local ENT disease but also a serious systemic pathology capable of causing immunoinflammatory damage to various organs and body systems.

## Conclusion

Chronic tonsillitis remains one of the most common diseases in otorhinolaryngology and represents an important medical problem due to its recurrent course and severe systemic complications. According to the study findings,  $\beta$ -hemolytic *Streptococcus pyogenes* was identified as the main etiological factor and was detected in 30–60% of patients. In addition, microbial biofilms were found in more than 70% of cases, contributing to the persistence of infection and increased resistance to antibacterial therapy.

Clinical observations showed that more than 80% of patients complained of halitosis caused by the accumulation of caseous masses in the tonsillar lacunae. Modern diagnostic methods and comprehensive treatment approaches play a significant role in the early detection of the disease, prevention of complications, and improvement of treatment outcomes. Thus, chronic tonsillitis should be considered not only a local ENT disorder but also a serious systemic pathology that negatively affects various organs and body systems.

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