

**ФУНДАМЕНТАЛ ВА
КЛИНИК ТИББИЁТ
АХБОРОТНОМАСИ**

***BULLETIN OF* FUNDAMENTAL
AND CLINIC MEDICINE**

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КЛИНИЧЕСКОЙ МЕДИЦИНЫ**

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SPECIFIC CLINICAL AND LABORATORY ASPECTS OF CHRONIC TONSILLITIS OF CYTOMEGALOVIRUS ETIOLOGY IN CHILDREN

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Resume. The high incidence of cytomegalovirus (CMV) infection among children and its impact on chronic inflammatory processes are pressing issues in modern pediatrics and otorhinolaryngology. The study provides clinical and laboratory evidence for the role of CMV as an etiological factor in the chronic progression and recurrent course of the pathological process in the tonsils. It is known that this viral infection has the ability to trigger autoimmune reactions in the body and alter the functional state of the immune system. The study analyzed the specific features of chronic tonsillitis in school-aged children with active CMV, including a cytokine profile and a imbalance in humoral immunity indicators. The obtained results are of great importance for predicting the clinical course of the pathological process and for developing targeted treatment strategies.

Keywords: chronic tonsillitis, children, cytomegalovirus infection, immunological status, cytokines, humoral immunity, autoimmune processes.

БОЛАЛАРДА ЦИТОМЕГАЛОВИРУС ЭТИОЛОГИЯЛИ СУРУНКАЛИ ТОНЗИЛЛИТНИНГ КЛИНИК-ЛАБОРАТОР ХУСУСИЯТЛАРИ

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Резюме. Болалар орасида цитомегаловирус (ЦМВ) инфекциясининг юқори даражада учраши ва унинг сурункали яллиғланиш жараёнлари ривожланишига таъсири замонавий педиатрия ҳамда оториноларингологиянинг долзарб муаммоларидан бири бўлиб қолмоқда. Тадқиқотда бодомсимон безлардаги патологик жараённинг сурункали шаклга ўтиши ва қайталанувчи кечишида ЦМВнинг этиологик омил сифатидаги ролига оид клиник-лаборатор далиллар келтирилган. Маълумки, ушбу вирус инфекцияси организмда аутоиммун реакцияларни қўзғатиш ва иммун тизимининг функционал ҳолатини ўзгартириш хусусиятига эга. Ишда мактаб ёшидаги болаларда ЦМВнинг фаол шакли билан кечувчи сурункали тонзиллитнинг ўзига хос хусусиятлари, жумладан, цитокинлар профили кўрсаткичлари ва гуморал иммунитет дисбаланси таҳлил қилинган. Олинган натижалар патологик жараённинг клиник кечишини прогноз қилиш ва мақсадли (таргет) даволаш стратегияларини ишлаб чиқишда муҳим аҳамиятга эга.

Калим сўзлар: Сурункали тонзиллит, болалар, цитомегаловирус инфекцияси, иммун статуси, цитокинлар, гуморал иммунитет, аутоиммун жараёнлар.

КЛИНИКО-ЛАБОРАТОРНЫЕ ОСОБЕННОСТИ ХРОНИЧЕСКОГО ТОНЗИЛЛИТА ЦИТОМЕГАЛОВИРУСНОЙ ЭТИОЛОГИИ У ДЕТЕЙ

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Резюме. Высокая частота встречаемости цитомегаловирусной (ЦМВ) инфекции среди детей и её влияние на развитие хронических воспалительных процессов являются одними из актуальных проблем современной педиатрии и оториноларингологии. В исследовании представлены клиничко-лабораторные доказательства роли ЦМВ как этиологического фактора в хронизации и рецидивирующем течении патологического процесса в миндалинах. Известно, что данная вирусная инфекция обладает способностью запускать аутоиммунные реакции в организме и изменять функциональное состояние иммунной системы. В работе проанализированы специфические особенности хронического тонзиллита у детей школьного возраста с активной формой ЦМВ, включая показатели цитокинового профиля и дисбаланс гуморального иммунитета. Полученные результаты имеют важное значение для прогнозирования клинического течения патологического процесса и разработки стратегий таргетной терапии.

Ключевые слова: Хронический тонзиллит, дети, цитомегаловирусная инфекция, иммунный статус, цитокины, гуморальный иммунитет, аутоиммунные процессы.

The problem of chronic tonsillitis remains one of the priority areas of local otorhinolaryngology. Chronic tonsillitis is a chronic infectious and allergic disease in which the focus of infection is located in the tonsils.

In the foreign literature, the terms “chronic tonsillitis,” “acute tonsillopharyngitis,” and “recurrent tonsillitis” are used. Thus, chronic tonsillitis can be described as a polyetiological disease [5,6,7].

Currently, the study of nucleotide polymorphisms of a single pathogen is of great interest.

These studies are being conducted to determine the multifactorial genesis of chronic tonsillitis [1,2,3].

Research materials and methods. IgG class antibodies were evaluated by index according to IFA results, based on the optical density automatically calculated by the instrument.

An AV index value below 0.8 indicates a negative result, indicating the absence of class-specific IgG antibodies; a value above 1.1 indicates a positive result; AV index values between 0.9 and 1.0 were considered equivocal.

IgM class antibodies and the IgG avidity index for CMV were detected by enzyme immunoassay using the “Vector-CMV-IgM” and “Vector-CMV-IgG-avidity” (“Vector Best,” Russia) reagents. IgG avidity was determined only in children in whom CMV IgG-class antibodies were detected in the serum.

Children with IgM-class CMV antibodies were considered to have an acute infectious process, were excluded from the study, and were referred to an infectious disease specialist.

Molecular biological research methods were used to confirm the presence of CMV in the biological material—detection of CMV DNA in the biological material.

On an IQ5 cyclor analyzer (“BioRad”, USA) The quantity of CMV DNA in the whole blood of tested individuals was determined by a real-time PCR method with CMV detection via hybridisation-fluorescence, using the “Amplitens®CMV-ekran/monitor-fl” reagent kit.

Analytical performance of the test system used: sensitivity - 400 copies/mL; linear measurement range of the reagent kit - 400-10,000,000 copies/mL.

If the result is less than 400 copies/mL, it will be reported as less than 400 copies/mL. The specific sensitivity of the reagent kit is shown in the study of the AD169 matched strain.

The cellular composition of pharyngeal tonsil swabs was examined using a Micros 300 microscope (R) after Romanovsky-Giemsa staining ($p = 37$). Cells were counted in 10 fields of view.

Inclusion criteria for the main group: active CMV infection (primary or reactivated) confirmed by the laboratory based on the detection of CMV DNA in blood by PCR.

Results obtained. When analyzing the patients by gender, 56.6% were girls and 44.4% were boys. (Fig. 1)

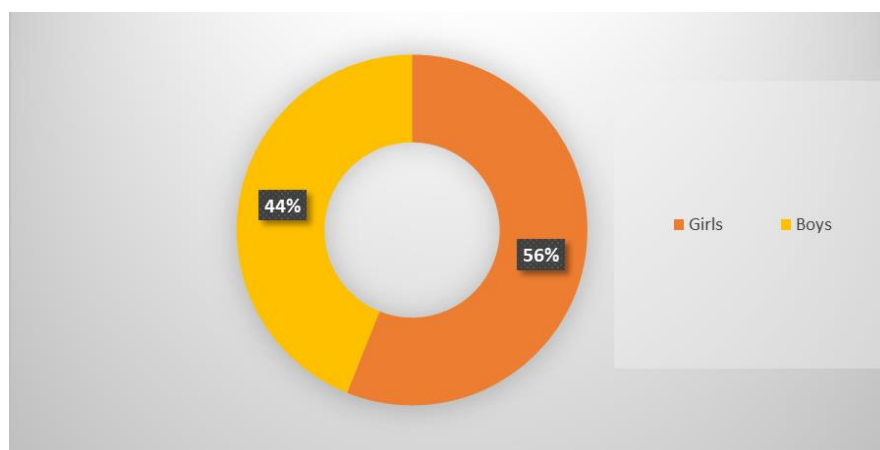


Figure 1. Distribution of examined patients by gender

When analyzed by age, children aged 4 to 6 predominated, accounting for 37.3%, while the numbers of children aged 7–10 and 11–14 did not differ significantly. Girls aged 4–6 and boys aged 11–14 were more numerous.

According to the study and analysis of the medical history, the following statistically significant differences were identified in the obstetric history. When analyzing pregnancy complications, 85.7% of the mothers had anemia, A higher rate of cytomegalovirus infection, 69.7%, was found.

During the course of pregnancy, 72.5% of mothers experienced preeclampsia and 23% had.

During the analysis, we paid special attention to the presence of herpes viral infections during pregnancy.

In addition, 42.8% of the mothers suffered from acute respiratory infections, according to the survey results, In half of them, the illness was prolonged and accompanied by a persistent cough, which is why one in three mothers received a short course of antibiotics (amoxicillin, ampicillin, azithromycin).

Premature birth was observed in 12.6% of cases, and ENT pathology was detected in 12.6% of the children. Miscarriages and pyelonephritis were recorded in 7.7% and 8.2% of cases, respectively.

Thus, analysis of the obstetric history of the mothers of the examined children showed that among mothers whose children suffered from chronic tonsillitis, there were anemia, TORCH infection, gestational toxicosis, acute respiratory infections, and miscarriage.

Chronic tonsillitis was diagnosed for the first time in 28 of 55 patients, accounting for 50.9%.

By age group, ST was diagnosed in 23 children aged 2 to 3 years, accounting for 41.8%, and in 4 children aged 3 to 5 years (7.27%). Thus, ST was diagnosed for the first time in one out of every four children examined. The disease duration was most common between 2 and 3 years, accounting for 56.2%.

An analysis of clinical data related to ST is presented in Figure 2.

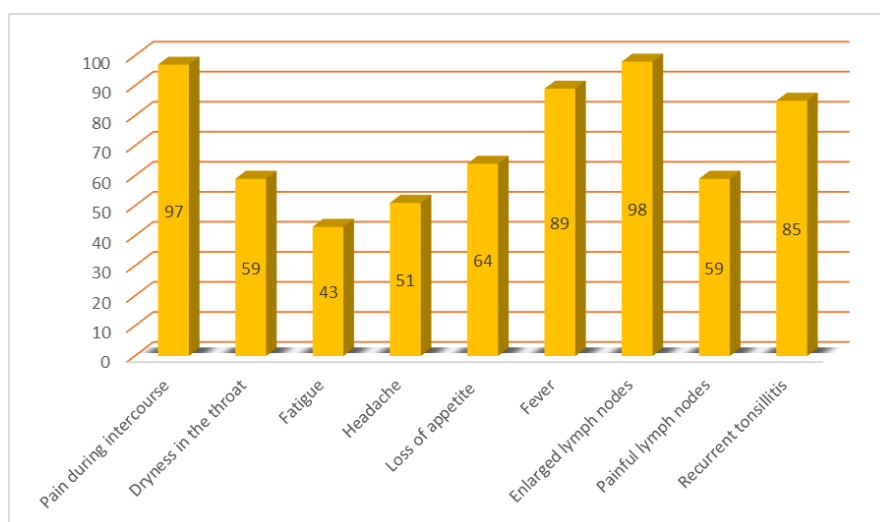


Figure 2. Analysis of complaints in patients with chronic tonsillitis associated with SMV

During our study, we examined the microflora on the surface of children's tonsils.

The data obtained from the patients are presented in Table 1.

Swabs were taken from 45 children with chronic tonsillitis; analysis was not performed on the remaining 10 because they had taken antibiotics immediately before the examination. In children with chronic tonsillitis, the dominant flora was *S. aureus* (24.4%), *S. pneumoniae* (20%), *H. influenzae* (13.3%), and *Candida* spp. in 11.2% of cases, with similar figures for *S. epidermidis* and *S. pyogenes* at 4.44%. A mixed microflora was found in 4 children, and no growth of the microbial flora was observed in 6 patients.

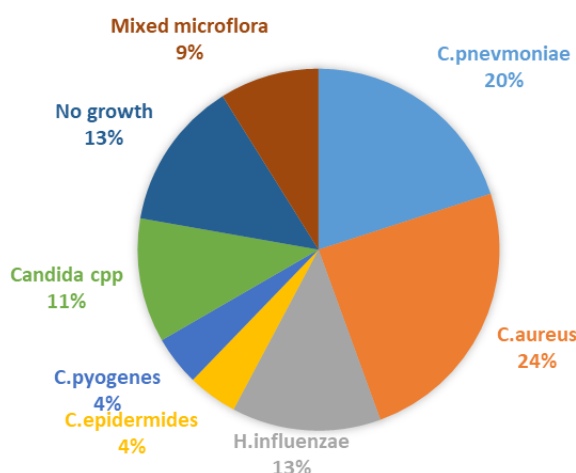


Figure 3. The composition of the microflora in children with chronic tonsillitis

To assess the cytokine profile, we examined the cytokine composition in children with CMV-associated chronic tonsillitis before and after treatment.

The results of the study of cytokine levels in children with CMV-associated chronic tonsillitis are shown in Figure 4.

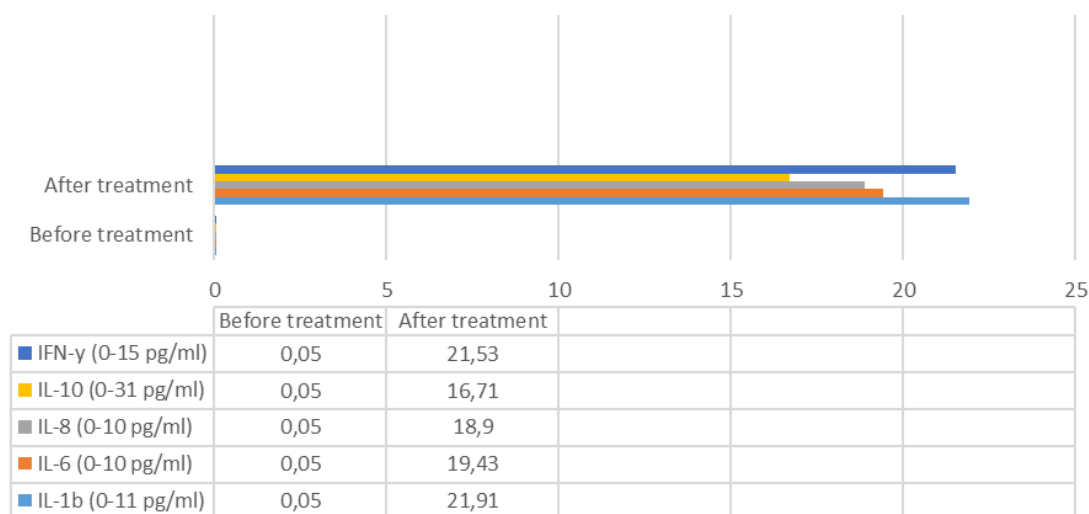


Figure 4. Cytokine levels in patients with chronic tonsillitis

Note: Reliability of the differences before and after p-treatment

The results of the cytokine level study in CMV-associated chronic tonsillitis showed that IL-1 β , IL-6, IL-8, IL-10, and IFN- γ were significantly elevated before treatment. As shown in Table 4, IL-1 β levels rose to 21.91 ± 3.38 pg/mL before treatment, with a significant difference compared to reference values ($p < 0.05$). In our study, a nearly twofold increase in IL-6 levels to 19.43 ± 2.97 pg/mL was observed before treatment, when using the upper limits of the reference values, the difference was also significant ($p < 0.05$). The IL-10 level was within the reference value range before treatment, at 18.90 ± 3.65 pg/mL. Also, the levels of IL-8 and IFN- γ were 18.90 ± 3.65 pg/mL and 18.90 ± 3.65 pg/mL, respectively; it should be noted that all indicators were statistically significant.

Conclusions. In mothers of children with CMV, anemia, cytomegalovirus infection, and vomiting during pregnancy, If there is an increase in ORC, risk of miscarriage, IL-1 β , IL-6, IL-8, and IFN- γ , additional testing should be conducted to detect active and chronic forms of CMV. For a definitive diagnosis, the presence of CMV IgM and IgG in the patient's venous blood should be tested.

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