

MEDICINE

FEATURES OF THE COURSE OF TONSILLITIS IN CHILDREN INFECTED WITH THE HERPES VIRUS

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ABSTRACT

The article presents the features of the clinical course of tonsillitis caused by hemolytic streptococcus in children infected with human herpes simplex virus type 6 (HHV 6). It was revealed that tonsillitis in children with background infection with HHV 6 is characterized by a prolonged course, prolonged maintenance of fever, impaired general condition, the presence of signs of hepatomegaly and regional lymphadenitis, and as a result, a longer stay of such patients in the hospital. The characteristic clinical and laboratory features of tonsillitis in children infected with HHV 6 include the presence in the debut of the disease subfebrile body temperature, regional lymphadenopathy, hepatomegaly, thrombocytopenia, signs of a parenchymal reaction of the liver and mesadenitis. Latent HHV 6 infection in children affects the frequency of registration and the duration of certain symptoms of tonsillitis.

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Tonsillitis is one of the most common diseases of childhood, they are diagnosed worldwide in about 6-8% of the outpatient population [1]. But the most common this pathology is among the children's population. It is known that the peak in the prevalence of tonsil hypertrophy and adenoid hypertrophy occurs at the age of six, and it is at this age that chronic tonsillitis is more often decompensated [2, 3].

Not only the acute period of tonsillitis attracts the attention of scientists, but also the likelihood of further development of the pathology of the immune system, the development of sensitization and chronic intoxication, due to the persistence of various microflora in the tonsils, the breakdown products of tissue proteins [4, 5].

Beta-hemolytic group A streptococci are most often isolated from the surface of the tonsils – up to 30% [6, 7]. Many authors consider streptococcal tonsillitis in childhood as a trigger for certain somatic diseases, such as glomerulonephritis, rheumatoid arthritis, rheumatism, and others. [8, 9]. Acute rheumatic fever in 40-60% of cases leads to irreversible autoimmune damage of the heart valves and the development of chronic rheumatic heart disease [10, 11, 12, 13].

Recent decades have been characterized by an increase of children infected with herpes viruses, among which special attention is drawn to type 6 human herpes virus (HHV-6), the clinical manifestations of which vary from asymptomatic carriage to severe CNS lesions [14, 15, 16].

It is known that replication of HHV-6 with a horizontal transmission pathway occurs in the salivary glands, lymphoid tissue of the oropharynx and cervical lymph nodes, followed by damage to lymphocytes (up to 90%), monocyte-macrophage and glial cells, megakaryocytes [17]. This fact explains that the reactivation of chronic HHV-6 infection is often accompanied by inflammation of the lymphoid structures of the oropharynx. The persistence of the virus in the body can also support chronic local inflammatory processes, including chronic tonsillitis in children. Therefore, we considered it appropriate to study the effect of persistence of HHV-6 on the course of tonsillitis caused by hemolytic streptococcus in children.

The purpose of the work is to study the course of streptococcal tonsillitis in children infected with HHV-6.

The study was conducted on the basis of the Regional Children's Infectious Clinical Hospital in Kharkov, where we examined 76 children aged 6 to 13 years, patients with tonsillitis due to hemolytic streptococcus group A. All patients were divided into two groups. The first group included 34 patients with tonsillitis and infected with HHV-6 (mixed infection - the main group), the second - 42 children with tonsillitis without concomitant infection with any viruses (mono-infection - control group). The disease proceeded in moderate form in all children. The final diagnosis was formulated taking into account the results of clinical, bacteriological, virological and serological studies of patients. In all patients by bacteriological examination of smears from the nasopharynx and oropharynx *S. pyogenes* was isolated. In addition, studies of acute phase indices, ECG, ultrasound of the abdominal cavity, heart and lymph nodes (if necessary) were performed. Persistent HHV-6 infection was diagnosed if the patient had high titers of IgG antibodies to HHV-6 (latent form). PCR examination of blood serum and saliva did not detect the presence of the virus. The results of studies of patients on other herpes viruses were negative. Children of both groups were comparable in age (9.91 ± 1.53 and 11.06 ± 1.05 years, $p > 0.05$) and gender. Static processing of the results was carried out using Excel and Statistica 6.0.

The results of the study. A comparison of the main clinical symptoms of patients showed that at the onset of the disease, in both study groups the main clinical signs were the same. In the vast majority of children, the disease began acutely with an increase in body temperature, impaired general well-being, sore throat, decreased appetite, and reaction of regional lymph nodes. We found differences in the frequency of registration and the severity of some clinical symptoms and indicators of additional examination (table. 1).

Table 1. The main clinical and laboratory parameters of patients, (abs, %)

Symptom		Main group (n=34)		Control group (n=42)	
		abs.	%	abs.	%
1		2	3	4	5
Fever	total	34	44,74	42	55,26
	subfebrile digits	25	32,90	14	18,42
	febrile digits	9*	11,84	28	36,84
General condition disorder		30	39,47	37	48,68
Decreased appetite		28	36,84	35	46,05
Sore throat		28	36,84	33	43,42
Joint pain		15	19,74	26	34,21
Oropharynx hyperemia		34	44,74	42	55,26
membrane on one of the tonsils		8	10,53	15	19,74
Plaque on both tonsils		26	34,21	27	35,53
Language tightness		26	34,21	37	48,68
Enlarged cervical lymph nodes		29*	38,16	14	18,42
Enlarged submandibular lymph nodes		34	44,74	42	55,26
Generalized lymphadenopathy		18*	23,68	6	7,89
Difficulty in nasal breathing		19*	25	7	9,21
Hepatomegaly		18*	23,68	6	7,89

Continuation of table 1.

1		2	3	4	5
Change in heart sounds (auscultation)		25*	32,90	11	14,47
Skin rash		19*	25	7	9,21
Peripheral Neutrophilia		18*	23,68	34	44,74
Accelerated ESR		28	36,84	30	39,47
Thrombocytopenia		18*	23,68	6	7,89
Changes in the clinical analysis of urine		15	19,74	21	27,63
Increased C-reactive protein		23	30,26	29	38,16
Increased O-Streptolysin		22	28,95	34	44,74
ECG changes		29	38,16	28	36,84
Changes in abdominal ultrasound	increased echogenicity of the liver parenchyma	18	23,68	15	19,74
	mesadenitis phenomena	13*	17,11	3	3,94
	hepatitis	14*	18,42	3	3,94
	splenitis phenomena	3	3,95	0	0

Note: * - probability of a sign, $t \geq 2,0$.

An analysis of the medical history showed that the children of the main group were admitted to the hospital on 3.38 ± 0.74 days from the onset of the first symptoms of the disease, and the patients of the control group – 1.18 ± 0.68 ($p < 0.05$). In the history of life of patients with mixed infection, frequent respiratory infections and tonsillitis were noted (7.84 ± 1.08 times a year). The frequency of respiratory diseases in patients with mono-infection was less (4.08 ± 1.17 times a year), $p < 0.05$.

When children were admitted to the hospital, all children had an elevated body temperature. But in patients of the main group a subfebrile temperature reaction prevailed, while in children of the control group more often febrile numbers were recorded ($t \geq 2,0$). Patients of the main group significantly more often noted difficulty in nasal breathing, a rash on the skin, increased cervical lymph nodes, generalized lymphadenopathy, changes in heart sounds during auscultation studies, an increase in liver size based on palpation and percussion of the abdomen ($t \geq 2,0$). The skin rash in patients with mixed infection was mainly spotty-papular, small with a predominant location on the trunk and extremities, in three patients single petechial elements were noted. In all children, the appearance of a rash is regarded as allergic dermatitis.

An additional laboratory and instrumental examination of patients also revealed certain differences. Thus, in the study of peripheral blood indices, neutrophilia typical for bacterial infection was recorded significantly more often in patients of the control group (34 – 44.74 % and 18 – 23.68 %, respectively, $t \geq 2,0$). At the same time, a decrease in platelet count was characteristic of patients in the main group (18 – 23.68 % and 6 – 7.89 %, respectively, $t \geq 2,0$). We did not observe a significant difference in acute phase indices in the acute period of the disease.

Differences were found during ultrasound examination of the abdominal organs of children. Significantly more often in patients with mixed infection, the phenomena of mesadenitis and hepatitis were recorded ($t \geq 2,0$). Additional liver tests did not reveal significant differences in the levels of cytolytic enzymes in the studied groups ($p \geq 0.05$), although an increase in their content was determined in six patients of the main group. By the time patients were discharged from the hospital, the level of cytolytic enzymes of the liver was restored to physiological.

We have analyzed the duration of preservation of the main clinical symptoms in children. The results are presented in table. 2.

An analysis of clinical and instrumental indicators revealed a long-term persistence of fever, symptoms of general intoxication in the form of impaired well-being and decreased appetite, hyperemia of the oropharynx, enlargement of the submandibular lymph nodes, nasal congestion, enlargement of the liver with a parenchymatous reaction of its parenchyma according to ultrasound data in patients of the main group compared with the results of children in the control group, $p < 0,05$. The phenomena of hepatomegaly persisted in the vast majority of patients with mixed infection until discharge from the hospital (13 – 17.11 %). The revealed features of the main clinical symptoms duration in patients of the main group caused their long stay in the hospital (10.11 ± 0.54 versus 8.25 ± 0.35 days, respectively, $p < 0.05$).

Table 2. The duration of the main symptoms, (M \pm m, day)

Symptom	Main group (n = 34)	Control group (n = 42)
	M \pm m	M \pm m
Fever	6,14 \pm 0,67*	4,24 \pm 0,24
General condition disorder	5,23 \pm 0,37*	3,53 \pm 0,42
Decreased appetite	4,47 \pm 0,11*	3,18 \pm 0,27
Sore throat	4,08 \pm 0,28	4,28 \pm 0,67
Joint pain	2,21 \pm 0,38	2,97 \pm 0,34
Oropharynx hyperemia	6,81 \pm 0,64*	5,03 \pm 0,42
Tonsil coating	3,06 \pm 0,33	3,97 \pm 0,44
Language tightness	5,25 \pm 0,35	4,84 \pm 0,27
Enlarged submandibular lymph nodes	7,27 \pm 0,54*	5,81 \pm 0,35
Nasal congestion	4,25 \pm 0,51*	1,98 \pm 0,43
Hepatomegaly	8,47 \pm 0,41*	4,21 \pm 0,50
Parenchymal liver reaction	8,06 \pm 0,29*	4,42 \pm 0,38
Duration of hospital stay	10,11 \pm 0,54*	8,25 \pm 0,35

Note: * - probability of a sign, $p < 0,05$.

Thus, the course of tonsillitis caused by *S. ryogenes* in children against the background of infection with HHV type 6 is characterized by a number of clinical, laboratory and instrumental features. In the history of such children, frequent respiratory infections and tonsillitis occur. Patients with tonsillitis due to infection with HHV type 6 are later admitted to the hospital, which, in our opinion, is associated with subfebrile temperature in the onset of the disease in these children, while in patients with mono-infection febrile fever is more often recorded. The features of tonsillitis in children infected with HHV type 6 also include difficulty in nasal breathing, a rash on the skin, an increased cervical lymph nodes, generalized lymphadenopathy, changes in heart sounds, hepatomegaly, and the absence of changes typical of a bacterial infection in the analysis of peripheral blood with frequent thrombocytopenia, as well as the phenomena of mesadenitis and hepatitis according to the results of ultrasound. Children with tonsillitis and HHV infection 6 are characterized by a prolonged preservation of the main clinical symptoms, leading to a prolongation of their hospital stay.

Our results will allow to detect the persistence of HHV type 6 in children in the early stages of tonsillitis without the use of specific expensive studies that are not always available to the population, which will contribute to the timely improvement of therapy and clinical observation of patients.

Conclusions. 1. Latent HHV 6 infection in children affects the frequency of registration and the duration of certain clinical and laboratory symptoms of tonsillitis caused by *S. pyogenes*.

2. The main features of tonsillitis in children infected with HHV type 6 include an subfebrile body temperature, difficulty in nasal breathing, a rash on the skin, an increase in cervical lymph nodes, generalized lymphadenopathy, changes in heart sounds, hepatomegaly, thrombocytopenia, and the absence of a shift in the blood count to the left, and also the phenomena of mesadenitis and hepatitis according to the ultrasound.

3. Tonsillitis in children infected with HHV type 6 is characterized by a longer course of the disease, which leads to a longer hospital treatment.

4. The revealed features of the course of tonsillitis in children against the background of infection with HHV type 6 dictate the need to improve the treatment and rehabilitation of such patients.

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