Bacteriological Methods Determination of the Respiratory Way in Chronic Infection

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ABSTRACT

The great social significance of diseases of the ear, throat and nose is determined by their high incidence in childhood. The prevalence of chronic otorhinolaryngological pathology in children in Uzbekistan ranges from 181.9 to 465.0 per 1000 of the child population, while adenotonsillar pathology occupies a leading position

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The problem of frequently and long-term ill children (FSI) remains relevant. Among young children attending kindergartens, the group of children with frequent and long-term respiratory diseases ranges from 40 to 50% [1]. In 40% of cases, by the age of 7–8 years, a chronic pathology develops in children with CSD, while the risk of chronicity is directly proportional to the increase in the number of ARI episodes during the year [2]. The works of domestic and foreign researchers have shown the etiological and nosological heterogeneity of recurrent respiratory diseases in children with respiratory diseases [3—8].

A feature of the current course of infectious pathology in children is a frequent combination of etiological factors, including viruses, bacteria, fungi and parasitic pathogens. The ability for long-term active persistence is possessed by many infectious agents — representatives of the Herpesviridae family, "atypical" pathogens from the Chlamydiaceae and Mycoplasmataceae families [4,7], bacterial flora of the upper respiratory tract [1,6,9]. Moreover, herpesviruses can cause significant disturbances in the immune status of the macroorganism, thereby forming a vicious circle: chronic active herpesvirus infection - secondary immunodeficiency, against which frequent acute respiratory viral infections are noted [5,7,10], recurrent course of bacterial and parasitic diseases [1,6,10].

Purpose of the work: to present the etiological structure of persistent infections in children with a serecurrent course of respiratory diseases and to evaluate the effectiveness of etiopathogenetic therapy.

Materials and methods of research:

43 children aged from 1 to 17 years who applied to the clinic for frequent respiratory diseases occurring for a long time and in a complicated form (otitis media, tonsillitis,

sinusitis, stenosing laryngotracheitis, bronchitis, pneumonia) underwent a comprehensive clinical, anamnestic and laboratory examination which included: clinical blood count, general urinalysis, determination of the level of alanine aminotransferase and antistreptolysin-O (ASL-O), a study of blood and saliva using a polymerase chain reaction to detect DNA of herpesviruses of type 4 - Epstein-Barr virus (EBV), type 5 - cytomegalovirus (CMV) and herpes type 6 (HHV-6) (determination of IgM antibodies to the capsid antigen, IgG to the early and nuclear antigen of EBV, IgM and IgG to CMV by enzyme-linked immunosorbent assay (ELISA) Qualitative composition of aerobic and facultative anaerobic microflora of the nasal and oropharyngeal mucosa was assessed by a semi-quantitative bacteriological (cultural) method.

Children with repeated diseases of the lower respiratory tract (bronchitis (n = 34), pneumonia (n = 7)), as well as those with prolonged coughing (n = 16) were examined by ELISA for IgM and IgG antibodies to Mycoplasma pneumonia and Chlamydophila pneumonia, and also by PCR on the DNA of these pathogens in the discharge of the upper respiratory tract.

Results and its discussion:

The mean age of the observed children was 5.8 ± 0.9 years. Children from 1 to 2 years old accounted for 14.8%, from 3 to 6 years old - 51.0%, from 7 to 11 years old - 18.1% and from 12 to 18 years old - 16.0%. Boys predominated among those who applied (63%). Among children under 7 years of age, 85.6% attended preschool educational institutions. 35.8% of children had monthly episodes of respiratory disease, 32.9% had 6 to 10 episodes with a “light interval”, as a rule, in the summer months.

Frequent acute respiratory infections (ARI) in an uncomplicated form were suffered by 18.9% of children with respiratory infections, 8.6% of patients complained of recurring tonsillitis, otitis media - 16.0%, sinusitis - 7.0%, stenosing laryngotracheitis - 2.5%, bronchitis - 14.0%, pneumonia - 2.9%. In 39.1% of children with CSD, long-lasting inflammation of the ENT organs was noted: symptoms of chronic adenoiditis in 30.5%, chronic tonsillitis in 6.2%, recurrent sinusitis in 3.3% of children.

The most frequent use of antibiotics was noted in the groups of children aged 3 to 6 years - 5.4 ± 0.2 times a year, and in the age group from 1 to 2 years - 4.9 ± 0.3 times; 3.8 ± 0.2 times a year were used antibiotics among younger schoolchildren, and 3.3 ± 0.2 times per year among children older than 12 years.

During a clinical examination, the phenomena of chronic pharyngitis were noted in 92.2% of children, chronic tonsillitis in 35.0%, adenoid hypertrophy II and III degree in 56.4% of cases, hypertrophy of the tonsils II or III degree - 32.1%, lymphadenopathy of the cervical lymph nodes - 76.1% of children, polylymphadenopathy - 57.2%, hepatomegaly - 63.8%, splenomegaly - 33.3%.

As a result of the survey, markers of active herpesvirus infection were identified in 86.8% of children. Herpes type 6 DNA was detected more often (in 65.4% of cases) and EBV (in 63.7%), less often CMV — in 30.5%. Mixed herpesvirus infection was diagnosed in 56.0% of CSD children: in 16.8% of cases - a combination of EBV, CMV and HHV-6, in 29.6% - EBV and HHV-6, in 4.1% - EBV and CMV, in 5.5% - CMV and HHV-6.

In 30.8% of children with CSD, markers of active herpesvirus infection were detected in the mono variant - in 13.2% - EBV, in 4.1% - CMV and in 13.5% - HHV-6 type. Moreover, if in preschool children in most cases (75.0 ± 3.4%) herpesvirus DNA was detected by PCR in the blood, then herpesviruses were detected less often in FSD of school-age children (66.1 ± 5.2% versus 95.6 ± 1 ,7, $p < 0.001$) and in half of the cases - only in saliva.

In a bacteriological study from the nasopharynx and oropharynx, pathogenic and opportunistic microflora in an etiologically significant amount (> 104 CFU / ml) was determined in 47.3% of the children's respiratory tract. Growth Str. Pyogenes (β hemolytic streptococcus group A) was determined in 23 children (9.5%), among them elevated titers of ASL-O were determined in 17

children. Among the entire group of FDD children, elevated titers of ASL-O were determined in 32 patients (13%). Thus, streptococcal infection was diagnosed in 15.6% of children with CSD, and in 2/3 cases in association with EBV, CMV or herpes type 6 virus infection. Among opportunistic microorganisms, S. aureus was more often detected in a diagnostically significant amount - 38%, fungi of the genus Candida - 16%, less often Str. pneumoniae - 6%, H. influenzae - 5%, B. catarrhalis - 4%, K. pneumoniae - 3%, Ps. aeruginosa - 2%. At the same time, 18% of children had an association of two pathogens, and 7% had three or more. Mycoplasma and chlamydial infection was found in 16 and 7 children, respectively, which amounted to 28.1 and 12.3% of the 57 examined children with recurrent bronchitis, pneumonia or prolonged coughing.

In the presence of a purulent process in the nasopharynx and / or oropharynx, inoculation of group A β-hemolytic streptococcus, or confirmation of mycoplasmal or chlamydial infection, antibiotic therapy was prescribed (n = 57). In the case of a diagnosed streptococcal infection (inoculation of group A β-hemolytic streptococcus or an increase in the level of ASL-O), children received an antibiotic after 10-14 days.

The effect of therapy was assessed by the frequency of exacerbations during the year after treatment, the persistence of complaints in the interrecurrent period (difficulty in nasal breathing and snoring during sleep, low-grade fever, asthenic syndrome).

Clinical improvement was recorded with the relief of catarrhal, lymphoproliferative and asthenic syndromes, a decrease in the incidence to 6 or less episodes of acute respiratory infections per year in preschool children and 4 or less episodes of acute respiratory infections per year in schoolchildren. Laboratory improvement was considered to be cases when the causative agent of the disease was not determined during a second study after treatment. Six months after the start of treatment, 86.4% of patients showed clinical improvement, but by the year from the start of treatment, such an effect could be noted in 77.8%. In 30.9% of patients, by 6 months after the start of treatment, markers of persistent infections were not determined; by 1 year from the start of treatment, 27.2% of such patients remained.

Analysis of the effectiveness of therapy for children with PDD, depending on age, showed the best results in schoolchildren, among whom clinical improvement was noted in 94.3% during the year from the start of treatment. Moreover, in almost half of the schoolchildren, markers of persistent infections were not determined during repeated examinations. The greatest difficulty was the treatment of FDD in children aged 3 to 6 years. A stable clinical effect during the year was achieved only in 67.5% of children of this age, the majority (86.2%) retained markers of active herpesvirus infections during repeated studies

Among PDD children under the age of 3 years, therapy was effective in 91.7% of children by 6 months; and by 1 year after the start of treatment, the clinical effect persisted in 83.3% of patients, despite the detection of markers of active infections during laboratory control. The therapy was highly effective in eliminating group A β-hemolytic streptococcus, the division of which decreased from 9.5 Ґ} 1.8% to 0.8 Ґ} 0.5% ($p < 0.001$) and "atypical" pathogens of respiratory diseases (chlamydia, mycoplasma), the markers of which were not determined in children after 6 and 12 months after treatment.

Isolation of opportunistic microflora in a diagnostically significant titer during bacteriological examination of smears from the upper respiratory tract decreased by 2.2 times (from 41.6 Ґ} 3.1 to 18.5 Ґ} 2.8%, $p < < 0.001$). By 1 year from the start of treatment, the frequency of detection of herpesvirus DNA in the blood decreased by 2.7 times (from 60.1 Ґ} 3.2 to 22.2 Ґ} 2.6%, $p < 0.001$), however, the division of viruses with saliva decreased insignificantly (from 86.8 Ґ} Ґ} 2.1% to 67.9 Ґ} 3.0% of patients, $p < 0.001$). The frequency of antibiotic use in children after treatment of persistent infections decreased by 2.2 times overall. A particularly significant decrease was noted in the group of schoolchildren - by 3.5

times (from 3.3 Ѓ} 0.4 times a year to 0.7 Ѓ} 0.1, $p < 0.001$).

The presented method for diagnosing persistent infections in children with recurrent respiratory infections made it possible to carry out differentiated etiopathogenetic therapy and immunorehabilitation of this group of patients, as a result of which 78% of children achieved a stable normalization of their condition during the year - relief of catarrhal, lymphoproliferative and asthenic syndromes, a decrease in the incidence to 6 or less ARI episodes per year in preschool children and 4 or less episodes in schoolchildren.

Conclusions

1. The recurrent course of respiratory diseases in children in the vast majority of cases is associated with persistent infection.
2. The most frequently detected pathogens of persistent infections are representatives of the Herpesviridae family (herpes virus type 6, Epstein-Barr virus and cytomegalovirus), group A β-hemolytic streptococcus, Staphylococcus aureus.
3. Differentiated etiopathogenetic therapy and immunorehabilitation of CSD in children, depending on the diagnosed persistent infection, makes it possible to achieve stable normalization of the condition in 78% of cases; reduce the frequency of antibiotic use per year by 2.2 times.

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