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DYSBIOTIC UPPER AIRWAY DISORDERS IN CHILDREN WITH ACUTE STENOTIC LARYNGOTRACHEITIS LARYNGOTRACHEITIS

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Abstract:

In children, an increasing number of acute respiratory infections accompanied by airway obstruction very often leads to the development of stenotic laryngotracheitis. The primary factor in this is respiratory viruses, and bacterial flora often joins secondary to modify the course of the disease and determine its outcome. Exposure to infective agents in children promotes chronic infections of the respiratory tract, damaging the ciliary epithelium and weakening its connection with basal cells and the basal membrane, which contributes to the penetration of allergens and other inflammatory stimulants into the submucosal layer.

Keywords: respiratory tract, acute stenotic laryngotracheitis.

INTRODUCTION. Acute respiratory diseases are the leading pathology of childhood. Their share together with influenza is not less than 70% in the structure of all morbidity in children. In recent years there has been an increase in acute respiratory viral infections, accompanied by airway obstruction, among which stenotic laryngotracheitis has a large specific weight [1, 2, 4, 6].

The predominant view in literature is that OSLD is caused by viral infection [1, 3, 5, 6]. There is evidence that the disease can develop against the background of any etiology of respiratory disease. The primary etiological factor is always the respiratory viruses, and the bacterial flora usually joins, modifying the course of the disease, causing complications, and aggravating the condition of patients, which determines its outcome.

PURPOSE OF THE STUDY: study of shifts in the microbiocenosis of the respiratory tract of children in both primary and recurrent laryngotracheitis.

MATERIAL AND METHODS OF INVESTIGATION. The microbial landscape of mucous membranes of the upper respiratory tract (URI) was studied in 107 children aged from 6 months to 5 years with acute stenotic laryngotracheitis by standard methods of bacteriological examination, including culture of nasopharyngeal and oropharyngeal secretions on nutrient media with subsequent identification. All examined children were divided into 2 groups according to the forms of acute stenotic laryngotracheitis according to the classification of Y. V. Mitin (1986):

- Group I comprised 48 (44.4%) children with primary stenotic laryngotracheitis (PSLT)
- Group II: 59 (55.6%) with recurrent stenotic laryngotracheitis.

In addition, all sick children with both PSLT and RSLT were divided by age groups: Group 1 - young children (6 months to 3 years) and Group 2 - children 3 to 6 years and Group 3 - children older than 6 years.

RESULTS: According to our data, OSLT develops more frequently in young children (6 months to 3 years).

In group I - patients with PSLT the majority of children (60,7%) fell ill between 1 and 3 years of age, 16,4% of children fell ill before the age of 1 year, and 23,0% - between 3 years and older. In group II - with PSLT the picture was somewhat different, the incidence at age 3 years and older was almost 3 times higher than in group 1.

We compared the pattern of respiratory dysbiotic changes in the acute period of the disease depending on the age of our patients, and noted frequent lesions of mucous membranes with Staphylococcus aureus in all age groups. In the acute

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period of PSLT in children from 6 months to 3 years, the most severe violations of mucocoenosis of the respiratory tract mucosa were found in both nasopharynx and oropharynx (normal microflora composition was found in 9.5% and 9% of examined patients respectively). In RSLT in the acute period, no such pattern was observed. During remission in PSLT, the normal microbiological composition of the respiratory tract was restored only in half of the examined persons aged 6 months to 3 years; at older ages, the normal nasopharyngeal flora composition was found in 33% of children aged 3-6 years and in 22% of those aged 6 years and older. The normal oropharyngeal microbial landscape in children with PSLT under 3 years of age during remission was found in 50% of cases, and in the other two groups, in only 25%.

In RSLT during remission, recovery of normal flora was observed in only 16% of children from 0 to 3 years of age, and in 50% of cases over 3 years of age the microflora remained normal.

In the acute period, significant shifts in the respiratory tract microbiocenosis were observed in both primary and recurrent SLT. Dysbiotic processes were characterized by infestation of the mucous membranes of the EAP with pathogenic and conditionally pathogenic Gram-positive and Gram- tsal flora, a decrease in the excretion of saprophytic and normal microflora. Staphylococcus aureus is the undisputed leader in this process in the acute phase of the disease. It occurs both as a monoculture and in association with other pathogens. Staphylococcus aureus involvement in the respiratory tract in the acute period is high in both PSLT and RSLT.

Staphylococcus aureus was isolated in the nasopharynx in 28% of the children examined and in 25% of the oropharynx in the acute period with PSLT. In RSLD, the microbe was found in the nasopharynx in 39% of cases and in the oropharynx in 23% of children. In associations, S. aureus was more frequently isolated from the oropharynx in PCLC patients, in 22% of cases.

In the acute period, α-haemolytic streptococcus was detected more frequently in the oropharynx in patients with PSLT (17%), and very rarely in PCLT (2%). In both PSLT and RSLT, E. coli was found on the tympanic mucosa in the acute period (6 and 8%, respectively). In the oropharynx, Candida fungi were detected in 25% of cases in PSLT and 18% in PCLT, and nasopharyngeal fungus mycelia was also detected in both PSLT and PCLT. Complex bacterial associations were not observed in the nasopharynx only in PSLT patients but were found in both nasopharynx (15%) and oropharynx (23% of investigated patients) in RSLT. Gram-positive pathogens in the acute period of SLT are mainly associated with Staphylococcus aureus and are not as highly represented in the EPD as S. aureus.

Complex pathogen associations were more common in older children in the oropharynx (43%) during the acute period of RSLT. The presence of such changes in the microbiocenosis characterises the severity of the dysbiotic processes and the duration of their existence. In acute PSLT, the above patterns were not detected, although pathogens such as Candida, E. coli, Klebsiella were more frequently isolated in older children. Staphylococcus aureus mucosal infections during the remission period are very high in both primary and recurrent SLE. However, the infestation of mucous membranes is more pronounced in PCLS. During PSLT, nasopharyngeal secretion rate of St. aureus is 32% and during PCRT it is practically 50%. (3-Hemolytic Streptococcus aureus occurs in the PSLT organism only in association, and only in the oropharynx, up to 17%; in PSLT, p-hemolytic Streptococcus occurs as a monoculture in the nasopharynx up to 7% and in the oropharynx in association up to 20% of those examined. Pneumococcus in PSLT is detected in the respiratory tract during remission in 13%, and in RSLT only in the oropharynx in 12% of those examined. Complex pathogen associations during remission are found in the nasopharynx almost twice as often in RSLT as in PSLT. In the oropharynx, complex combinations of pathogens in PSLT during remission are detected rather frequently - in 33%, in RSLT - in 26%. Both in the acute period and in remission, phenomena of deepening nasopharyngeal dysbiotic processes are detected in PSLT.

Candida fungi were not detected in the PSLT nasopharynx during remission and were detected in 3% of those examined in RSLT.

In the oropharynx, the rate of detection of these pathogens in both primary and recurrent SLT is about the same at 20%. Klebsiella in the respiratory tract during remission was not detected in PSLT but in 3% of cases in PCRT. The detection of E. coli from the nasopharynx in primary and recurrent SLT is approximately at the same level, at 7% and 6%, respectively. Colonization of the oropharynx by E. coli in PCRT is up to twice as high as in PSLT at 12% and 7%, respectively. The normal flora is predominantly α-haemolytic streptococci in remission, as in the acute period, in both primary and recurrent SLT.

During remission, Staphylococcus aureus isolation from the respiratory mucosa of PSLT was

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more frequent in children aged 3 to 6 years. Staphylococcus aureus was detected as a monoculture in 100% of these children from nasopharyngeal mucosa and in 50% from the oropharynx. Children of this age also had a higher frequency of Candida fungi (75%), pneumococci (50%), complex bacterial associations (75%), and the most aggressive pathogens, S. Haemolyticus (25%) and E. coli (25%). In young children, the composition of the microflora of the ENT during the remission period is mainly represented by Staphylococcus aureus and Pneumococcus aureus (14% each). At older ages, the leading role belongs to Staphylococcus aureus (50%), pneumococcus (25%) and complex microbial associations (50%).

Staphylococcus aureus isolation from the mucosa of the ENT was found in children of all age groups, reaching 83% in older children (nasopharyngeal and oropharyngeal). Complex combinations of pathogens and microorganisms such as E. coli, S. haemoyiticus and Candida fungi were detected mainly in older children during remission. In children over 3 years of age the main representatives of the microflora were S. aureus, pneumococcus, haemolytic staphylococcus (42, 17 and 17% respectively). In this age group, we observed an absence of Gram-negative bacteria, Klebsiella, E. coli, and α-haemolytic streptococcus. Despite frequent administration of antibiotics in children of this age group, Candida fungi and complex associations from the oropharynx were detected in only 8% of subjects.

A high degree of mucosal contamination with Staphylococcus aureus (20%), α-haemolytic streptococcus (20%) and complex associations (30%) was seen in recurrent early and remission periods. A significant decrease of Staphylococcus aureus isolation from the mucous membranes of the AF compared to the acute period was found (from 83 to 20%), and the proportion of α-haemolytic streptococcus at this age (remission period) increased from 0 to 20%; there was also increase of E. coli (from 0 to 10%) and complex associations (from 0 to 30%).

CONCLUSIONS: In the acute period, both PSLT and RSLT have the highest infestation of the respiratory tract with Staphylococcus aureus, particularly in the oropharynx and nasopharynx.

Nasopharyngeal lesions with complex associations of pathogens, especially in RSLP, are more common in older children, which characterizes the greater severity of dysbiotic processes and the duration of their existence in RSLP.

Thus, dysbiotic disorders, supporting chronic inflammatory process on the mucous membranes of the ENT, provide aggravation of laryngeal stenosis degree, increase duration of cough, changes in the lungs and are a risk factor for relapse of stenotic laryngotracheitis

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