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Condition of the Cardiovascular System in Young Children with Recurrent Bronchitis

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Abstract

A number of age-related features of changes in heart activity in patients with recurrent bronchitis have been identified, among which the following can be distinguished: a high frequency of heart rhythm disturbances in children of the younger age group, the predominance of a vertical position of the heart among them, disturbances in the processes of repolarization and partial blockade of the right bundle branches.

Keywords: recurrent bronchitis, repolarization, His bundle, monotonous rhythm.

Relevance. Despite the achievements of medicine in the field of bronchopulmonary pathology in children, bronchitis is the most common form of respiratory pathology, among them the most common is recurrent bronchitis, which attracts the attention of researchers, both to expand understanding of the mechanisms of formation and clinical course of the disease, and for the purpose of elucidation of the role of this lung pathology in the processes of chronic inflammation in the respiratory system [5].

Recurrent bronchitis is a disease in the whole organism, therefore, it is of scientific and clinical interest to understand the essence and degree of involvement in the pathological process of not only the respiratory system, but also the organs associated with it. In particular, the cardiovascular system interacts most closely functionally with the respiratory system. Information is presented on the direction of adaptive changes in the circulatory system during recurrent bronchitis in young children [2,3,5].

Purpose of the study. To study the state of the cardiovascular system in children with recurrent bronchitis.

Material and methods of research. We examined 45 sick children who were currently in the department of young children at the TashPMI clinic, of whom were diagnosed with Recurrent Bronchitis (RB) in the first 3 years of life, including 25 children under the age of 1 year and 12 children 2 years old and 8 children 3 years old. The following research methods were used: clinical and anamnestic, functional and instrumental - ECG Echocardiography. Consultations of narrow specialists; ENT, neurologist, ophthalmologist. Survey – parent surveys.

Analysis of electrocardiographic data in these patients was carried out according to the generally accepted method based on registration of 12 ECG leads. An echocardiogram was performed on a Medison device (Japan) in one- and two-dimensional mode using a sensor with a frequency of 3.5 MHz. Linear morphological indicators were analyzed, indicators of central hemodynamics, blood volumes in relation to the body area of the examined person and a number of indices and coefficients were calculated.

Statistical processing was carried out using the standard computer analysis package Microsoft Excel. the significance of the differences was determined by calculating the Student's t test.

Results and discussion. Children of two age groups with recurrent bronchial pathology are characterized by unidirectional dynamics of the rate and rhythm of heart contractions, which consists in an increase in heart rate and the appearance of sinus arrhythmia. But at the same time, it was noted that the degree of detection of these types of cardiac dysfunction is different in younger and older patients.

Thus, tachycardia was detected in 83.4% of patients in the first year of life and in 65.5% of children from 1 year to 3 years ($P<0.05$). The incidence of severe tachycardia in both age groups was approximately the same (16.7% and 13.8%, respectively), and normal heart rate was significantly more often observed in children of the older age group (16.7 and 34.5%, respectively, $P < 0.05$).Children under 1 year of age with recurrent bronchitis did not have a monotonous rhythm, while in children over 1 year of age, heart rhythm disturbances in the form of pronounced sinus arrhythmia were detected somewhat more often - in 34.5% of patients, in the younger age group the percentage of patients with this type of rhythm dysfunction was 25.0% ($P<0.05$).

In all children of the first year of life with recurrent bronchitis, a vertical position of the heart was noted, including in 73.3% of the EOS was located vertically, and in the remaining 16.7% of patients, a deviation of the EOS to the right was detected, i.e. angle a was greater than +90 °. In the older age group of patients with recurrent bronchitis, the vertical position of the heart was observed in 50.5% of cases, the deviation of the electrical axis of the heart to the right - in 20.5%, the normal position of the EOS was observed in 20.0% of those examined. Lengthening of the Q-T interval, indicating electrolyte imbalance in the myocardium was observed in 33.7% of sick children of the younger age group and in 41.4% of patients older than 1 year ($P>0.05$).

The normal duration of electrical ventricular systole was characteristic of the majority of patients with recurrent bronchial pathology and was detected approximately equally often in patients of different ages (66.7 and 58.6%, respectively, $P>0.05$). Partial blockade of the right bundle branch was detected, respectively, by groups of those examined in 41.7% and 34.5% of cases.

Conclusions. Thus, a number of age-related features of changes in heart activity in patients with recurrent bronchitis have been identified, among which the following can be distinguished: a high frequency of heart rhythm disturbances in children of the younger age group, the predominance of a vertical position of the heart among them, disturbances in the processes of repolarization and partial blockade of the right bundle branches.

These facts reflect age-related patterns and indicate a predominance of heart sensitivity to hypoxia and toxic effects in children of the first year of life compared to patients 2 and 3 years of age.

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