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CHARACTER OF THE CURRENT AND RISK FACTORS OF DEVELOPMENT OF DISORDER OF THE HEART RHYTHM IN CHILDREN

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ABSTRACT
The course, prognosis and mechanisms of heart rhythm disturbances in children differ in adults. This is especially true for newborns and young children, whose conducting system is distinguished by functional and morphological immaturity. In this regard, it is of interest to assess the natural course of cardiac arrhythmias occurring in the perinatal period, to determine the risk factors for the development of arrhythmias in newborns and young children. The study involved 50 children. An assessment of risk factors arising in the perinatal period and potentially affecting the development of cardiac arrhythmias was performed. The collection of gynecological, obstetric anamnesis, data on the course of pregnancy and childbirth, early and late neonatal period, infancy, echocardiography, neurosonography, 24-hour ECG monitoring with the determination of heart rate variability.
KEY WORDS: *heart rhythm disturbances, early age, risk factors for development.*

INTRODUCTION

Cardiovascular diseases are a big problem in pediatric cardiology [2,3]. Heart rhythm disorders are conditions that change in speed heartbeats and their sequence. Unlike adults, cardiac arrhythmias in children are often asymptomatic and can progress from functional arrhythmias to life-threatening conditions, and in 40% of cases they are detected by chance. Prenatally and in the early postnatal period, up to 25% of arrhythmias manifesting in the first year of a child's life are diagnosed [13]. However, at this time, issues related to heart rhythm disturbances in young children remain poorly understood [3,6]. Later, the first electrocardiography in our country, the inability of children to formulate their complaints, nonspecific clinical manifestations, as well as the inability to conduct not only stress tests and electrophysiological research methods, but also daily electrocardiographic monitoring Holter makes it difficult to diagnose arrhythmias in children of the first year of life [10]. Heart rhythm disorders occur at different stages of a person's life. The leading etiopathogenetic factors in the development of cardiac arrhythmias in young children are the presence of an arrhythmogenic substrate, in addition, hypoxia and the morphofunctional immaturity of myocardial tissue aggravated by it [5,9]. The neurohumoral mechanisms of heart rate regulation represent one of the more studied aspects of early cardiology. In the neurological status of children with arrhythmias, there are signs of residual-organic cerebral insufficiency and hypertensive-hydrocephalic syndrome, the formation of which is influenced by trauma of the central nervous system and hypoxia in the antenatal, intranatal and postnatal periods of development [14].

It is known that one of the main predictors of cardiac arrhythmias is an increased activity of the sympathetic nervous system [1]. The emergence and maintenance of tachyarrhythmias, in which the leading role belongs to the relative predominance of parasympathetic influences on the heart, is another concept, and one of the pathophysiological mechanisms of the development of arrhythmias is a decrease in adaptive trophic effects on the heart [4,7]. The sympathetic part of the autonomic nervous

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system. The relatively high tone of the parasympathetic division of the ANS plays a protective role up to a certain point, but reduces the sensitivity to wandering influences during the development of tachycardia paroxysm [6,8].

Along with the leading etiopathogenetic mechanisms of the development of rhythm disturbances that are important throughout the entire period of childhood, the formation of arrhythmias at an early age is facilitated by:

- The presence of fragments of specialized conductive tissue of the heart that has not undergone resorptive degeneration;
- Congenital and acquired organic pathology of the heart: congenital heart disease, cardiomyopathy, inflammatory lesions of the myocardium;
- Functional immaturity of the main regulatory autonomic centers responsible for cardiorespiratory control;
- Imbalance of the links of neurovegetative regulation of the heart rate during maturation in the first years of life;
- Transferred ante- and intrapartum hypoxia [11, 12].

The importance of the problem of timely diagnosis and treatment of arrhythmias already at an early age is due to their prevalence, tendency to chronic course, and the potential risk of sudden death. This problem requires new scientific data, since the risk criteria for complications of cardiac arrhythmias and sudden cardiac death in young children are unknown [15].

The aim of the study was to establish the risk factors for the development of cardiac arrhythmias in young children.

MATERIAL AND METHODS

The analysis of 50 inpatients of the pediatric cardiorheumatology department for the period of 2019 was carried out. Of these, 28 boys (56%), 22 girls (44%). The age structure of the examined children was from 1 to 3 years. Gynecological and obstetric anamnesis was collected. General clinical examination of the child included clinical examination, electrocardiographic examination, 24-hour Holter ECG monitoring, cardiac ultrasound examination, neurosonography.

RESULTS OF THE STUDY

Given the variety of identified cardiac arrhythmias, all patients were divided into groups.

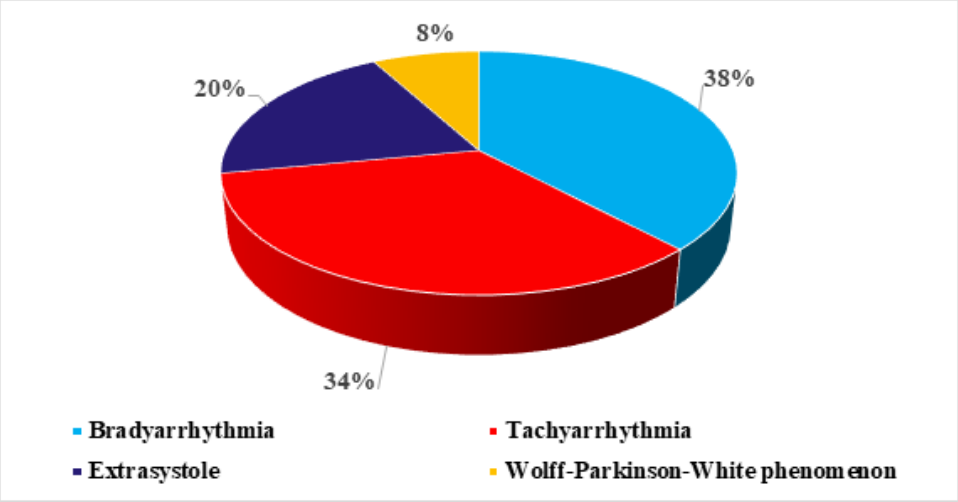

Figure 1. Distribution of children depending on heart rhythm disorders

Figure 1. All children were divided into four groups depending on cardiac arrhythmias: bradyarrhythmias - 19 (38%) patients (sinus bradycardia), tachyarrhythmias - 17 (34%) patients (sinus tachycardia, supraventricular tachycardia, ventricular tachycardia (VT)), extrasystoles - 10 (extrasystole). extrasystoles). 20%) patients and Wolff-Parkinson-White (WPW) syndrome - 4 (8%) patients.

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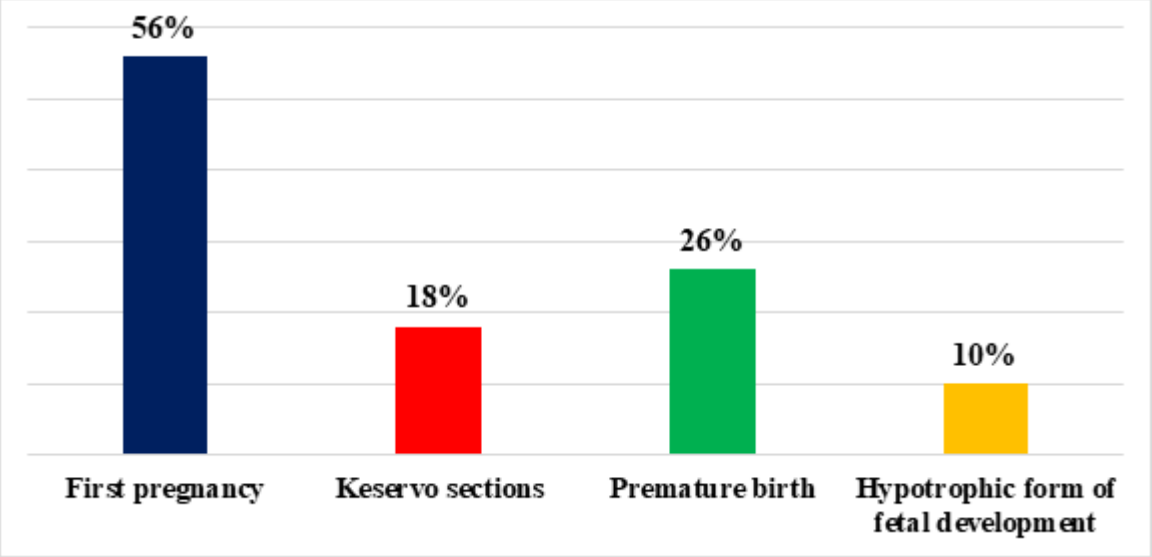

Figure 2. Data of the obstetric history of the mother of children with cardiac arrhythmias

Figure 2. When evaluating the data of the anamnesis and the course of pregnancy, it was found that 28 patients (56%) with cardiac arrhythmias were born from the first pregnancy. In the group of patients with tachyarrhythmia, there were also more children whose mothers gave birth for the first time. In particular, 9 (53%) patients with tachyarrhythmias were born by cesarean section, of the total number of patients it is 18%. On the other hand, the physiological delivery route was used in all patients with bradyarrhythmia. It was revealed that 13 (26%) patients with cardiac arrhythmias were born prematurely, of which 5 (10%) were born with a hypotrophic form of intrauterine growth retardation.

Among the clinical factors that increase the risk of developing cardiac arrhythmias, the presence of syndromes of CNS damage, in particular, convulsive syndrome, stood out. In general, hypoxic-ischemic damage to the central nervous system was less common among patients with heart rhythm disorders. In patients with tachyarrhythmias and syndrome, the Wolf-Parkinson-White phenomenon, there was a lower incidence of hypoxic-ischemic damage to the central nervous system of the 2nd degree and depression syndrome, in patients with extrasystole - hypoxic-ischemic damage to the central nervous system of the 2nd and 3rd degree. In the group of patients with extrasystole, as well as in the group of patients with the syndrome, the Wolff-Parkinson-White phenomenon, hypoxic-ischemic lesions of the central nervous system of the 2nd and 3rd degrees were less often recorded. At the same time, patients with cardiac arrhythmias were found to have respiratory distress syndrome, hemorrhages in the central nervous system, the presence of syndromes of damage to the central nervous system and, in particular, depression syndrome.

When studying neurosonography indicators in patients with cardiac arrhythmias and various (bradyarrhythmias, tachyarrhythmias and extrasystoles), the posterior dimension of the right lateral ventricle was higher, which indirectly indicates an increase in intracranial pressure.

When assessing heart rate variability, an increase in the mean value of the R - R intervals in children with the syndrome, the Wolff - Parkinson - White phenomenon and the mean values in children with extrasystole was revealed.

An absolute correlation of heart rhythm disturbances in newborns with acute respiratory diseases suffered by the mother during the second half of pregnancy was shown. In the group of patients with the syndrome, the Wolff-Parkinson-White phenomenon, there were also more mothers who had an acute respiratory illness in the second half of pregnancy.

Cardiac ultrasound examination was performed in 38 patients, accounting for 76% of the total. When comparing the indicators, the systolic pressure of the right ventricle turned out to be a significant parameter, which was higher in children with cardiac arrhythmias.

CONCLUSIONS

1. The largest proportion in the structure of cardiac arrhythmias in young children had bradyarrhythmias of extrasystoles - 38%, tachyarrhythmias - 34%, extrasystoles were 20%, Wolf – Parkinson – White syndrome (phenomenon) - 8%.

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2. All types of cardiac arrhythmias can potentially contribute to the manifestation of arrhythmias: first pregnancy and first birth; acute respiratory infections suffered by the mother during pregnancy; prematurity; operative delivery; intracranial hypertension according to neurosonography; increased systolic pressure in the right ventricle.

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