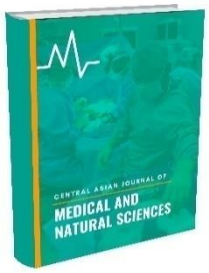
CENTRAL ASIAN JOURNAL OF MEDICAL AND NATURAL SCIENCES



Volume: 04 Issue: 02 | Mar-Apr 2023 ISSN: 2660-4159

http://cajmns.centralasianstudies.org

Actuality of Pediatric Arrhythmology

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Received 2nd Jan 2023,
Accepted 3rd Feb 2023,
Online 30th Mar 2023

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Abstract: Pediatric arrhythmology has an important place in the field of pediatrics. This article discusses the development of the disease, treatment measures, international experiences.

Key words: Pediatrics, cardiology, arrhythmia, treatment, statistics.

INTRODUCTION

The problem of cardiovascular diseases over the past three decades in the world remains one of the most relevant for public health. This is due to the leading role of premature mortality of the population from diseases of the circulatory system in Uzbekistan, as the reason for lagging behind developed countries in terms of life expectancy [1, 2] and the fact that maintaining the health of the population and increasing life expectancy largely depends on the prevention and effect - active treatment of diseases of the heart and blood vessels in childhood.

MATERIALS AND METHODS

In childhood, the foundations of a number of diseases are laid, which later lead to high risks of premature death. In childhood, almost all known congenital and hereditary diseases of the cardiovascular system manifest, many chronic heart diseases originate, and the main patterns of cardiovascular pathology are formed. At the same time, it should be taken into account that the structure of morbidity and mortality from diseases of the heart and blood vessels in children has significant features compared to adults [3].

RESULTS AND DISCUSSION

Scientific data on the prevalence of arrhythmias in the general population of children is limited. According to one of the most significant population studies conducted in Japan and including more than 150 thousand children, rhythm disturbances are detected in 1.25% among children aged 5–6 years and in 2.32% among children aged 12–13 years [5]. According to the only population-based study of newborns, which included 660,000 children, the frequency of clinically significant sustained arrhythmias was 1:4000, of which two-thirds are atrioventricular re-entry tachycardia [2].

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The statistics are quite alarming given the extremely high risk of sudden death (SD) in childhood in primary electrical heart disease (PEHD), to which this syndrome belongs. Therefore, early detection and timely prescribed treatment are a prerequisite not only for improving the quality of life and preventing the development of heart failure, but also for saving the life of a child with heart rhythm disturbance.

It was shown that at the age of 35 years, among the causes of SD, malignant ventricular tachyarrhythmias against the background of a structurally normal heart came to one of the first places [3]. According to autopsies of the suddenly deceased, structural pathology of the heart is absent in 10-45% of cases. At the same time, post-mortem genetic studies in many of these cases reveal PEHD or cardiac channelopathies, such as SUIQT, catecholaminergic polymorphic ventricular tachycardia, Brugada syndrome and short QT syndrome, which are diagnosed in almost 1/3 of those who died suddenly from postmortem molecular genetic study of individuals with structurally normal hearts. An autopsy protocol and sampling (blood or tissue) for subsequent genetic studies in cases of unexplained SD is recommended [1].

Thus, in addition to a rather high prevalence of arrhythmias in the pediatric population, it is important to take into account the role of hereditary factors in the formation and early manifestation of arrhythmias, which is especially important in relation to PEHD.

The principal electrophysiological mechanisms of rhythm disturbances in children and adults do not differ. However, among the etiopathogenetic factors in children, in contrast to adults, the role of genetic mechanisms, neurovegetative, metabolic and electrolyte disorders, inflammatory (including autoimmune) and degenerative lesions of the myocardium and the conduction system of the heart, congenital anomalies, as well as cicatricial postoperative changes (incisional arrhythmias). Despite the extensive arsenal of diagnostic methods, 20-50% of children (depending on the type of rhythm disturbance) are diagnosed with idiopathic arrhythmias. All this, along with age-related features of the anatomy of the heart and heart rhythm, determines the specifics of drug and interventional methods for the treatment of rhythm disorders in children. Arrhythmias in children often (up to 80% of cases) develop in the absence of organic heart damage and are asymptomatic or the symptoms are very nonspecific. Diagnosis can take months or even years, which is associated with the development of secondary arrhythmogenic changes in the myocardium, heart failure, cardiogenic syncope and SD.

In pediatric interventional arrhythmology, practically the same methods of treatment are used as in adults, but the specifics of childhood, together with the peculiarities of the pathophysiology and the nature of the course of rhythm disturbances, require the use of more gentle technologies with an emphasis on minimizing effects [3]. Rhythm disturbances in children are highly likely to be curable or successfully controlled, which often requires high-tech treatment methods. In a number of cases, especially in life-threatening hereditary arrhythmias, a specific hybrid tactic has been developed for the combined use of medical, interventional and, if necessary, surgical treatment, as well as personalized monitoring.

The main directions of modern interventional and surgical arrhythmology in children are: surgical correction of bradyarrhythmias, resynchronization therapy, diagnosis and interventional treatment of tachyarrhythmias, treatment of life-threatening ventricular arrhythmias and prevention of SD, surgical arrhythmology, hybrid interventions. Some tachycardias are very complex and require 3D mapping systems. The combination of various imaging methods - intraoperative intracardiac ultrasound control, rotational angiography, integration of computer and magnetic resonance tomograms, allows you to most accurately determine the source of arrhythmia, which is especially important in cases of structural anomalies and in patients with incisional tachycardias after correction of congenital heart defect. Pediatric interventional arrhythmology is a rather complex field of medicine and requires appropriate experience to ensure optimal results and patient safety. Treatment aims at the complete

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elimination of the arrhythmia, since there must be a long period of life ahead, which places special demands on technology. At the same time, despite the currently available arsenal for the treatment of arrhythmias, there are almost no tools developed specifically for the pediatric population.

CONCLUSION

The use of combination or hybrid therapy has become an important strategy for the treatment of children with life-threatening and persistent arrhythmias associated with structural heart disease. In 1996-2022, 70,314 children were consulted and 25,909 children with various arrhythmias were treated in the hospital. Since 2003, 7,721 surgical interventions have been performed, and an effective comprehensive system has been created for providing specialized care to children with heart rhythm disturbances. Pediatric arrhythmology remains a growing field, where intensive development takes place and innovations are introduced every year. At the same time, there are still many unresolved problems that need research, which makes pediatric arrhythmology a very promising scientific direction and an attractive medical specialty.

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