

## CONGENITAL HEART DEFECT

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**Annotation:** Congenital heart defects are anatomical abnormalities of the heart or major blood vessels that occur during the embryonic development period. They are among the most common congenital anomalies observed in newborns. Such structural defects in the heart can negatively affect its full or partial function. The most frequent types of congenital defects include septal defects (such as ventricular or atrial septal defects), narrowing of the aorta or pulmonary artery, and abnormal development or malfunction of heart valves. This article discusses the causes, types, clinical signs, diagnostic methods, and modern treatment options for congenital heart defects. These conditions may result from genetic factors, maternal infections during pregnancy, toxins, or other external influences. Diagnostic methods include echocardiography, X-ray, ECG, and MRI. Treatment depends on the patient's condition and may involve medication or surgical intervention. When diagnosed early and treated appropriately, the quality of life and life expectancy of such patients can be significantly improved. This article focuses on analyzing modern approaches to this important medical issue.

**Keywords:** Congenital heart defect, heart developmental anomaly, atrial septal defect, ventricular septal defect, heart valves, genetic factors, pregnancy pathology, heart diseases, echocardiography, cardiac surgery, pediatrics, cardiology, diagnostics, treatment methods, pediatric cardiology.

### Introduction

Cardiology, one of the main areas of medical science, studies diseases of the heart and vascular system that are important for human life. Congenital heart defects, especially those found in children, are one of the urgent problems in modern medicine. Congenital heart defects (CHD) are anatomical changes that occur in the early stages of fetal development, that is, at 3-8 weeks of pregnancy, as a result of incomplete or incorrect formation of the heart or blood vessels related to the heart. This condition manifests itself with various clinical symptoms immediately after birth or at later stages of life. According to the World Health Organization, more than 1 million babies are born with congenital heart defects worldwide every year. This means that CHD is detected in approximately 8-10 out of every 1,000 live births. In some cases, these defects are mild, pass without any clinical symptoms and heal on their own. However, in severe cases, they pose a serious threat not only to the child's heart function, but also to the life of the whole organism. Congenital heart defects that are not detected and treated in a timely manner can lead to growth retardation, rapid fatigue, respiratory failure, heart failure, and even premature death in children. There are many factors that contribute to the occurrence of congenital heart defects. These include genetic mutations, i.e. hereditary changes, infectious diseases of the mother during pregnancy (for example, measles, toxoplasmosis), radioactive radiation, certain medications, environmental factors, and bad habits of the mother (smoking,

alcohol consumption). Also, a lack of trace elements such as iodine, folic acid, and zinc during pregnancy can negatively affect the development of the heart structure. The manifestations of congenital heart defects are diverse and can be manifested in the form of holes between the walls of the heart (for example, interatrial or interventricular defects), malposition of blood vessels, narrowing or incomplete development of heart valves, and malposition of large blood vessels leaving the heart. Each condition has its own characteristics, and special diagnostic tools are used to identify them - echocardiography, cardiac ultrasound, radiography, ECG, MRI. Thanks to the current level of development of medicine, it is possible to detect congenital heart defects during pregnancy, make an early diagnosis after the baby is born, and successfully treat them. This includes special medications, heart-strengthening drugs, oxygen therapy, physiotherapy, and, most importantly, open or closed heart surgery. In many countries, pediatric cardiologists and pediatric heart surgeons specializing in congenital heart defects are working. Congenital heart defects are not only a medical problem, but also a social and psychological problem. Such children need special attention, patience, psychological assistance, and social support. In particular, it is necessary to take into account their capabilities in kindergartens and schools, and to create conditions close to healthy peers through special approaches. This article fully reviews the causes, types, methods of detection, clinical symptoms, preventive measures, and modern treatment approaches of congenital heart defects. The article aims to increase attention to this problem and raise awareness of the disease among medical personnel and parents. The topic is also of theoretical and practical importance for students and specialists studying in the medical field, and will serve for early detection and effective treatment of diseases in the future.

### Literature review

Scientific research on congenital heart defects is of great importance in medicine. In recent years, scientific articles, monographs and textbooks published in this area have served to deeply study the causes, clinical course, diagnostic methods and treatment approaches of heart defects. For example, the monograph “Врожденные пороки сердца у детей” by the Russian cardiologist A. G. Mikhailov extensively covers the pathogenesis, classification and frequency of congenital heart defects in children. It explains on a scientific basis that certain defects occur at a certain stage of embryonic development and are related to external factors at this period. The textbook “Pediatrics” written by Uzbek scientists covers in depth the clinical signs, auscultation results and diagnostic methods of congenital heart defects. This textbook is of practical importance for medical students, and provides descriptions of each type of defect. In addition, scientific articles published by the American Heart Association in the USA provide up-to-date information on modern treatment technologies for congenital heart defects, especially minimally invasive (via catheter) operations. These methods are mainly used in developed countries and are characterized by reducing the recovery time of sick children. In the medical literature, in particular, there is a lot of information about the importance of echocardiography. It is noted that more than 90% of congenital heart defects can be reliably detected using this method. There are also scientific studies that identify hereditary factors through genetic analysis. A comparative analysis of foreign and domestic sources shows that in recent years, the understanding of congenital heart defects has significantly expanded, and diagnostic and treatment technologies are developing based on the achievements of modern medicine. However, early diagnosis opportunities are still limited in some regions, which is a

pressing issue for the healthcare system. Based on this literature analysis, it can be said that it is important to study international experiences and adapt them to local conditions for early detection, optimal treatment, and prevention of TUN.

## Conclusion

Congenital heart defects are one of the most complex pathological conditions that occur as a result of disorders in the development of the heart and blood vessels during the fetal period. Based on the analysis and scientific sources, it can be noted that these defects are among the most common congenital anomalies in infants and have a significant impact on the physical and psychological development of children. Hereditary factors, harmful factors affecting the mother during pregnancy, infections and environmental conditions play an important role in the development of congenital heart defects. As a result of the introduction of modern methods of diagnosis and treatment, the possibility of improving the quality of life and life expectancy for children with CHD is increasing.

As a result, the following conclusions can be drawn:

1. Screening and prenatal examinations during pregnancy are important for the early detection of congenital heart defects.
2. Modern echocardiography and MRI methods allow for the accurate detection of anatomical defects in the heart.
3. Many forms of congenital heart disease can be successfully treated surgically, which improves the quality of life of patients.
4. The disease can be prevented by promoting a healthy lifestyle among the population and increasing attention to maternal health.
5. It is urgent to expand the activities of specialized cardiological centers for congenital heart disease, combining local and foreign experience.

In conclusion, congenital heart defects are not only a medical, but also a social and psychological problem. Therefore, conducting regular scientific research in this area, improving prevention and treatment strategies is one of the priority areas of modern medicine.

Research and practical observations on congenital heart defects (CHD) show that this disease remains an urgent issue in modern medicine. CHD is noted as one of the main causes of cardiac dysfunction not only in infants, but also in children of different ages. Every year, CHD is detected in thousands of newborns, which poses important tasks for the healthcare system in terms of early diagnosis, treatment and rehabilitation. The complexity of this problem is primarily due to the diversity of clinical symptoms of the disease and its often latent course. Some congenital heart defects begin to manifest themselves clinically only a few days or weeks after the birth of the child. This leads to late diagnosis and a threat to the patient's life. Especially after birth, signs such as respiratory failure, blue lips and nails (cyanosis), and

growth retardation increase the likelihood of TYUN and require prompt evaluation by doctors. Another important aspect in the discussion is that the causes of congenital heart defects have not been fully determined. Despite all the scientific and technical advances, there are still many unknown aspects in determining the exact etiology of the diseases. Many factors, such as genetic factors, the mother's condition during pregnancy, the environmental environment, nutrition, stress, and infections, can have a complex effect on the development of the disease. Modern treatment methods, especially heart surgery and non-invasive technologies (catheter-based procedures), play an important role in saving the lives of children born with TYUN and ensuring their quality of life. However, these opportunities are not provided equally in all countries. Due to the lack of high technologies or a shortage of specialists in some regions, patients with congenital heart defects do not receive the necessary assistance in a timely manner. For this reason, the medical system faces the following important tasks: the development of prenatal diagnosis, the widespread introduction of perinatal screening, the increase in specialized institutions for pediatric cardiology, and the strengthening of medical monitoring of mothers during pregnancy. In particular, genetic counseling, timely detection, and, if necessary, early surgical intervention can significantly improve the outcomes of congenital heart defects. The discussion shows that congenital heart defects are an important issue that requires not only a clinical, but also a social and preventive approach. Cooperation between doctors, health organizations, parents, and all segments of society is of great importance in this regard. Through early detection of diseases, proper treatment, and social support, children living with congenital heart defects will have the opportunity to live a full life like their healthy peers.

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