

## HEART DEFECTS

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<https://doi.org/10.5281/zenodo.7764549>

**Abstract.** *A heart defect is an anomaly in the structure of this organ, which affects its work to one degree or another. this is a persistent pathological change in the structure of the heart that violates its function. Heart defects (vitia cordis) are congenital or acquired anomalies and deformities of the heart valves, openings or partitions between the chambers of the heart or vessels departing from it, violating intracardiac and systemic hemodynamics, predisposing to the development of circulatory insufficiency. Heart defects can be congenital and acquired.*

**Keywords:** *heart defects, insufficiency, stenosis, congenital defects and acquired defects.*

Congenital heart defects occur as a result of a violation of the normal development of the heart and the main vessels in the prenatal period or are associated with the preservation of intrauterine blood circulation after birth. At the same time, defects of the atrial and interventricular septa (DMPP and DMZHP), anomalies of the location of the main vessels, their narrowing may form; preservation of the features of intrauterine circulation after birth leads to a defect of the open arterial duct, an open oval opening; there may be a communication between the large and small circulatory circles, narrowing of the main vessels; congenital defects in the development of valves: left atrioventricular, right atrioventricular, aortic, pulmonary trunk valve. It may have an innate nature or occur during the patient's life under the influence of certain factors. Depending on the type and stage, heart defects may be subject to dynamic monitoring, require symptomatic medication or urgent surgical correction. Heart defects in adult women and men more often belong to the acquired group, since congenital anomalies either heal themselves as the child grows, or undergo surgical correction, or lead to the death of the patient. The normal structure of the heart ensures the separation of arterial and venous blood flows, sufficient blood supply to tissues, supplying them with the necessary amount of oxygen and other nutrients. With defects, these mechanisms are disrupted, the load on individual parts of the organ (depending on the type of pathology) increases – its dysfunction develops, organs and tissues experience oxygen starvation, which affects the patient's well-being and is manifested by appropriate symptoms. Depending on the characteristics of hemodynamics, congenital malformations are "white" (when the venous and arterial bed do not mix) and "blue" (venous blood enters the arterial bed and spreads throughout the body, organs and tissues are deficient in oxygen, the patient has cyanosis – a bluish tinge of the skin, which determines the name). Depending on the type of defect, the septa of the heart, its blood vessels or valves may be affected. Acquired defects belong specifically to the valvular, affect the mitral, tricuspid valves, aortic valves and the mouth of the pulmonary artery, there are two types:

- stenosis (narrowing) of the valve, in which a sufficient amount of blood does not enter the underlying part of the heart during its contraction, and more blood accumulates in the overlying one than is physiologically necessary;
- insufficiency, in which, during the relaxation phase of the myocardium, part of the blood penetrates in the opposite direction through insufficiently closing valve flaps – from the underlying department to the overlying one.

A defect that is not accompanied by signs of circulatory disorders is considered compensated, characterized by circulatory insufficiency in certain situations (for example, with intense physical exertion) – subcompensated, proceeding with constant symptoms of heart failure – decompensated. The classification of heart defects proposed by the New York Association of Cardiac Surgeons, which allows assessing the severity of changes in the organ and determining the need for surgery, has received practical application. According to it, there are 4 classes of defects:

1. there is a defect, but there are no pronounced changes in the structure of the heart, there are no clinical manifestations of pathology, surgery and active drug treatment are not required;
2. there are changes in the structures of the heart and clinical manifestations of pathology, but they are expressed slightly, are reversible; surgery with a predicted 100% success is recommended for correction;
3. irreversible changes are determined in the structure of the heart, but the processes in the body caused by them and the clinical manifestations of pathology are reversible; surgical intervention is likely to help correct the defect and improve the patient's condition, but the benefit-risk ratio is determined individually in each specific situation;
4. the defect has led to irreversible changes in the heart and other organs of the patient, surgical intervention is impractical, not effective.

Heart defects in adults are characterized by the following symptoms: general weakness, fatigue; episodes of dizziness, fainting; frequent, long-term infectious diseases; palpitations, feeling of organ failure, heaviness, pain behind the sternum; shortness of breath – first during physical exertion, then at rest, especially in the supine position; cough; pallor of the skin; edema – first in the area of the feet, ankles, shins, gradually occupying a larger and larger area of the body, spreading from bottom to top; heaviness, dull pain in the right hypochondrium;

At the stage of decompensation – an increase in the size of the abdomen due to the pathological fluid accumulating in it (ascites); with prolonged existence of pathology – signs of chronic hypoxia (thickening of the terminal phalanges of the fingers according to the type of "drumsticks", deformation of the nails according to the type of "watch glasses").

Congenital anomalies of the structure arise due to gene mutations or in as a result of exposure to the mother's body, and through it – and the fetus, adverse factors: infections (rubella, chickenpox and others); radiation; nicotine, alcohol, drugs; certain medicinal substances; industrial toxins, poisons. Causes of acquired heart defects: infections (streptococcal acute tonsillitis, influenza virus, enterovirus and others) affecting the endocardium; autoimmune processes in systemic lupus erythematosus and other systemic connective tissue diseases; aortic aneurysm; atherosclerosis; CHD; hypertension.

In patients with aortic valve insufficiency:

- Corrigan's pulse: fast, rapid (pulsus celer), jumping (pulsus saliens), short, high (pulsus altus), large (pulsus magnus) and hard, tense (pulsus durus), the tendency to increase the pulse (pulsus frequens) is not uncommon;
- systolic pressure is normal or slightly elevated (up to 160 - 180 mmHg), diastolic pressure measured by the Korotkov method is below 50 mmHg ("diastolic pressure tends to zero" - the phenomenon of Korotkov's infinite tone), pulse pressure is high (80-100 mmHg)
- on an ECG: signs of left ventricular hypertrophy;

- on the PCG: above the apex of the heart, a decrease in the amplitude of oscillations of the I tone; above the aorta, a decrease in the amplitude of oscillations of the II tone, a decreasing protodiastolic noise.
- on the radiograph of the heart: in the direct projection, elongation and bulging of the 4 arches of the left contour of the heart, the aortic configuration of the heart, bulging of the upper arches of the right and left contours of the heart, low level of the right atriavasal angle; in the left oblique projection, bulging posteriorly of the left ventricle.

In patients with aortic stenosis:

- pulse: slow or sloping (pulsus tardus), soft, low filling (pulsus mollis), small or low (pulsus parvus seu humilis) pulse; rare (less than 65 beats per 1 min) (pulsus rarus), slow;
- blood pressure: systolic is reduced to 90-100 mmHg, diastolic blood pressure is normal, but may be slightly elevated, pulse pressure is low;
- on an ECG: signs of left ventricular hypertrophy;
- on the PCG: above the apex of the heart, a decrease in the amplitude of oscillations of the I tone; above the aorta, a decrease in the amplitude of oscillations of the II tone, an increasing-decreasing (diamond-shaped) systolic noise;
- on the chest X-ray: in the direct projection, the elongation and bulging of the 4 arches of the left contour of the heart, the aortic configuration of the heart, the bulging of the upper arches of the right and left contours of the heart, the low level of the right atriavasal angle; in the left oblique projection, the bulging posteriorly of the left ventricle.

Drug therapy usually includes drugs of the following groups: antihypertensive agents; diuretics; antiarrhythmics; cardiac glycosides; cardiometabolics, cardioprotectors; anticoagulants, antiplatelet agents; antibiotics; with the autoimmune nature of pathology – glucocorticoids and cytostatics. The type of surgical treatment depends on the type and severity of the heart defect in stenosis – commissurotomy (separation of fused or scarred valve flaps, expansion of the opening between the heart sections, allowing to improve hemodynamics); in case of insufficiency – prosthetics or plastic surgery of the existing valve; in case of combined defects – replacement of the affected valve with artificial, sometimes with commissurotomy; in case of combined defects – simultaneous prosthetics of valves. Modern heart surgeries are, as a rule, minimally invasive interventions – they are carried out through a catheter inserted into the vascular bed into the heart. This improves the tolerability of operations by patients, minimizes the risk of complications, and shortens the recovery period.

To reduce the risk of developing acquired heart defects, timely treatment of infectious diseases will help to prevent the spread of infection to the heart or the chronization of pathology; adequate treatment of autoimmune diseases and metabolic pathology, achieving their stable remission; rational, balanced nutrition; minimizing stress; adequate sleep; active lifestyle, daily physical activity in the amount of at least walking; giving up bad habits (smoking, drinking alcohol, taking drugs).

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