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PATHOLOGICAL CHANGES OBSERVED IN PATIENTS AS A RESULT OF MYOCARDIAL INFARCTION AND METHODS OF EARLY DIAGNOSIS OF THE DISEASE

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Abstract. Myocardial infarction is a pathology that leads to ischemic necrosis of the heart muscle as a result of an acute violation of coronary blood circulation. This is often caused by the formation of blood vessels or, in 90% of cases, severe occlusion of an artery due to atherosclerosis or other factors. Clinically, the disease manifests as burning, squeezing or pinching pain behind the sternum, which can spread to the mouth, neck, scapula and left arm. In this article, the incidence of myocardial infarction in the younger age group, recurrence of the disease, which type of the disease is dominant, and the causes of its origin are considered.
Key words: ECG, coronary angiography, transmural infarction, intramural infarction, subendocardial cardiosclerosis.

Myocardial infarction is a disease caused by an acute violation of coronary blood circulation leading to necrosis of the heart muscle. [1]

Myocardial infarction occurs in 97-98 patients when the coronary artery of the heart is affected by atherosclerosis. The heart causes the coronary artery to become blocked. Myocardial infarction occurs if acute compression of the coronary artery of the heart continues for a long time. After the capillary bursts, platelet aggregation develops inside it, mixing with blood. With the help of blood coagulation, the system is activated. Fibrin and erythrocytes join together to form a thrombus. Blockage of the coronary artery of the heart disrupts the blood supply to the myocardium. Myocardial necrosis develops mostly in the wall of the left ventricle. Due to necrosis in the myocardium, the systolic and diastolic activity of the heart is disturbed.

Despite the advances in modern medicine, cardiovascular diseases remain the main cause of death in developed countries. Myocardial infarction is the most urgent form of ischemic heart disease, requiring the patient to be admitted to a specialized hospital with immediate treatment measures. Myocardial infarction usually affects the left ventricle of the heart, but sometimes the origin of the disease is also related to the right ventricle. The participation of the right ventricle in the field of myocardial infarction has been known since the 30s of the last century, necrosis of the right side of the heart was described in autopsies by Saunders and others. At the same time, the clinical presentation of right ventricular infarction was first identified by Kon et al. in a group of patients with left ventricular inferior wall infarction who had signs of right ventricular failure in the form of increased venous pressure [17].

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It has been scientifically proven that the risk of death during the first year after the hospital in young and middle-aged people with myocardial infarction does not depend on the patient's gender, age, or the presence of a deviation of the BT segment at the time of diagnosis [18].
Acute and long-term changes in the architecture of the left ventricular myocardium after infarction is an important process that affects the functions and clinical care. After an acute ischemic event, three interrelated processes occur in the left ventricular myocardium: enlargement, dilatation, and hypertrophy. The goal of any treatment in the acute period is to limit the size of the infarct, to accelerate its formation, to reduce infarct expansion in one or a combination, and to end myocardial stress, which should affect the post-infarct recovery processes. [4,11]

Due to the formation of eccentric left ventricular hypertrophy, the peri-infarct zones, which are not damaged by acute myocardial ischemia, undergo structural and functional changes that cover the non-working damaged areas of the heart muscle, i.e., in conditions of ischemia, compensatory hypertrophy develops without an increase in the number of cardiomyocytes. This process can continue for a long time after the infarct zone has healed, which distinguishes it from the expanding nature of the acute period. It should be noted that with transmural infarctions, the hypertrophy process is significantly manifested, especially in the localization of the front wall of the left ventricle. In cases of minimal damage to the myocardium, the size and shape of the left ventricle may not be abnormal.
[4,12].

Along with chronic respiratory and oncological diseases, diseases of the cardiovascular system are the main cause of death of adults from non-communicable diseases in economically developed countries. According to a report published by the World Health Organization in 2011, 7.3 million people died from cardiovascular diseases, which is 13% of all deaths in the world [2].

In the Russian Federation, the rate of morbidity and mortality due to the pathology of the cardiovascular system is alarming - it is 57% of all deaths. 38% of deaths in working age (25 to 64 years old) occur due to diseases of the circulatory system, the contribution of men and women to the total mortality is almost the same. One of the most serious manifestations of coronary heart disease is acute coronary blood circulation disorders - myocardial infarction (MI) and stable tension angina - the majority of deaths in ischemic heart disease are associated with this pathology. According to official data, the incidence of cardiovascular diseases, including myocardial infarction, continues to increase among the population over 18 years old. In 2000, this indicator was 17,432.5, and by 2004, this indicator was 21,841.6 per 100,000 inhabitants [3].

Heart attack patients are always at high risk of developing heart failure, arrhythmia, and recurrent heart attacks [13, 14, 15, 16].

Systemic and functional changes caused by the "ischemic cascade" in the myocardium contribute to the occurrence of negative consequences. It is known that changes in the structure of the heart muscle and its activity are influenced by the depth and size of damage areas (necrosis foci), the involvement of peri-infarct zones, and the initial state of myocardial and coronary blood circulation.
All this ultimately leads to a violation of myocardial perfusion, its metabolism, and the development of diastolic and systolic dysfunction. Undamaged and infarcted zones participate in the process of structural and functional changes of the myocardium, which leads to the development of hypertrophy and expansion of the left ventricle. Against the background of

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damage to many vessels, in conditions of long-term ischemia, "sleeping" zones are formed, which leads to an additional regional violation of myocardial contractility and a lack of cardiac compensation. It should be remembered that in conditions of hypertrophy, the blood flow in the myocardium can be damaged in the areas of blood supply to the coronary arteries without the manifestation of atherosclerosis [11, 4, 6].

Post-infarct dilatation can be seen as a response to left ventricular dysfunction, and the degree of expansion of its cavity depends on the magnitude of the primary damage caused by the infarct [5,10].

Restoration of coronary artery patency in the initial stages reduces the size of the infarct and, as a result, improves regional and global contractility [8,9].

A study conducted by P. Marino et al showed that 6 months after myocardial infarction, a decrease in left ventricular volume was observed in patients who underwent primary revascularization. [7]

The purpose of the research: to prevent damage to the heart muscles in myocardial infarction, to restore normal blood supply to the heart, to apply preventive measures to prevent complications of myocardial infarction, and to study the frequency of myocardial infarction among different young people.

Research materials and methods: 20 patients with myocardial infarction were selected as research material and compared with 20 patients in a healthy group. Various diagnostic methods are used to detect myocardial infarction.

Electrocardiography (ECG): An ECG is a simple and widely used method that records the electrical activity of the heart. It can detect changes in the rhythm and structure of the heart, which makes it possible to detect a myocardial infarction.

Coronary angiography (cardiac catheterization): This is a procedure in which a catheter is inserted into an artery and the heart. This allows you to visualize the heart's arteries and identify any narrowing or blockages that could lead to a heart attack. Ultrasound of the heart (echocardiography): This is a non-invasive test uses ultrasound to create an image of the heart. It helps to evaluate the structure and function of the heart.

Magnetic resonance imaging (MRI): MRI provides detailed images of the heart and blood vessels, which can help detect myocardial infarction.

Computed tomography (CT): CT can be used to visualize the anatomy of the heart and detect atherosclerotic plaques.

Research results. Within two months, 10 of the 20 patients selected as research material died due to myocardial infarction. 30% of them were women, 70% were men. It was found that 60% of those who died due to the disease died from myocardial infarction for the first time, and 40% died from repeated myocardial infarction. In 70% of the patients who died, intramural (large-scale necrosis between the myocardium) myocardial infarction was noted, and in 30% of cases, transmural (necrosis crossing the myocardium) myocardial infarction was noted. 40% of deaths from myocardial infarction were observed mainly in patients aged 40-49 years, 20% in 50-59 years, 10% in patients over 70 years, 30% in 60-69 years. Myocardial infarction is an acute condition caused by the necrosis (death) of a part of the heart muscle due to a violation of coronary blood circulation. Clinically, it is manifested by the following signs:

The following symptoms were observed in patients with myocardial infarction: chest pain: burning, squeezing, burning pains in the chest. Distribution of pain: pain can spread to the left arm, neck, shoulder, jaw. Shortness of breath: difficulty breathing. Feeling of fear and cold sweat. Advanced myocardial infarction requires urgent hospitalization in the cardiac

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intensive care unit. If help is not provided in time, it can end in death. 50 years old is a period in which myocardial infarction occurs more often in men due to the early development of atherosclerosis. After 55 years, both sexes are about the same. Mortality from myocardial infarction is 32% and sudden death is 18%.

Conclusion: During the study of repeated myocardial infarction, subendocardial cardiosclerosis, i.e. replacement of the heart muscle with connective tissue in the subendocardial layer (formation of scars of various sizes) and thrombus in this area were found in all cases. Myocardial infarction is a serious condition, the development of which requires urgent hospitalization in the cardiac intensive care unit and intensive therapy. Failure to provide timely help can lead to death.

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