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DEFORMATIONAL CHARACTERISTICS OF THE MYOCARDIUM IN NORMAL AND IN VARIOUS VARIANTS OF THE COURSE OF CORONARY HEART DISEASE (EVALUATION OF THE EFFECTIVENESS OF SURGICAL INTERVENTION AND REGULAR STATIN THERAPY)

Batchaeva Aishat Mukhdarovna¹, Khadzhibaeva Fatima Dalkhatovna¹, Kojakova Tanzilya Shakharbievna²

1 - Stavropol State Medical University of the Ministry of Health of Russia, Stavropol;

2 - North Caucasus State Academy, of the Ministry of Health of Russia, Cherkessk

НОРМА ВА ЮРАК ИШЕМИК КАСАЛЛИГИНИНГ ҲАР ХИЛ КЕЧИШ ТУРИДА МИОКАРДНИНГ ДЕФОРМАЦИОН ХАРАКТЕРИСТИКАСИ (ЎТКАЗИЛГАН ЖАРРОҲЛИК АРАЛАШУВИ ВА РЕГУЛЯР СТАТИНОТЕРАПИЯНИНГ АФЗАЛЛИГИНИ БАҲОЛАШ)

Батчаева Айшат Мухдаровна¹, Хаджилаева Фатима Далхатовна¹, Коджакова Танзила Шахарбиевна²

1 – Олий таълим Федерал давлат бюджети таълим муассасаси "Ставропол давлат тиббиёт университети" Россия Соғлиқни сақлаш вазирлиги, Ставропол ш.;

2 - Олий таълим Федерал давлат бюджети таълим муассасаси "Шимолий Кавказ давлат академияси", Россия Соғлиқни сақлаш вазирлиги, Черкесск ш.

ДЕФОРМАЦИОННЫЕ ХАРАКТЕРИСТИКИ МИОКАРДА В НОРМЕ И ПРИ РАЗЛИЧНЫХ ВАРИАНТАХ ТЕЧЕНИЯ ИШЕМИЧЕСКОЙ БОЛЕЗНИ СЕРДЦА (ОЦЕНКА ЭФФЕКТИВНОСТИ ПРОВЕДЕННОГО ХИРУРГИЧЕСКОГО ВМЕШАТЕЛЬСТВА И РЕГУЛЯРНОЙ СТАТИНОТЕРАПИИ)

Батчаева Айшат Мухдаровна¹, Хаджилаева Фатима Далхатовна¹, Коджакова Танзила Шахарбиевна²

1 - ФГБОУ ВО «Ставропольский государственный медицинский университет»

Министерства здравоохранения России, г. Ставрополь;

2 - ФГБОУ ВО «Северо-Кавказская государственная академия» Министерства здравоохранения России, г. Черкесск

e-mail: xadzhibaevafatima@mail.ru

Резюме. Ҳозирги вақтда юрак-қон томир тизими касалликлари дунёнинг кўплаб мамлакатларида катталар аҳолиси орасида кенг тарқалган. Юрак ишемик касаллиги (ЮИК) дунёдаги энг кенг тарқалган касалликлардан биридир. Россия Федерациясида 2002 йилда коронар артерия касаллиги билан касалланиш 100 минг аҳолига 448,8 ни ташкил этди ва 2011 йилга келиб 100 мингга 633,0 га ошди. Жаҳон соғлиқни сақлаш ташкилоти маълумотларига кўра, 2019 йилда 17,5 миллион одам юрак-қон томир касалликларидан вафот этган - дунёдаги барча ўлимларнинг 31 фоизи. Юрак ишемик касалликларидан ўлим даражаси бўйича мамлакатимиз (Россия Федерацияси) етакчи ўринлардан бирини эгаллайди.

Калит сўзлар: юрак-қон томир тизими касалликлари, юрак ишемик касаллиги, атеросклероз.

Abstract. Currently, diseases of the cardiovascular system are widespread among adults in many countries of the world. Coronary heart disease (CHD) is one of the most common diseases in the world. In the Russian Federation, the incidence of CHD in 2002 was 448.8 per 100 thousand population and increased to 633.0 per 100 thousand by 2011. According to the World Health Organization, 17.5 million people died from CVD in 2019 — 31% of all deaths in the world. Our country is one of the leading countries in terms of the death rate from CHD.

Keywords: diseases of the cardiovascular system, coronary heart disease, atherosclerosis.

The relevance of research. Ischemic heart disease is a disease in which a person's blood supply to the myocardium is disrupted due to pathologies of the coronary arteries. CHD is a fairly common disease. That is why, probably, almost everyone imagines what kind of disease it is. It is one of the main causes of mortality of the population, as well as loss of working capacity. It is for this reason that modern doctors pay so much attention to this disease. In European countries, coronary heart disease and brain stroke account for about 90% of all pathologies of the heart and blood vessels. It is CHD that accounts for 30% of all deaths. Coronary heart disease is present in 30% of women and 50% of men. This difference is explained by some features of the hormonal background (female sex hormones prevent atherosclerosis of blood vessels). However, if we consider that during menopause, a woman's hormonal background changes, then their risk of developing coronary heart disease also increases. Among the main factors causing coronary heart disease can be distinguished: atherosclerosis of coronary vessels. The most common pathological process affects the anterior branch of the vessels of the left coronary artery. In more rare cases, the disease affects the right branch of the arteries; spasm of the coronary arteries, changing their reactivity and increasing their sensitivity to various adverse factors; various diseases of the coronary arteries. The very mechanism of the development of coronary heart disease is that the vessels cannot fully supply blood, and accordingly oxygen, nutrients to the myocardium. This phenomenon develops for the following reasons: damage to the coronary arteries, which led to a violation of blood circulation; an increase in the load on the heart to meet its metabolic needs; a combination of vascular pathologies and metabolic disorders. Under normal conditions, a person's coronary vessels can increase up to 5 times so that more blood flows to the myocardium.

The aim of the study is to consider the deformational characteristics of the myocardium in normal and in various variants of the course of coronary artery disease with an assessment of the effectiveness of surgical intervention and regular statin therapy.

Objectives of the study: to review statistics on this topic, to investigate the deformation characteristics of the myocardium in normal and in various variants of the course of coronary heart disease with an assessment of the effectiveness of surgical intervention and regular statin therapy.

The results of the study. Cardiovascular diseases (CVD) are a leading problem of public health and society as a whole, since 50% of all deaths in the Russian Federation occur as a result of these diseases. In recent decades, there has been a steady decline in mortality from diseases of the circulatory system (BSC) in economically developed countries [1-5]. In our country, since 2004, there has been a positive trend towards a decrease in mortality from BSK, but this indicator is 2-3 times higher than in economically developed countries. Among the causes of death from BSC, the leading place is occupied by coronary heart disease (CHD), which in 2019 is 52.8% in the structure of mortality of the BSC decomposition. This is 3 times higher than in the United States, and 9 times higher than in Japan. Death from myocardial infarction makes a big contribution to the mortality from coronary heart disease. Usually, the reduction of the ventricular myocardium is considered one unit, but its anatomical structures are characterized by a complex architecture dedicated to the definition of this section. For a long time it was believed that the ventricular myocardium consists of three layers: the outer oblique, middle circular, inner longitudinal, outer layer, common in both ventricles. Today in cardiology, along with the well-known classical theory of the three-layer structure of the myocardium, there is a new "spiral single-layer theory of the structure of the myocardium" F. Torrent-Guasp considers the myocardium as a muscular band with a beginning and an end formed by the pulmonary artery and aorta. In his writings, the author compares this tape with a rope, which is a spiral movement of fibers. Torrent-Guasp draws attention to the sequential change in the directions of the fiber and identifies three main directions of the heart muscle: vertical (subendocardial), circular and fan-shaped (subepicardial). V. N. Fatenkov adheres to a similar point of view in his works. The interaction of the latter leads to deformation of each part of the ventricular wall. This deformation obeys the law of conservation of volume of elastic bodies during deformation [56]. Thus, the modern interpretation of the deformation of the heart makes it possible to evaluate the biomechanics of the heart in a new way. Clinically important is that violations of the parameters of myocardial deformation in some diseases are observed not only before the appearance of clinical symptoms, but also before the appearance of traditionally used functional parameters [1]. J. Kuama noted violations of the parameters of systolic deformation and deformation rate in patients with asymptomatic course of primary cardiac amyloidosis, when violations of the speedometers of myocardial movement in the tissue The Doppler mode has not yet been detected. Changes in the parameters of myocardial deformation were observed in patients with type 2 diabetes mellitus [3], arrhythmogenic dysplasia of the right ventricle [5]. Studies, determination of deformation and deformation rate, an indicator of the accuracy of the myocardium of the subclinical stage of diseases such as diabetes, sclerosis of the system, hypertension, cardiomyopathy, coronary artery disease, as well as to assess the effectiveness of myocardial revascularization and prognosis in patients with heart failure in determining. Observations conducted in a study of 260 patients with suspected congestive heart failure of various etiologies show that in patients with systolic and diastolic heart failure, longitudinal deformation is closely related to the levels of cerebral natriuretic peptide (BNP) [1]. To study the viability of the myocardium, the important role of methods for determining the rate of deformation and deformation of the myocardium was demonstrated. The study included 260 people, including 200 patients and 60 people selected as a result of screening of various variants of the course of coronary heart disease together with stage 2-3 hypertension and dyslipidemia – practically healthy individuals. The diagnosis of coronary artery disease is based on the presence of 50% stenosis in at least one of the major coronary arteries according to the results of anamnesis, clinical manifestations of the disease, signs of coronary insufficiency according to the results of a physical activity test and/or coronary angiography; in some patients, what they have experienced in the past is proven by an increase in cardiospecific enzymes and/or the presence of scarring on the ECG. In addition, a necessary condition for the inclusion of patients in the research group was not chronic heart failure (CHF) 3-4 FC, moderate and severe systolic dysfunction and severe LV Hypertrophy (GLF). The presence of dyslipidemia was established in accordance with national guidelines [5] total cholesterol concentration for the prevention of atherosclerosis and its complications, respectively. Blood serum (OHS) should not exceed 5.0 mmol/L, triglycerides – 1.7 mmol/L, low lipoprotein density is 3.0 mmol/L, and the level of high-density lipoproteins should be 1.0-1.89 mmol / L. Currently, people with proven coronary heart disease and other cardiovascular diseases 33 (heart-vascular diseases)) and the lipid levels of the diabetic target have changed significantly and amount to OHS < 4.5 mmol / L, LDL < 2.5 mmol / L. In addition, the following inclusion criteria were used for patients with coronary heart disease: signed informed consent, including diagnostic CAG, at the age of 50 years 90 years, no contraindications to taking statins, mental and physical ability to participate in the study. As can be seen from the presented data, the groups were comparable with age, anthropometric indicators, heart rate levels, blood pressure, lipid spectrum. The work is dominated by male faces, gender is associated with the gender characteristics of the spread of the disease. The BMI values in the groups corresponded to the criteria of overweight. All patients received standard treatment before they were included in the study for coronary heart disease at moderate therapeutic doses: 66.6 – - IAPP (Enalapril, fosinopril, Perindopril, Lisinopril, zofenopril), 2.22% - dec (Losartan, valsartan), 66% - beta blockers (Bisoprolol, Carvedilol, metoprolol, Atenolol), 44% - nitrates, 71.1% - aspirin, 6.6% - calcium antagonists (Amlodipine), 6.6% - diuretics (Indapamide), 55.5% – statins (simvastatin, Atorvastatin, Rosuvastatin) in ineffective doses, as evidenced by the indicators of the lipid spectrum. At the stage of participation in the study, all patients have their treatment corrected: if necessary, decomposers, statins, beta-blockers and ACE Blood pressure, calcium antagonists and diuretics are prescribed, nitrates are short on demand. All patients underwent anthropometric examination, biochemical blood analysis, heart ultrasound recording with ECG, blood pressure measurement, assessment of myocardial deformity and rate of deformation by xstrain, diagnostic coronary angiography, as well as analysis of outpatient charts. It

was filled out in order to evaluate the clinical efficacy of a quality of life assessment survey in patients with various forms of coronary heart disease. The analysis of the examination showed that in most patients it was on the background of treatment, patients treated with maximum doses of atorvastatin had an increase in health assessment, a tendency to increase exercise tolerance. In addition, in general, there was a significant reduction in the number of angina attacks, which lead to a decrease in the need for nitrates. Similar data are confirmed in the works of other authors who believe that the anti-ischemic effect of statins is associated with the restoration of normal endothelial function [5]. Strain determination using two-dimensional strain technology has been successfully used in the clinic to determine myocardial ischemia and assess the degree of myocardial infarction [5]. It has been shown that the strain and strain rate values are very accurate and specific to identify them.

Discussion. During the examination of 260 patients, it was found that deformation properties accounted for 80.3 97.8% of infarct segments and 97.8% of normal segments were correctly identified by the gray scale point monitoring method [5]. The diagnostic value of measuring the rate of myocardial deformation and deformation for detecting regional myocardial dysfunction in patients with the right ventricle was noted [180]. In patients with myocardial infarction, the rate of deformation varies depending on the site of injury for healthy individuals, this parameter was characterized by uniformity. In an experiment on induced ischemia, it was shown that a decrease in the rate of myocardial deformation corresponds to a systolic decrease in wall thickening [12]. It was also found that the deformation parameters improve the diagnosis and prognosis of myocardial ischemia and scarring after a heart attack during EchoCG[5]. Caution should be exercised in patients, the assessment of complex LV deformation on the longitudinal axis and short axis with dysfunction can be used to determine its depth. The method of assessing echocardiographic deformation and the rate of myocardial deformation, based on the DOP ultrasound imaging technology, is a promising tool for assessing myocardial function. The spectrum of potential clinical use is very wide due to the ability to distinguish between active and passive movements of myocardial segments, components of myocardial function, such as longitudinal and circular shortening of the myocardium, it is usually not visualized. For this reason, many researchers recommend this new non-invasive diagnosis method for traditional clinical use. According to international studies, most effective drugs from the synthetic group of statins are atorvastatin. Aggressive AVERT therapy with atorvastatin has proven its validity, safety and high efficacy in 245 patients with clinical manifestations of coronary heart disease and hyperlipidemia. Minimal stenosis was found in all patients with CAH ca more than 50%. Treatment with atorvastatin at a dose of 80 mg / day. It took 18 months. In a parallel group of patients with coronary heart disease, angioplasty was performed and a standard treatment regimen was prescribed. 6 months after the start of the study, there was a discrepancy in the curve of primary cumulative formation, LDL levels decreased by 46% as a result of ischemic events and 18-month therapy with atorvastatin%, but the overall incidence of coronary insufficiency decreased by 36% [8]. The need for repeated use of revascularization was registered in 13% of patients receiving atorvastatin at the end of the study, and in 21% of patients receiving treatment after angioplasty. So it was shown for the first time. The effectiveness of treatment of stable patients with coronary heart disease with an intensive decrease in LDL is not lower according to the assessment of angioplasty [5]. In addition, treatment with high doses of atorvastatin is important, it can serve as an alternative to clinical benefits and angioplasty. A significant late absence of the benefits of coronary angioplasty was shown in the study. Undoubtedly, the pleiotropic effect of statins requires more in-depth study due to the effect on endothelial dysfunction, "stabilization" and reverse development of atherosclerotic plaque, stimulation of ischemic angiogenesis is especially interesting in the treatment of patients with coronary artery disease. At the same time, the question remains open – Can modern statins affect the contractile function of the myocardium? In our opinion, one of the points of application of the unique pleiotropic effects of statins is the hibernating myocardium. We believe that aggressive therapy with atorvastatin due to the main and pleiotropic effects: stabilization and regression of atherosclerotic plaque, neoangiogenesis, restoration of endothelial function – will lead to an improvement in myocardial perfusion and, as a consequence, to its contractility. Restoration of local contractile function will inevitably improve global myocardial contractility. This hypothesis is of particular value in patients with coronary heart disease who have undergone MI, as it will accurately determine an adequate strategy and tactics of treatment.

Conclusions. Thus, it can be concluded that Undoubtedly aggressive statin therapy deserves special attention and requires further study. The available data indicate not only their high efficiency, but also the potential ability of these drugs to compete seriously with interventional methods of surgical treatment of chronic coronary heart disease. Modern diagnostic technologies in cardiology allow us to get an objective idea of the contractile function of the heart. The method used in this study to assess the deformation characteristics of the myocardium of X-countries has shown great potential and advantages of application.

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ДЕФОРМАЦИОННЫЕ ХАРАКТЕРИСТИКИ МИОКАРДА В НОРМЕ И ПРИ РАЗЛИЧНЫХ ВАРИАНТАХ ТЕЧЕНИЯ ИШЕМИЧЕСКОЙ БОЛЕЗНИ СЕРДЦА (ОЦЕНКА ЭФФЕКТИВНОСТИ ПРОВЕДЕННОГО ХИРУРГИЧЕСКОГО ВМЕШАТЕЛЬСТВА И РЕГУЛЯРНОЙ СТАТИНОТЕРАПИИ)

Батчаева А.М., Хаджилаева Ф.Д., Коджакова Т.Ш.

Резюме. В настоящее время заболевания сердечно-сосудистой системы широко распространены среди взрослого населения многих стран мира. Ишемическая болезнь сердца (ИБС) — одно из самых распространенных заболеваний в мире. В РФ заболеваемость ИБС в 2002 году составила 448,8 на 100 тысяч населения и увеличилась к 2011 году до 633,0 на 100 тысяч. По данным Всемирной Организации Здравоохранения в 2019 году от ССЗ умерло 17,5 миллиона человек — 31 % от всех случаев смерти в мире. По уровню смертности от ишемической болезни сердца наша страна занимает одно из лидирующих мест.

Ключевые слова: заболевания сердечно-сосудистой системы, ишемическая болезнь сердца, атеросклероз.