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DIASTOLIC DYSFUNCTION OF THE LEFT VENTRICLE IN PATIENTS WITH MYOCARDIAL INFARCTION

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Abstract: Patients with myocardial infarction often experience left ventricular dysfunction, which can manifest as impaired diastolic function. Diastolic dysfunction refers to abnormalities in the relaxation and filling of the left ventricle (LV) during diastole, leading to increased left ventricular end-diastolic pressure (LVEDP) and decreased left ventricular compliance. This article aims to explore the relationship between myocardial infarction and diastolic dysfunction, highlighting its clinical implications and management strategies.

Keywords: Diabetes, researches, prognosis, diabetes, dysfunction, development.

Introduction: Although the existence of diastole became known at the beginning of the last century, for a long time it was perceived as a simple interval during which the chambers of the heart are passively filled for the subsequent pumping cycle.

The prognostic value of LV systolic function has been comprehensively studied, and relatively little is known about the effect of diastolic dysfunction on the prognosis of patients. To date, only a few publications contain information about the optimal timing in which LV DF indicators acquire the greatest prognostic value.

The contribution of diastolic dysfunction to the development of CHF after MI in patients with preserved systolic function remains poorly understood. After MI, LV diastolic dysfunction is considered to be the earliest marker preceding the expanded picture of CHF. At the same time, according to many researchers, the type of LV diastolic dysfunction corresponds to the severity of CHF manifestations.

The development of pathology occurs before the development of the appearance of the clinic and symptoms, as well as therapeutic effects on the mechanisms, which makes it difficult to study due to insufficient information. Numerous studies claim that the following risk factors prevail for the development of diastolic heart failure against the background of coronary heart disease, such as female sex, the presence of concomitant pathology in the form of diabetes mellitus, obesity, arterial hypertension, metabolic syndrome and others.

According to the latest Recommendations of the European Society of Cardiology, heart failure is a clinical syndrome that contributes to the development of characteristic symptoms such as swelling of the shins, shortness of breath and fatigue, contributing to the development of objective signs (wet wheezing in the lungs, increased pressure in the jugular vein, peripheral edema), resulting in morphological or functional disorders of cardiac activity, causing This is a decrease in cardiac output and an increase in intracardiac pressure at rest or during exercise.

There are reliable studies on the prognosis of patients with diastolic dysfunction as a result of coronary heart disease (CHD), although these studies are few.

The cardiac cycle having a phase in which the karyomyocytes stop contracting, relax and return to their original length is called diastole. The normal diastolic function of the left ventricle is

understood when the left ventricle is completely filled with blood, regardless of rest and physical activity, as a result of an increase in diastolic pressure in the left ventricle does not occur.

But if the heart cannot relax completely or it happens slowly, we can talk about diastolic dysfunction. Diastolic heart failure occurs with long and severe diastolic dysfunction.

There are internal and external factors that affect the diastolic function of the left ventricle. Such as the elastic properties of the myocardium associated with the presence of scar tissue; the rate of myocardial relaxation associated with ischemia and myocardial hypertrophy, amyloid deposition determined by myocardial hypertrophy, inflammatory edema; increased coronary blood flow during reperfusion; the presence of fluid in the pericardial cavity.

Numerous studies claim that the following risk factors prevail for the development of persistent heart failure against the background of coronary heart disease, such as female sex, the presence of concomitant pathology in the form of diabetes mellitus, obesity, arterial hypertension, metabolic syndrome, etc.

A study by Niczuik Okiga et al., who studied the gender characteristics of diastolic indices, argue that changes in the parameters of diastolic heart functions differ mainly among older women and mortality increases due to cardiovascular problems of the same age and gender. In addition, all this is due to the interruption and beneficial effect of natural sex hormones-estrogens in the postmenopausal period, which increases HF with preserved LV in women than in men of the same age.

Some studies show that the incidence of left ventricular diastolic dysfunction (LVD) in patients with type 2 diabetes mellitus (DM) without cardiovascular symptoms is 75%. Type 2 diabetes the concomitant disease arterial hypertension (AH) increases the risk of developing macro- and microvascular complications of diabetes and increases the prevalence of LVDD among patients with type 2 diabetes.

According to studies by other scientists of LV diastolic dysfunction in patients with type 2 diabetes without coronary heart disease, hypertension ranges from 50% to 75%. In addition to standard echocardiography, the Valsalva test was used to determine patients with pseudonormalization of the transmittal spectrum in patients with type 2 diabetes mellitus. As a result, it was found that the prevalence of LDL with type 2 diabetes mellitus without cardiac signs has more a high prevalence of less than 50%.

Another study showed that, indeed, BPH has a high incidence in patients without cardiac diseases. Normal diastolic function is the ability of the LV to fill with the necessary volume of blood at rest and during physical exertion without a significant change in its filling pressure and without the development of venous congestion in the lungs.

With an increase in LV filling pressure in the final diastolic pressure (CDP) in the LV >16 mmHg and the average pressure of jamming of the pulmonary capillaries > 12 mmHg is considered elevated. A change in diastolic function (DF) causes an increase in LV filling pressure.

After LV systole, a period begins in which LV pressure decreases rapidly, the aortic valves close before the mitral valve valves open, and this period is called the period of isovolumic ventricular relaxation. If the LV filling pressure becomes lower than in the left atrium (LP), the mitral valve opens and, due to the pressure difference between the chambers, rapid filling begins (up to 75-80% of LV filling is provided).

After that, the LV pressure is reduced to a minimum in order to relax during the rapid filling of the LV myocardium. Due to the rapid filling of the LV with blood, the pressure in it rises to the pressure of the left atrium, after which it decreases until it stops (diastasis phase). During the period of atrial contractions, the pressure of the left atrium (atrial systole) increases, leading to additional blood flow, which is up to a quarter of the LV filling in normal.

Echocardiography is considered an important information technique for determining risk and assessing prognosis after acute myocardial infarction. With the help of traditional echocardiography, information can be obtained about such parameters as the volume and ejection fraction of the left ventricle, the index of wall movement, the volume of the left atrium and the presence of mitral regurgitation.

New prognostic data are provided by the development of tissue Dopplerography and "speckle tracking" methods, such as deformation, strain rate and dissynchrony of the left ventricle. With the help of contrast echocardiography, it is possible to assess myocardial perfusion and the integrity of the microvascular blood supply, which provides information about the viability of the myocardium.

Stress echocardiography allows you to determine myocardial ischemia and viability, dopplerography of the coronary arteries allows you to assess the reserve of coronary blood flow, and three-dimensional echocardiography indicates the volume, function and sphericity of the left ventricle. Many patients with clinical signs of CHF have normal LV contractility (LVEF > 50%).

According to the National Guidelines for the diagnosis and treatment of CHF, the main factors in the development of CHF are arterial hypertension (AH) — 88% and coronary heart disease (CHD) 59% of cases.

In recent years, chronic heart failure with preserved ejection fraction (CHF-SFV) has been common, which is why an in-depth study of the functional state of the myocardium is necessary. One of the latest methods of transthoracic echocardiography (ECHOCG) allows for the diagnosis of CHF-SFV to determine the systolic and diastolic function of both the left and right ventricles.

PV is one of the main parameters determining the contractility of LV. LVEF is determined by the modified Simpson method, showing the architecture of LV. Conventional echocardiography does not provide reliable information about the work of the heart. Because of this, new methods are being developed to determine the condition of the heart muscle by determining the ultrasonic strain (strain or strain) and the strain rate (strain rate or strain rate) of the myocardium.

Conclusion

Diastolic dysfunction of the left ventricle in patients with myocardial infarction is a significant clinical problem. Understanding the pathophysiology, recognizing the clinical presentation, and implementing appropriate management strategies are crucial in improving patient outcomes. Early identification, lifestyle modifications, pharmacological interventions, and interventional therapies form the cornerstone of managing diastolic dysfunction in this population. Further research is needed to enhance our understanding of this complex condition and develop innovative therapeutic options.

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