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ECHOCARDIOGRAPHIC SIGNS F CHF IN PATIENTS WITH ESSENTIAL HYPERTENSION

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Annotation

To date, chronic heart failure (CHF) remains one of the most common and prognostically unfavorable outcomes of many cardiovascular diseases (CVD). It has been demonstrated that about 50% of patients with CHF die within 3-5 years, while 30-50% of patients with severe CHF die within 1 year from the moment of diagnosis verification. In this regard, early diagnosis and prevention of it is an urgent task of cardiology and healthcare. In the recommendations of the American College of Cardiology and the American Association of Cardiology (ACCF/ANA) (2009) emphasizes that the most useful diagnostic test for patients with heart failure is complex two-dimensional echocardiography in combination with Doppler examination.

Keywords: Chronic heart failure, echocardiography, dopplerography, arterial hypertension.

Introduction

According to studies, CHF affects more than 22 million people worldwide. CHF is characterized by a high mortality rate, as well as a high risk of complications and hospitalizations. Thus, decompensation of CHF is one of the reasons for hospitalizations in the cardiology department of almost every second patient (49%), and CHF is diagnosed in 92% of those hospitalized in such hospitals. In recent years, more and more attention of researchers has been attracted by issues related to the diagnosis and treatment of CHF in patients with preserved LV systolic function (SSF). According to epidemiological studies, in 85% of outpatients with clinical manifestations of CHF, the LV ejection fraction (EF) exceeds 45%, which indicates the presence of CHF with LV SSF [1].

When analyzing the prognosis of patients depending on the initial LVEF, it was shown that mortality increases in parallel with a decrease in EF below 45%, while if this indicator is exceeded, the prognosis does not change at any value of myocardial contractility. Taking into account the variety of manifestations of heart failure, certain difficulties are possible in the diagnosis of CHF, especially in the case of a slow

development of symptoms and in the absence of the need for urgent hospitalization of the patient. At the same time, research data indicate that in about 30% of patients with CHF, which they do not suspect, in the next 3 years, pronounced symptoms of the disease appear. The accuracy of diagnosis increases if it is possible to establish the presence of risk factors for the development of CVD, as well as using a consistent methodological approach to diagnosis [2]. Early detection of this clinical syndrome allows starting preventive pharmacotherapy, which allows to increase the patient's life expectancy while maintaining its quality.

Diagnosis requires a thorough medical history and physical examination evidence of symptoms and signs of fluid retention and / or hypoperfusion of target organs. Physical examination data alone are insufficient to differentiate between systolic and diastolic heart failure, since clinical signs may be similar, including cardiomegaly and gallop rhythm (S3) [3]. In CHF, wheezing in the lungs, often considered a sign of venous congestion, may not be detected, despite the increased filling pressure of the LV. Their absence may be due to hypertrophy of the pulmonary lymphatic system, which prevents the occurrence of alveolar edema, despite the increased interstitial pressure [4]. To diagnose CHF, objective evidence of the presence of serious heart damage and dysfunction of the heart muscle is required, which, as a rule, cannot be obtained without the use of instrumental research methods.

Methods for instrumental diagnosis of CHF. Among the instrumental methods for diagnosing CHF, the most common are ECG, chest x-ray and echocardiography. The purpose of instrumental diagnostics is to obtain objective evidence of cardiac dysfunction in a patient with suspected CHF.

Echocardiography is the main method used to confirm the diagnosis of heart failure and / or cardiac dysfunction. The term "Echocardiography" unites all ultrasound methods for examining the heart, including pulsed, continuous wave, color and tissue Doppler studies. In the recommendations of the American College of Cardiology and the American Association of Cardiology (ACCF / AHA) (2009) [5] it is emphasized that the most useful diagnostic test for patients with heart failure is a complex two-dimensional echocardiography in combination with Doppler examination. This method allows you to determine changes in the myocardium, valve apparatus and chambers of the heart, pericardium. With its help, you can solve 3 main issues necessary in the diagnosis of CHF:

- Is LVEF lowered?
- Are there any structural changes in the LV?
- Are valvular, pericardial, or right ventricular abnormalities determined?

In addition, the data obtained using this method can be measured and presented in a numerical value. Echocardiography determines LVEF, the size and / or volume of the ventricle, wall thickness, as well as the geometry of the heart chambers, wall mobility, the size of the right ventricle, systolic work, as well as the size and volume of the atria, functional and structural changes in the valves. In valvular pathology, first of all, attention is paid to the presence or absence of insufficiency of the mitral and tricuspid valves. The lower limit of the norm of LVEF, according to various studies, ranges from 45 to 60%. In modern guidelines, a level of more than 45-50%, calculated by the method of two-dimensional echocardiography according to Simpson, is recommended as an indicator indicating the preservation of LV systolic function [6]. It is believed that a decrease in LVEF below 40% indicates a significant decrease in LV systolic function. It is important to remember that a normal LV ejection fraction does not exclude the presence of heart failure. It should also be noted that the expansion of the LV cavity and low values of LVEF are not always accompanied by clinical signs of CHF. In a study by Sharpe N. and Dought V. [7], many patients with LVEF less than 40% do not have obvious symptoms of cardiac decompensation. This is probably due to the adaptive remodeling of the LV cavity. Normally, the LV end-diastolic diameter ranges from 42 to 55 mm, while the normal LV end-systolic diameter ranges from 25 to 36 mm. These indicators make it possible to determine the state of the LV, in particular, dilatation of its cavity, and to assess the effectiveness of drug treatment. In addition, they are important for assessing prognosis, since patients with severe LV dilatation (LV end-diastolic diameter> 75 mm or LV end-systolic diameter> 60 mm) have a high risk of adverse events, including sudden death. Thus, echocardiography allows you to solve the main diagnostic problem - to clarify the very fact of dysfunction and its nature, as well as to assess the state of the heart chambers in the dynamics of observation. The most important hemodynamic parameter reflecting the global function of the LV myocardium is LVEF [8]. Determination of this indicator makes it possible to differentiate patients with systolic dysfunction from those in whom systolic function is preserved. Therefore, if heart failure is suspected, there are three types of LV filling disturbance in patients with sinus rhythm: with delayed relaxation, pseudonormal, and restrictive.

- The type with "delayed" relaxation of the myocardium corresponds to the initial stage of diastolic dysfunction and is characterized by a decrease in the maximum velocity of early transmitral diastolic blood flow (E), a compensatory increase in the maximum velocity of transmitral blood flow to atrial systole (A) and a corresponding decrease in the E / A ratio. This variant was more often recorded in

patients with hypertension and in the elderly and is associated with normal or decreased LV filling pressure.

- "Restrictive" type - the type of filling, which is characterized by an increase in the rate E, a shortening of the delay time of early diastolic filling (DT) and a significant increase in the ratio E / A. For the formation of this type of diastole disorder, the following main components are required: high end-diastolic pressure in the LV cavity, formed by a significant stiffness of its myocardium; high pressure in the left atrial cavity, ensuring adequate filling of the ventricle in early diastole; decreased systolic function of the left atrium. This type of reaction is also called decompensated or compliance failure. It is observed in decompensated heart disease, accompanied by chamber dilatation, an increase in myocardial stiffness, an increase in pressure in the left atrium and a deterioration in its contractility.
- In intermediate states of diastolic function, the E / A ratio and DT time may be normal - in such cases, one speaks of a "pseudonormal" type of filling. To differentiate this type of filling from normal, additional Doppler indices (blood flow in the pulmonary veins and diastolic elevation of the LV base) are determined.
- Doppler echocardiography allows not only qualitative diagnosis of diastolic disorders, but also to determine their severity. With the progression of heart disease, the nature of the transmitral Doppler spectrum undergoes complex changes associated with both aggravation of diastolic disorders and the development of hemodynamic adaptive reactions acting through an increase in pressure in the left atrium (LA) and / or end-diastolic pressure of the LV and leading to the formation of pseudonormal and restrictive transmitral spectrum. Thus, NYHA functional class I (FC) CHF patients are characterized by a slowdown in the rate of peak E and an acceleration in peak A, which leads to a decrease in the E / A value [9]. This type of spectrum is called "hypertrophic". But for patients with CHF III and IV FC, the opposite results are characteristic: an increase in the speed indicators of the peak E and a slowdown in the indicators of peak A. At the same time, the E / A value increases (> 2.0). This type of spectrum is called "decompensated" or "restrictive". But in patients with CHF II FC, the spectrum of the transmitral diastolic flow occupies an intermediate position (E / A - from 1 to 2). This type of spectrum is called "pseudonormal". The dynamics of E / A from FC I to IV of CHF is nonlinear, therefore, an isolated interpretation of this indicator in the assessment of diastolic function without taking into account the direction of changes in the severity of CHF may lead to erroneous conclusions [10]. At the same time, impaired diastolic function makes it possible to make reliable predictions: an increase in the E / A index> 2.0 is associated with an

increased risk of death in patients with CHF. Moreover, it is important to note that the relationship between FC CHF and indicators of diastolic dysfunction is significantly higher than with the parameters of systolic function. The identification of the noted disorders is of great clinical importance, since it indicates pronounced diastolic disorders and, therefore, the need for their medical correction.

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