

Diagnostic Aspects of Chronic Heart Failure

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Abstract: Chronic heart failure (CHF) is a clinical syndrome in which patients have typical complaints (shortness of breath, decreased exercise tolerance, fatigue) and objective signs (wheezing in the lungs, hepatomegaly, expansion of the jugular veins) caused by a violation of the structure and / or function of the heart (primarily the left ventricle (LV)), which leads to a decrease in cardiac output and/or an increase in intracardiac pressure at rest or during exercise. The proof of LV dysfunction is the most important argument that allows us to move from the clinical hypotheses for a confirmed diagnosis.

Chronic heart failure is not an independent disease, it is a complication, the outcome of cardiac diseases that violate the anatomy and function of the heart. Therefore, an important task facing a doctor who suspects or has diagnosed a patient with CHF is to determine its cause (table). Although the treatment of CHF syndrome is universal, the impact on its cause can vary significantly. Patients with CHF of ischemic etiology need pharmacotherapy aimed at eliminating the symptoms of ischemic heart disease (CHD) (antianginal drugs) and improved prognosis (statins, antiplatelet agents, angiotensin converting enzyme (ACE) inhibitors), and /or surgical revascularization; patients with arterial hypertension (AH) require hypotensive drugs (including the possible use of calcium antagonists); if the symptoms of heart failure are due to tachyarrhythmias, treatment aimed at reducing the frequency of ventricular response, or electrical cardioversion is necessary. Congenital and acquired heart defects stand apart, because when they if the symptoms of heart failure are detected, they cannot be eliminated otherwise than by surgical operation, for example, valve replacement. Modern diagnostic methods (primarily echocardiography (EchoCG)) they allow us to distinguish two main variants of LV dysfunction in patients with CHF: in the first case, its contractile, systolic function mainly suffers, in the second – diastolic, the ability to relax. In the first case , a significant decrease in the ejection fraction is determined (LV) LV (<40%) due to local or diffuse violation of its contractility, often dilation of the cavity and thinning of the LV walls indicate CHF with reduced or low LV (CHF-nFV). In the second case, the LV remains normal, preserved (>50%), local contractility disorders are uncharacteristic, LV volume may be normal or even decrease, wall thickness is usually increased using special techniques (Doppler study of transmittal blood flow or tissue Doppler) a violation of diastolic function is detected LV (HSN with preserved PV (HSN-sFV)). Recently a subgroup of patients with CHF has been identified, in whom FV is 40-49%, but so far this has little effect on practical decision-making.

Keywords: alternative, signs of stagnation, Magnetic resonance, therapeutic effect.

Materials and methods. The clinical hypothesis about the presence of CHF in a patient is formulated when identifying characteristic complaints and objective signs. Since all of them are not very specific, differential diagnosis of dyspnea, edema, weakness, hepatomegaly, etc. can cause difficulties. The collection of anamnesis should be aimed at establishing the disease that

causes CHF. In the future, the examination algorithm is built in such a way as to identify LV dysfunction, determine its cause and exclude alternative explanations of the patient's symptoms. There are no specific manifestations of CHF on an electrocardiogram (ECG), however, normal ECG is observed in patients with CHF quite rarely. This method suggests the etiology of CHF, since most of the diseases leading to its development cause changes in the ECG (signs of LV hypertrophy, scarring, rhythm and conduction disturbances). Chest radiography allows you to assess the configuration of the heart and vascular bundle, identify cardiomegaly, signs of stagnation in the small circle of blood circulation, hydrothorax.

In addition, an X-ray in a patient with shortness of breath allows you to exclude its other causes, focal changes, changes in the mediastinum. The most widespread, non-invasive and relatively cheap method of verifying CHF is EchoCG, which allows to study the size and volume LV and right ventricle, left atrium, the thickness of the walls of the heart, quantify the systolic and/or diastolic functions of the LV, study the work of the valvular apparatus, exclude rare causes of CHF (tumors, congenital malformations, restrictive processes that violate LV work due to external compression or increased stiffness of the endocardium). The results of EchoCG in most cases allow us to formulate an initial diagnosis and develop a treatment plan. Other diagnostic tests are required when the diagnosis remains unclear (for example, poor imaging in echocardiography).

Result. As a diagnostic test, especially if EchoCG is unavailable, it is possible to use the determination of laboratory parameters reflecting the concentration of brain natriuretic peptide (MNUP) in the blood. These neurohumoral mediators increase the excretion of sodium and water by the kidneys, cause vasodilation and are secreted by the myocardium in response to increased pre- or post-loading on the LV. However, there are many factors that cause an increase in the level of MNUP (old age, chronic disease and/or acute kidney injury, AF, hypertension, pulmonary embolism), which significantly reduces the diagnostic value of this indicator. Therefore, the determination of the level of MNUP can be used to exclude, and not to establish a diagnosis of CHF: at normal or low values, the diagnosis of CHF can be considered excluded, and if they increase, the initial “working” diagnosis of CHF should still be confirmed by EchoCG. The test is of great relevance to confirm CHF in patients with characteristic symptoms and preserved LV LV.

Magnetic resonance imaging of the heart allows to achieve high image quality and accurate parameter estimation in patients with poor visualization when EchoCG. Magnetic resonance imaging is the method of choice in the diagnosis of congenital heart defects, amyloidosis, myocarditis, Fabry's disease, unclassified cardiomyopathies. Contrasting with magnetic resonance imaging helps to differentiate ischemic and non-ischemic causes of CHF, as it allows to identify fibrosis / sclerosis. Compared to echocardiography, this method is less accessible and more expensive. Magnetic resonance imaging is not performed in patients with metal structures (joint prostheses, mechanical valves, pacemakers). Computed tomography of the heart is used for noninvasive visualization of coronary arteries in patients with CHF and suspected coronary artery disease. However, coronary angiography is a more sensitive and specific method of diagnosing atherosclerosis of the coronary arteries, allowing, if necessary, to immediately proceed to the therapeutic effect.

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