



Chronic Heart Failure in Women

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Abstract: Our work presents the features of epidemiology, etiology and pathogenesis of chronic heart failure in women. The recorded gender differences determine the clinical features of the course of the disease, which must be taken into account in the development of individual management tactics for women with heart failure.

Keywords: chronic heart failure, gender differences, women's health, hormonal continuum.

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In today's time, chronic heart failure (CHF) is one of the urgent medical and social problems. This is due to its wide prevalence, a constant increase in morbidity and an unfavorable prognosis. The prevalence of CHF increases annually. Advances in the treatment and prevention of CHF, as well as the diseases that cause it, have significantly affected the sexual and age characteristics of this condition. However, data from numerous large population studies that have studied aspects of this problem currently allow us to talk about the presence of gender differences in CHF.

Gender characteristics of the prevalence of CHF

According to the Framingham study, the prevalence of CHF in the population is 0.8% in the age group of 50-59 years and increases in the group of 80-89 years to 6.6 and 7.9% for men and women, respectively. Significant sex differences were revealed when analyzing the distribution of patients with CHF by age in European countries. It was found that the average age of men with CHF is 10 years less than that of women. At the age of 40-49 years of age, the incidence of CHF is low, but men predominate in this group. The age group of 50-59 years is also dominated by men. Approximately half of the total number of patients with CHF belongs to the age group over 60 years. Most men with CHF belong to the age category of 60-69 years. Among the persons older than 70 years, women predominate in a ratio of 3: 1, in the group of patients with CHF older than 80 years, this ratio is 4-5: 1. Thus, the proportion of men among patients with CHF is greatest in working age and early retirement age, whereas in women, on the contrary, CHF is more often detected in older age.

The structure of the causes of CHF in men and women

The main causes of the development of CHF in our country are arterial hypertension (AH) – 95.5%, coronary artery disease - 69.7%, myocardial infarction (MI) or acute coronary syndrome - 15.3%, diabetes mellitus (DM) – 15.9%. The combination of coronary heart disease and hypertension occurs

in most patients with CHF. Gender differences in the causes of cardiac decompensation were found in the population of patients with CHF. For men as causes of development CHF turned out to be a priority. Coronary heart disease, acute cerebral circulatory disorders, and for women - the presence of hypertension, diabetes, heart defects and myocarditis. Thus, according to the Framingham study, CHF was detected in 13% of women with valvular defects and only in 10% of men with a similar pathology. It is known that hypertension is the most common cause of development CHF in women. In the Framingham study, hypertension was associated with a twofold increase in the risk of developing CHF in men and a threefold increase in women. In other studies, it was noted that women with coronary heart disease have a 2.7-fold higher risk of developing CHF than men. Although the prevalence of MI in women is lower than in men, in the post-infarction period, heart failure develops significantly more often in them (46 vs. 22%).

Epidemiological studies have found that men from adolescence to 70 years of age have higher levels of systolic, diastolic and pulse blood pressure (BP) than women. However, lower blood pressure levels are typical only for younger women 55 years old. In older age groups, there is a more intense increase in blood pressure, especially systolic and pulse, in women than in men. All this serves as a prerequisite for a greater prevalence in women of isolated systemic hypertension with high pulse blood pressure, which is an important predictor of the development of cardiovascular complications (CVD).

In addition, the presence of metabolic disorders in women is of great importance for the development of MTR than in men. There is evidence that an increase in body mass index in women is more significant for the development of CHF in comparison with men. In women, obesity has a greater effect on the function of the left ventricle (LV) and increases the metabolic load associated with an increase in cardiac output and intravascular fluid volume. As a result, the filling pressure increases, leading to its dysfunction. In women with DM, the risk of developing CVD increases by 5 times, while in men it increases by 2-3 times. According to the Framingham study, fasting hyperglycemia was associated with an increased risk of developing cardiovascular diseases (CVD) in women, but not in men, and in the presence of DM, echocardiographic signs of CHF were found in 2 times more often in men and 5 times more often in women compared to people without diabetes.

All these features are largely due to the relationship that exists between the functioning of the cardiovascular and reproductive systems in women. Recently, when discussing this relationship, the concept of «hormonal continuum of women's health» has been used, which includes an integrative approach to treatment strategies, risk factors assessment, diagnosis and prevention of CVD in different periods of a woman's life, depending on the state of her reproductive sphere. In elderly women, the incidence of CVD is higher than in young women. A significant increase in the frequency of CHF, as well as other CVD, in women is noted after menopause, which is often associated with hypoestrogenism and a decrease in the endothelioprotective effects of estrogens. The influence of female sex hormones can also explain the sex differences in myocardial remodeling. In premenopausal women with essential hypertension, compared with their male peers, the thickness of the posterior wall and the mass of the LV myocardium are smaller, and systolic function is better.

In most cases, heart failure develops in women already during menopause, which is primarily due to a sharp increase in the incidence of hypertension, coronary heart disease, abdominal obesity and diabetes against the background of changes in hormonal status. An important role in this case is undoubtedly played by the general aging processes of the body, inseparable from the extinction of reproductive function in women. However, according to the concept of the hormonal continuum of women's health, we should not forget about the direct negative effect of hypoestrogenism on the myocardium, which, if not, it has independent significance in the development of CHF, then in any case it aggravates its course in postmenopausal women and determines gender differences in the pathogenesis of CHF. Women are characterized mainly by diastolic type of dysfunction LV and

concentric LV hypertrophy, whereas in men, the systolic type of LV dysfunction and the eccentric type of LV hypertrophy are more often detected. Gender differences in the etiology and pathogenesis of CHF lead to clinical features of the course and prognosis of CHF in women, which must be taken into account when developing individual therapeutic and preventive strategies.

Clinic and prognosis in women with CHF

There are a number of features in the clinical picture of CHF in women. Symptoms such as shortness of breath, swelling and decreased exercise tolerance are more common in women and are more pronounced than in men. The heart rate indicator in women is not as important for prognosis as in males. At the same time, age, LV ejection fraction and exercise tolerance in women are more significant. Atrial fibrillation is 1.6 times more often combined with CHF in women than in men. Women with CHF are more likely to develop depressive disorders: the proportion of patients suffering from such disorders reaches, according to various studies, 14-38%. Mortality from CHF among women is lower in comparison with men, but the quality of life of the former is worse: even against the background of therapy, a significant limitation of functional capabilities remains.

The survival rate of women at the diagnosis of CHF is higher than that of men. In the Framingham study, after the diagnosis of CHF, the 5-year survival rate was 25% in men and 38% in women. Many studies have revealed a tendency to a longer course of the disease in women. In a large European study with an equal number of men and women included (14529 and 14524, respectively) the risk of death after hospitalization for CHF was higher in men at different times - 28 days, 1 and 5 years. Risk ratio for men and women after age correction and concomitant diseases amounted to 1.21 (95% confidence interval (CI) 1.14–1.28), 1.26 (95% CI 1.21–1.31) and 1.28 (95% CI 1.24–1.31), respectively. In the FIRST study, the survival rate of men with CHF for 18 months, depending on various characteristics (age, nature of treatment, severity of CHF symptoms), was lower in all cases. In the BEST study, regardless of treatment with beta-blockers, lower mortality was found in women compared to men (26 vs. 29%), in including in patients with CHF of functional class III according to NYHA (New York Heart Association – New York Association of Cardiologists) (25 vs. 32%). In studies conducted in the USA, a constant increase in the number of such patients was demonstrated, which made it possible to determine the problem CHF with preserved systolic function as one of the non-infectious epidemics of the XXI century. This category of patients with CHF mainly refers to older women with poorly treated hypertension and/or diabetes. At the same time, the occurrence of CHF with preserved LVEF reaches 68%, which is most likely due to gender differences in the causes of CHF development.

Gender differences in CHF pharmacotherapy

Recommendations for lifestyle modification are the same for all groups of patients with CHF. Drug therapy in women also practically does not differ from that used in men, however, there are a number of features related primarily to the effectiveness of drugs depending on gender.

Angiotensin converting enzyme (ACE) inhibitors are a mandatory element of the treatment of CHF, regardless of its etiology, age and gender of patients. Nevertheless, when analyzing in subgroups of numerous clinical studies using these drugs, it was found that the effectiveness of ACE inhibitors in women is significantly lower than in men. This is especially true of the effect of ACE inhibitors on the clinical outcomes of CHF. Similar results were obtained when studying the preventive significance of ACE inhibitors. In the presence of clinical signs of CHF, taking ACE inhibitors contributed to a significant reduction in the risk of death and hospitalization in women, but this effect was less pronounced in them than in men (meta-analysis of SAVE studies, SOLVD, CONSENSUS, SMILE, TRACE). In addition, it should be borne in mind that the overall proportion of women in these studies was small. In the treatment of CHF, no gender differences were found in the effectiveness of

angiotensin II receptor blockers (Val-HeFT, CHARM studies, ELITE II), which distinguishes this class of drugs from ACE inhibitors.

The effectiveness of diuretics in the treatment of CHF is not in doubt, but there is no data on sexual differences in their use. Aldosterone receptor antagonists are not just diuretics, they have an effect on the renin-aldosterone system. In the study RALES the use of spironolactone caused an equal reduction in mortality at CHF in men and women (30 and 28%, respectively). Given the presence of gender differences in the effectiveness of ACE inhibitors, the use of beta-blockers in women is of particular value. Unfortunately, according to the results of the study of clinical and demographic characteristics of participants in the largest studies using beta-blockers in CHF, it can be concluded that beta-blockers in women have a greater effect on the frequency of hospitalizations. However, these data cannot be considered absolutely reliable, since the number of women in the studies was very small, and the average age of patients was about 60 years, and finally, most patients had ischemic heart failure etiology and LV systolic dysfunction.

Cardiac glycosides are indicated for patients who have CHF combined with atrial fibrillation. Indications for the use of digoxin are quite limited: it should be prescribed to patients with CHF II-IV functional class according to NYHA with LVEF <40% in the presence of atrial fibrillation in order to reduce and regulate the rhythm, possibly improve the prognosis and reduce the risk of hospitalization. The effectiveness of digoxin in the treatment of Gender-adjusted CHF was evaluated in only one prospective randomized DIG study. Primary results they testified that taking digoxin does not increase overall mortality and slightly reduces the frequency of hospitalizations. At the same time, the analysis of sex differences was not carried out. 5 years later, repeated data processing revealed a higher mortality rate in women taking digoxin compared to the placebo group (33.1 vs. 28.9%). In men, on the contrary, mortality was 1.6% lower in the digoxin group. However, it was doubted that the data from this study is sufficient to refuse digoxin therapy in women.

Given that the risk of thromboembolism and strokes increases with CHF, anticoagulants play an important role in the treatment of this syndrome. Moreover, according to a number of researchers, the very presence of CHF is due to stasis in the cavities of the heart, observed during dilation LV is a factor contributing to the development of both peripheral venous and intracardiac thrombosis as a source of future thromboembolism. In the SOLVD study, in women with severe CHF (LVEF <35%) without cardiac arrhythmias, the risk of thromboembolic complications was detected somewhat more often than in men of the same group. When analyzing the reasons for this phenomenon turned out that women were significantly less likely to be prescribed antiplatelet agents and anticoagulants.

Thus, CHF in women manifests at an older age, on average 10 years later than in men. A significant increase in the frequency of CHF, as well as other CVD, in women is noted after menopause, which is associated with hypoestrogenism and a decrease in the endothelioprotective and cardioprotective effects of estrogens. In women, CHF with preserved PV is more common. The process of myocardial remodeling in women often proceeds in the form of concentric LV hypertrophy, an increase in myocardial mass and, as a consequence, diastolic dysfunction. Atrial fibrillation is 1.6 times more often combined with CHF in women than in men. In the clinical picture of CHF, women have a number of features: more pronounced shortness of breath and swelling, lower exercise tolerance, they subjectively tolerate the symptoms of CHF worse than men, as a result, their quality of life is lower, anxiety and depressive disorders are often observed. Survival in women at the diagnosis of CHF is higher than in men. As the causes of CHF in women, hypertension, diabetes, heart defects and myocarditis are more common. Metabolic disorders in the form of obesity, metabolic syndrome, diabetes are also more common in women. A feature of the course of hypertension in them is the predominance of isolated systolic hypertension with high pulse blood pressure, which increases the risk of MTR. When prescribing medication for CHF in women, the recommended groups of drugs

should be used, including blockers of the renin-angiotensin-aldosterone system, antagonists of aldosterone receptors, given that ACE inhibitors have demonstrated less effectiveness in women in clinical studies.

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