

CLINICAL AND ANAMNESTIC FEATURES IN PATIENTS WITH DIFFERENT PHENOTYPES OF CHRONIC HEART FAILURE

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Introduction. Chronic heart failure (HF) is defined as «a complex clinical syndrome with symptoms and signs that results from any structural or functional impairment of ventricular filling or ejection of blood» as per the American Heart Association and the American College of Cardiology [1]. Studies have revealed that a multitude of factors are responsible for causing chronic HF as they cause a substantial loss of functioning cardiomyocytes [2]. Diseases such as chronic obstructive pulmonary disease, hypertensive cardiac disease, rheumatic heart disease, and ischemic heart disease (IHD) are cited to be the major causative diseases, amongst which ischemic heart disease takes the lead [3]. IHD leads to poor perfusion of the myocardium, resulting in a decreased ejection fraction.

The 2016 European Society of Cardiology (ESC) guidelines have introduced a new classification of heart failure (HF) based on the left ventricular ejection fraction (LVEF), which classify patients with HF into heart failure with preserved ejection fraction (HFpEF) (LVEF $\geq 50\%$), heart failure with reduced ejection fraction (HFrEF) (LVEF is $< 40\%$), and heart failure with mid-range ejection fraction (HFmrEF) LVEF (40–49%) [3].

Despite the advancements in heart failure management, a gap remains in distinguishing the clinical, anamnestic, laboratory, and echocardiographic profiles among these subtypes, particularly in HFmrEF. Greater clarity in phenotypic presentations may facilitate diagnostic precision and guide targeted therapies. The aim of this study was to evaluate the clinical and anamnestic characteristics, laboratory and echocardiographic features in patients with HFmrEF.

Aim of the study was to establish clinical and anamnestic differences in patients with HF with reduced and mid-range LVEF.

Materials and methods. The study included 80 patients with heart failure and LVEF less than 50% who were admitted to the Grodno State Cardiological Center for treatment from January to November 2024. Group 1 included 45 patients with HFrEF (LVEF $< 40\%$), while Group 2 included 35 patients with HFmrEF (LVEF 41–50%).

Exclusion criteria from the study were: chronic rheumatic heart disease, valvular pathology of the heart requiring surgical correction, prosthetic heart valves, oncological diseases and severe concomitant extracardiac pathology.

All patients underwent clinical, laboratory, and instrumental studies, including transthoracic echocardiography.

Echocardiography was performed on Phillips iE33 device with a multi-frequency sensor (frequency 2.5-5.0 MHz). The examination was performed with the patient lying on his left side with his back to the researcher or on his back. The study protocol included the following indicators: LA and right atrium (RA) diameter in 2-chamber and 4-chamber mode, end-systolic diameter and end-diastolic diameter

(mm) of the left ventricle (LV), LVEF; assessment of the state of the valvular apparatus of the heart, degree of regurgitation on the valves.

Statistical analysis was performed using the STATISTICA 12.0 software package with a preliminary check for normal distribution using a distribution histogram. Quantitative data, the distribution of which was not normal, were given as a median, 25% and 75% quartiles. Since most of the quantitative characteristics did not obey the normal distribution law, non-parametric methods were used for comparison. The Mann-Whitney test was used to assess differences in quantitative traits between two independent groups. At a significance level of p less than 0.05, it was believed that the studied indicator in the compared groups had statistically significant differences.

The study was performed in accordance with Good Clinical Practice standards and the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants prior to inclusion in the study.

Results. Clinical characteristics of the patients are presented in Table 1.

Table 1 – Clinical characteristics of patients

Parameters	HFrEF (n=45)	HFmrEF (n=35)	p
Male gender, n (%)	29 (64.4%)	25 (71.4%)	>0.05
Age, years,	62.5 [56; 71]	64.4 [58.7; 70.8]	>0.05
Body mass index, kg/m ² ,	30.8 [24.5; 33.45]	28.9 [25.7; 31.8]	>0.05
Obesity, n (%)	22 (48.9%)	15 (42.8%)	>0.05
Class 1, n (%)	13 (28.9%)	13 (37.1%)	>0.05
Class 2, n (%)	3 (6.7%)	2 (5.7%)	>0.05
Class 3, n (%)	6 (13.33%)	-	0.022
Hypertension, n (%)	33 (73.3%)	32 (91.4%)	0.040
Stage 1, n (%)	7 (15.6%)	5 (14.3%)	>0.05
Stage 2, n (%)	24 (53.3%)	26 (74.3%)	0.046
Stage 3, n (%)	2 (4.4%)	1 (2.9%)	>0.05
Stable angina, n (%)	20 (44.4 %)	14 (40%)	>0.05
Myocardial infarction history, n (%)	24 (53.3%)	19 (54.3%)	>0.05
Diabetes mellitus, n (%)	13 (28.9%)	7 (20%)	>0.05
Atrial fibrillation, n (%)	29 (64.4%)	19 (54.3%)	>0.05
Paroxysmal AF, n (%)	4 (8.9%)	4 (11.4%)	>0.05
Persistent AF, n (%)	25 (55.5%)	15 (42.9%)	0.049
HF NYHA Class	-	-	
Class 2, n (%)	4 (8.9%)	15 (42.8%)	<0.001
Class 3, n (%)	28 (62.2%)	19 (54.3%)	>0.05
Class 4, n (%)	13 (28.9%)	1 (2.9%)	<0.001

Patients with HFrEF and HFmrEF were predominantly male (29 (64.4%) vs 25 (71.4%), $p>0.05$), comparable in age (63 [56; 71] vs 64 [59; 71] years, $p>0.05$), prevalence of obesity (22 (49%) vs 15 (43%), $p>0.05$), prior myocardial infarction (24 (53%) vs 19 (54%), $p>0.05$) and diabetes mellitus (13 (28%) vs 7 (20%), $p>0.05$). Patients with HFmrEF more often suffered from hypertension (33 (73%) vs 32 (91%), $p=0.04$) than patients with HFpEF. Prevalence of atrial fibrillation (AF) in both groups was comparable, however patients with HFrEF were characterized by higher rate of persistent AF compared to HFmrEF (55.5% vs 42.9%, $p=0.049$).

In both groups there was rather high number of patients with stable angina (20 (44%) vs 14 (40%), $p>0.05$), but patients with HFrEF more often had CCS class 3 (10 (22%) vs 1 (3%), $p=0.010$). Also, patients with HFrEF were characterized by higher class of heart failure (NYHA Class IV in 13 (28%) vs 1 (3%), $p<0.001$), while in HFmrEF patients NYHA class II was more common ($p<0.001$).

Conclusion. Patients with HFrEF had higher class of stable angina and HF NYHA class ($p<0.01$), however patients with HFmrEF more often suffered from hypertension ($p<0.05$). The new category of HFmrEF does not simply indicate an intermediate category between HFrEF and HFpEF but comprises a heterogenous population of patients with distinct and heterogeneous prognostic profiles.

References

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КЛИНИКО-АНАМНЕСТИЧЕСКИЕ ОСОБЕННОСТИ ПАЦИЕНТОВ С РАЗЛИЧНЫМИ ФЕНОТИПАМИ СЕРДЕЧНОЙ НЕДОСТАТОЧНОСТИ

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Целью исследования было выявить клиничко-анамнестические особенности пациентов с сердечной недостаточностью со сниженной (СНнФВ) и промежуточной (СНпрФВ) фракцией выброса левого желудочка. Пациенты с СНнФВ имели более высокий класс стабильной стенокардии и класс сердечной недостаточности по NYHA ($p<0,01$), однако пациенты с СНпрФВ чаще страдали артериальной гипертензией ($p<0,05$). Новая категория СНпрФВ не просто обозначает промежуточную категорию между СНнФВ и СНсФВ, а включает в себя гетерогенную популяцию пациентов с различными клиническими профилями.