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PSYCHOSOMATIC DISORDERS IN PATIENTS WITH CHRONIC CARDIAC INSUFFICIENCY AND ATRIAL FIBRILLATION

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Patients with AF, regardless of age, periodically complain of palpitations, decreased tolerance for physical loads, shortness of breath, dizziness, and other symptoms that affect the tolerance of the disease [Vologdina]. AF plays an important role in the formation of anxiety-depressive disorders (ADD) in patients.[3,7] In turn, the ADD have a negative impact on the course of AF, its complications, reduce the effectiveness of therapy, and worsen the prognosis as a consequence (11,12). In particular, according to Belyalov F.I., ADD is associated with an 8,6-fold increase in the risk of AF recurrence after successful restoration of sinus rhythm.[4] The mechanisms of the effect of ADD on the prognosis of AF are obviously associated with two vectors: with a decrease in adherence to treatment from one side, and due to concomitant biochemical and neurohumoral changes from another.[1,2]

The purpose of this research was: the correlational study between the frequency, structure and severity of psychosomatic disorders of the anxiety-depressive circle in CHF patients with different LVEF (left ventricular ejection fraction) parameters associated with atrial fibrillation and sinus rhythm.

MATERIAL AND RESEARCH METHODS

We examined 112 patients with CHF (71 men and 41 women), aged 35 to 72 (on average 61 ± 14 years), the duration of the disease - 6.0 ± 3.2 years. The main cause of CHF was coronary heart disease (CHD), including PMI-27% and CHD + hypertensive disease (HD) -32%, cardiomyopathy -41% (dilated-21%, valvular-20%). 44 (39.2%) of 112 patients had AF, while 7 (16%) had the paroxysmal form and 37 (84%) had the permanent form of AF.

All patients underwent a clinical examination and assessment of their somatic status using a rating scale of clinical state (RSCS, modified by Mareev V.Yu., year of 2000) and determining the 6-minute walking distance (6MWT- six-minute walk test). Functional research methods included ECG, Holter ECG monitoring (HECGM), and echocardiography (UCG) with LVEF measurement by the Simpson formula. CHF patients were divided into 3 groups depending on the value of the left ventricular ejection fraction (LVEF): patients with low LVEF <40% (n = 44), with midrange LVEF 41-49% (n = 22) and intact LVEF> 50% (n = 46).

The subjective scale HADS (Hospital Anxiety and Depression Scale - Zigmond A., Snaith R., year of 1983) was used to evaluate mental functioning. The scale is designed to identify and scale the severity of depression and anxiety in general medical practice; it has a high discriminant validity for two disorders: anxiety and depression. The questionnaire was filled out by the patient himself or by interviewing. The result of 0-7 points was evaluated as the absence of significantly expressed symptoms of anxiety and depression, 8-10 points indicated the presence of subclinical anxiety and / or depression, and 11 points or more indicated clinically expressed anxiety and / or depression. All patients studied the quality of life defined in points using the "Minnesota Living with Heart Failure questionnaire (MLHFOQ)".

All studies were conducted with the informed consent of patients. Exclusion criteria: acute myocardial infarction, acute cerebrovascular accident, pulmonary embolism, history of malignant neoplasms, acute infectious diseases.

Statistical data processing was carried out using the Excel 2013 software package. the arithmetic mean value (M) and root-mean-square deviation (M ± SD) or 95% CI were calculated for quantitative features. The absolute frequency of manifestation of the character (the number of examined) and the frequency of sign development were calculated for qualitative characters in percentage (%).

RESULTS

All patients with CHF included in the study, depending on the heart rate, were divided into 2 groups: 1st group - patients with atrial fibrillation (n-44); 2nd group - patients with sinus rhythm (n-68). Table №1. The groups

were comparable in terms of sex and age characteristics, while the number of men in both groups significantly exceeded women. Patients with atrial fibrillation began to notice the first clinical symptoms and signs of heart failure earlier than patients with sinus rhythm.

Table №1. Comparative analysis of patients.

Indicator	1st group (n=44), patients with AF	2nd group (n=68), patients with sinus rhythm
Age (years old)	61(±12)	65(±13)
Male/Female (n)	33/11	44/24
CHF duration (year)	4,1(±3,2)	3,2(±2,5)
low LVEF (n)	23(52,8%)	21(30,8%)
midrange LVEF (n)	12(27,2%)	10(14,8%)
intact LVEF (n)	9(20%)	37(54,4%)

Abbreviation list: low LVEF – low ejection fraction, midrange LVEF - midrange ejection fraction, intact LVEF- intact ejection fraction

According to the results of the analysis of echocardiography in group 1, the majority of patients, 53%, had low LVEF, ¼ midrange and 1/3 of the patients had intact LVEF. Different picture was observed in patients with sinus rhythm; in 1/3 of patients the LVEF was low, intact LVEF occurred in more than 50% of cases and midrange was recorded in 15% of patients.

The study of comparative characteristics of patients depending on LV systolic function and heart rate showed that the etiological factors of LV dysfunction were coronary heart disease, including a history of myocardial infarction and dilated cardiomyopathy.

Table №2. Comparative analyses of patients with CHF depending on the value of LVEF.

Indicator	LVEF <40%(n=44)		LVEF 40-49% (n=22)		LVEF >50% (n=46)	
	patients with AF (n=23)	patients with sinus rhythm (n=21)	patients with AF (n=12)	patients with sinus rhythm (n=10)	patients with AF (n=9)	patients with sinus rhythm (n=37)
CHD including a myocardial infarction and hypertension, n (%)	12(52%)	12(57%)	10(83%)	9(90%)	7(77,8%)	35(95%)
DCMP	11(48%)	9(43%)	2(17%)	1(10%)	2(22,2%)	2(5,0%)
Prior stroke, n (%)	4(17,3%)	3(14,3%)	3(25%)	2(20%)	2(22,3%)	2(0,5%)
PCI history, n (%)	4(17,3%)	4(19%)	2(16,7%)	0(0%)	0(0%)	5(13,5%)
DM of 2 type, n (%)	6(26%)	2(9,5%)	5(41,7%)	4(4%)	2(22,2%)	9(24,3%)

According to the presented data, patients with sinus rhythm predominated among patients with CHF and midrange EF. The CHF with midrange and low EF was more common in patients with coronary artery disease and hypertension. The AH as the only etiological factor of CHF among patients with ejection fraction <50% was rarely observed. However, the proportion of patients with postinfarction cardiosclerosis (including both patients with postinfarction aneurysm and without it) in this population increased dramatically. In terms of the incidence of diabetes mellitus (DM), it prevailed in the group with midrange LVEF. Patients with low and midrange LVEF had a history of stroke, especially in the group of patients with AF.

According to the results of the analysis of the HADS scale, ADD was diagnosed in 41 (93%) CHF patients with AF and in 40 (38%) patients with sinus rhythm. In the structure of ADD in the 1st group of patients with AF prevailed mixed anxiety-depressive symptoms in 25 (61%) patients, while the anxiety disorders dominated in 9 (22%), and depressive manifestations in 7 (17%). In group 2 (with sinus rhythm), isolated depression was observed only in patients with low LVEF (52% of cases).

The clinically apparent ADD was diagnosed reliably more often in CHF patients with AF: moreover, anxiety was at the level of 10,1 (± 4.9) points, depression - 11 (± 5.2) points. And, predominantly isolated mild depression was diagnosed at the level of 8,7 (±4,7) points without signs of anxiety in CHF patients with sinus rhythm.

The frequency and severity of psychological disorders of the anxiety-depressive circle in CHF patients, as well as the severity of the underlying pathology, differed in terms of LVEF. Thus, in CHF with AF and intact LVEF, isolated anxiety prevailed within the range of 11, 8 (± 5,7) points. The frequency and severity of clinical signs of ADD in patients with CHF and AF increased with lowering the LVEF and was the highest against the background of low and midrange LVEF. Therefore, the anxiety was determined within 9 (± 3,31) points in

patients with midrange LVEF, and depression - 12 (± 3,6) points; The anxiety was 8 (± 4,9) points with low LVEF, and depression was 13 (± 3,7) points. At the same time, psychological disorders of the type of isolated depression (11,7 points) in patients with CHF with sinus rhythm were diagnosed exclusively with low LVEF in group2.

Table №3. Clinical analyses of patients with CHF and AF depending on LVEF.

Patients with AF (n=44) Indicators	Anxiety (score)	Depression (score)	Heart rate beats / min	SBP/ DBP mm Hg	QOL (score)	6MWT distance (meter)	RSCS (score)
low LVEF <40% (n=44)	8(±4,9)	13(±3,7)	50-125(±22)	118(±16,3)/ 73(±16,3)	87,7(±23,2)	69(±31)	9(±2,5)
midrange LVEF 40-50%(n=22)	9(±3,31)	12(±3,6)	58-180(±33)	130(±18,9)/ 81(±11)	48,1(±16,5)	135(±65)	6,5(±3,2)
intact LVEF >51% (n=46)	11,8(±5,7)	7,1(±3,7)	70-100(±10)	122(±49,9)/ 87(±16)	55,6(±22,8)	162(±46)	6,1(±2,3)

Table №4. Clinical analyses of patients with CHF with sinus rhythm depending on LVEF.

Patients with sinus rhythm (n=68) Показатели	Anxiety (score)	Depression (score)	Heart rate beats / min	SBP/ DBP mm Hg	QOL (score)	6MWT distance (meter)	RSCS (score)
low LVEF <40% (n=44)	7,6(±3,5)	11,7(±5,5)	87(±19,6)	121(±20,5)/ 77(±10,3)	79,4(±31)	73,6(±54)	8(±2,1)
midrange LVEF 40-50% (n=22)	6,4(±5,2)	7,5(±5,1)	76(±9,8)	145(±17,7)/ 95(±12)	62,4(±20)	176(±95)	5,3((±3,0)
intact LVEF >51% (n=46)	7,3(±4,4)	6,8(±3,1)	69(±11,5)	149(±24,7)/ 89(±10,4)	49,5(±14)	181(±69)	3,8((±2,1)

The indices of central hemodynamics in patients with CHF of the 1st group differed expressively from those of the patients of the 2nd group. So, the average heart rate was significantly higher in patients of the 1st group, compared with patients of the 2nd (94 ± 24 beats / min and 70 ± 11.4 beats / min). Low SBP/ DBP and a statistically significant high heart rate were more common in the group of patients with AF and low LVEF. A significantly worse expression of clinical signs and symptoms of CHF was observed and verified by the test data with a 6-minute walk with a significantly shorter distance - 69 (± 31) m in patients with AF, especially in the group with low LVEF. While, these indicators were 135 (± 65) and 162 (± 46) meters, respectively, in patients with midrange and intact LVEF. This indicator turned out to be higher in patients with CHF against the background of sinus rhythm than in the first group, according to the value of LVEF: 73.6 (± 54) m with low, 176 (± 95) m - with midrange and 181 (± 69) m - with intact LVEF. Clinical expressions of heart failure (HF) were milder, respectively, in patients with sinus rhythm, as evidenced by the lower scores on the RSCS scale (table No. 3, No. 4).

The study of the QOL of patients depending on the heart rate showed that in CHF patients with psychological disorders of the anxiety-depressive circle, the quality of life indicators largely depends on the left ventricular ejection fraction. Since, QOL was, on average, 1.2 times worse in AF patients with LVEF than in sinus rhythm.

The frequency and severity of psychological disorders by comparison groups also differed in hemodynamic and echocardiographic parameters. A significant increase in the average heart rate was observed in patients with AF in combination with clinically pronounced manifestations of ADD (anxiety – 10,4 ± 4,78 points, depression - 13 ± 4,2 points), i.e. in patients of the 1st group (heart rate -113 ± 22 beats / min) versus patients of the 2nd group. Correlation analysis revealed the presence of a direct connection between the increase in heart rate and the severity of ADD ((ρ) = 1,000, p <0, 05).

Echocardiographic parameters of patients in the study groups did not differ statistically. Differences between the groups were noted only in terms of volumetric parameters of the left atrium (LA) (in the 1st group, the LA size was -46,6 * 67 (± 10,88) mm, and -53*73 (± 6,6) mm in the 2nd group. Obviously, the severity of ADD was influenced by the structural and functional parameters of the heart of patients with CHF and AF, since an increase in the LA volume was associated with a significant increase in scores on the HADS scale. The anxiety increased significantly to 10,2 ± 5,5 points and depression to 11 ± 4,4 points with an increase in the LA to 53 * 73 mm, versus 8,7 ± 2,7 points of anxiety without depression in group 2.

DISCUSSION

According to the results obtained, the incidence of ADD in patients with CHF in our study reached 93%. The differences that we established in the clinical and

hemodynamic expressions of CHF demonstrated that patients with AF, who constituted of the 1st subgroup, were the most susceptible to ADD. It is alarming that as heart failure progresses, especially with a decrease in LVEF, the frequency of ADD also increases. Moreover, anxiety experiences prevail with CHF and intact LVEF, and, depressive ones overcome with low LVEF. The results of this study indicate a close correlation between the severity of CHF, AF and the ADD, which is coherent with the results of our previously publications.[4,5,16,19]

CONCLUSION

1. A close connection was established between the frequency, structure and severity of ADD in patients with CHF and AF: the ADD was diagnosed in 41 (93%) patients with CHF and AF versus 40 (38%) patients with CHF and sinus rhythm.
2. The addition of psychological disorders of the anxiety-depressive circle adversely affected the clinical course of the disease and the values of RSCS in patients with CHF and AF. The indicators of central hemodynamics and quality of life was more significant in patients with CHF with low LVEF.

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