



## Psychosomatic relationships in patients with chronic heart failure with atrial fibrillation and various indicators of left ventricular ejection fraction

Usmanova NA<sup>1</sup>, Abdullaev TA<sup>2</sup>, Salimova NR<sup>3</sup>, Alimova DA<sup>4</sup>, Kodirov Sh S<sup>5</sup>

<sup>1-5</sup> Republican Specialized Scientific and Practical Medical Center Of Cardiology, Tashkent, Uzbekistan

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### Abstract

In the article, it was researched that the frequency and severity of psychosomatic disorders of the anxiety-depressive circle in 105 patients with chronic heart failure (CHF) with atrial fibrillation (AF) and various indicators of the left ventricular ejection fraction. There was a significant relationship between AF and the frequency and severity of anxiety-depressive disorders (ADD) in CHF, rather than CHF with sinus rhythm (92% and 38%, respectively). Also, the presence and severity of ADD correlated directly with heart rate and left atrial volume. The authors have convincingly analyzed that AF on the background of CHF with reduced LVEF (left ventricular ejection fraction) negatively affects the nature of psychosomatic relationships, forming, in fact, a "three-component" comorbidity, which negatively affects the clinical course and quality of life of patients.

**Keywords:** chronic heart failure, anxiety and depressive disorders, left ventricular ejection fraction, atrial fibrillation, quality of life

### Introduction

Despite progress in the study of pathogenesis, clinic and treatment, the prognosis of life in patients with CHF remains unfavorable [1, 11]. Especially in cases of atrial fibrillation (AF), anxiety and depressive disorders (ADD) [12, 17]. According to the results of the EORP-AF EURObservational Research program Pilot survey on Atrial Fibrillation, one-year mortality in patients with CHF and AF was significantly higher than in patients without heart failure (10,0 vs. 3,0%,  $p < 0,0001$ ) [12,15,16]. The results of this study were confirmed in the CHARM study [2, 4, 8]. The progressive course of the disease, the elderly age of patients, the risk of developing cardiovascular and cerebrovascular events, and the need for constant use of anticoagulants and other basic therapy drugs increase the significance of psychological factors for optimal management of patients with CHF and AF [9, 10].

It is obvious that the relevance of the problem of psychosomatic disorders observed in patients with CHF and AF is determined not only by their prevalence and maladaptive influence, but also by the fact that timely diagnosis and treatment of these disorders in many cases becomes a crucial condition for effective therapeutic care and improving the prognosis [18].

The analysis of the literature indicates that there are few publications that consider ADD in patients with CHF and AF [19]. Studies on the study of CHF in combination with AF and ADD (with the so-called "three-component" comorbidity) in relation to the left ventricular ejection fraction (LVEF), have not been found in the available literature.

### The purpose of the research

To study the frequency and severity of psychosomatic disorders of the anxiety-depressive circle in patients with CHF with atrial fibrillation.

### Material and Methods

105 patients with CHF (65 men and 40 women), aged 35 to 72 (average  $61 \pm 14$  years), disease duration – 6, 0=3, 2 years were examined. The causes of CHF were: ischemic heart disease (IHD) and hypertension (HD)-37%, postinfarction cardiosclerosis (PICS)-32%, dilated cardiomyopathy-21%, valvular heart disease-10%. Of the 105 patients, 37(35%) had documented AF, with paroxysmal form in 7(19%) and permanent AF in 30 (29%).

All patients in the hospital were given a clinical General somatic and cardiological examination using a scale for assessing the clinical condition (SACC), modified by V. Yu. Mareev, 2000) and determining the 6-minute walking distance. Functional research methods included ECG, Holter ECG monitoring and heart ultrasound with the determination of LVEF using the Simpson formula. According to the results of the initial echocardiographic examination, 40 (38%) patients had reduced LVEF (<40%), 20 (19, 2%) had mid-range LVEF (40-50%), and 45 (42, 8%) had preserve (>50%).

For a comprehensive assessment of the psychological state of patients with CHF in dynamics, psychometric scales adapted to use in a somatic hospital were used, in particular: the Hospital Anxiety and Depression Scale (hospital Anxiety and Depression Scale – HADS, A. Sigmund, R. Sanity, 1983).

The result of 0-7 points was evaluated as the absence of reliably 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. Quality of life was assessed using the "Minnesota quality of life questionnaire for patients with CHF (MLHFQ)" in points.

Statistical data processing was performed using the Excel 2013 software package. For quantitative features, the

Arithmetic mean (M) and standard deviation of the mean (M±SD) or 95% CI were calculated. For qualitative signs, the absolute frequency of manifestation of the trait (n=number of examined) and the frequency of manifestation of the trait as a percentage (%) were calculated.

**The result of the research**

Depending on the heart rate, patients with CHF were divided into 2 groups. The first subgroup consisted of patients with CHF and AF (n=37). The second subgroup consisted of patients with sinus rhythm (n=68) (table 1).

**Table 1:** Clinical and demographic characteristics of patients (abs).

Indicator	Group 1(n=37), patients with AF	Group 2(n=68), patients with sinus rhythm
Age(years)	61(±12)	65(±13)
Male/Female (n)	27/10	44/24
Duration of CHF (year)	4,1(±3,2)	3,2(±2,5)
reduced LVEF ( n )	19(47,5%)	21(52,5%)
mid-range LVEF ( n )	10(50%)	10(50%)
preserve LVEF ( n )	8(18%)	37(82%)

Based on the analysis of the HADS scale, ADD was diagnosed in 34 (92%) patients with CHF with AF and sinus rhythm in 40 (38%) patients. In the structure of ADD in the 1st subgroup of patients with AF, mixed anxiety and depressive symptoms prevailed-21(61, 8%), while in 7 (20, 5%) anxiety disorders prevailed, and in 6 (17, 7%) – depressive manifestations. Patients with CHF with AF were significantly more likely to be diagnosed with ADD, with anxiety at 10.1±3, 6 points and depression within 11±4, 1 points. And with CHF on the sinus rhythm, mostly isolated mild depression was diagnosed at the level of 8.7±3, 1 points without signs of anxiety.

The frequency and severity of psychological disorders of the anxiety-depressive circle in patients with CHF, as well as

the severity of the underlying pathology, differed in terms of LVEF. Thus, isolated anxiety within 11.5±6, 0 points prevailed in CHF with AF and preserved LVEF. The frequency and severity of clinical signs of ADD in patients with CHF and AF increased with decreasing LVEF and was greatest against the background of reduced and mid-range LVEF. So, in patients with mid-range LVEF, anxiety was determined within 9 points, and depression – 12 points; with reduced LVEF, anxiety was 9, 83 points, and depression was at the level of 14 points. At the same time, in the 2nd subgroup of patients with CHF with sinus rhythm, psychological disorders of the type of isolated depression (11, 7 points) were diagnosed exclusively with reduced LVEF (table 2).

**Table 2:** Clinical characteristics of anxiety and depressive disorders in patients with CHF with AF and sinus rhythm depending on LVEF.

Indicator	The severity of ADD, depending on the EF (in points)					
	Reduced LVEF		Mid-range LVEF		Preserve LVEF	
	Anxiety (point)	Depression (point)	Anxiety (point)	Depression (point)	Anxiety (point)	Depression (point)
Subgroup 1 N=34	9,83± 5,5	14±4,6	9±3,6	12±3,7	11,5±6,0	7,1±3,7
Subgroup 2 N=40	7,6±3,5	11,7±5,5	6,4±5,2	7,5±5,1	7,3±4,4	6,8±3,1

Some hemodynamic and Echocardiographic parameters differed in comparison groups. So, the average heart rate was significantly higher in patients of the 1st subgroup, compared with patients of the 2nd (92±24 beats/min and 70±11, 4 beats/min). 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 subgroup (113±22 beats/min). The correlation analysis revealed a direct correlation between the increase in heart rate and the severity of ADD.

The results of the echocardiographic study of patients of the 1st subgroup did not differ from those of patients of the 2nd subgroup. Differences between the groups were noted only in the volume parameters of the left atrium (LA) (in the 1st subgroup, the size of the LA is -46, 6\*67mm, in the 2nd subgroup -43\*60mm). 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 volume of LA was associated with a significant increase in scores on the HADS scale. When increasing the size of the LA to 53\*73mm, anxiety significantly increased to 10, 2±5,5 points and depression to 11±4,4 points, compared to 8,7±2,7 points of anxiety without depression in the 2 ND subgroup.

It should be mentioned that in patients with AF with psychological disorders of the anxiety-depressive circle, the

quality of life indicators were on average 1,2 times worse than in patients with CHF without AF. According to the "Minnesota" questionnaire, the lowest quality of life was found in patients with AF and reduced LVEF-79,4 points against 87,7 points for sinus rhythm.

When the test was performed with a 6-minute walk, the shortest distance was covered by patients with CHF with AF and reduced LVEF - 65m, and with mid-range and preserved LVEF, this distance was 135 and 175 meters, respectively. Against the background of sinus rhythm, this indicator was 1, 1 times higher, depending on the value of LVEF: 73, 6 m at reduced, 176m– mid-range and 181m - preserved LVEF. Clinical signs and symptoms of CHF had significantly worse characteristics in patients with CHF with AF, especially in the group of reduced LVEF, as evidenced by the test with a 6-minute walk. With sinus rhythm, the shock SACS were significantly lower depending on the LVEF values, and the clinical course was significantly easier and, accordingly, prognostically more favorable than in the comparison group.

**Discussion**

As noted in previous studies, the prevalence of ADD among patients with CVD is significantly higher than in other forms of somatic pathology [4, 6, 7]. In the acute period of myocardial infarction (MI), symptoms of depression are observed in 65-100% of patients, and within 18-24 months

after MI – in every fourth patient [5, 17]. The results of clinical and epidemiological studies of COMPASS and COORDINATE on the research of ADD in General practice also shows that ADD often develops in patients with CHF (61%), angina pectoris (57%), after MI (54%) and hypertension (52%), and 20-25% of the patients they reach a significant severity [3,5]. According to the literature, similar to other serious somatic diseases, patients with atrial fibrillation have a significantly increased frequency of psychological disorders [12]. Among patients with atrial fibrillation, depression was detected in 38%, and anxiety – in 28-38 % of cases [13]. In patients with atrial fibrillation, the quality of life decreases, mainly due to violations of the emotional state (anxiety, depression), rather than due to somatic factors [6, 20, 23]. Secondary mental changes in patients with atrial fibrillation may be based on brain damage due to thromboembolism, which often occurs without symptoms, and violations of cerebral hemodynamics [12, 23]. The results of our study indicate that there is a close relationship between the severity of CHF, AF and the severity of ADD, which is consistent with the results of previous studies and literature data [19, 21, 22]. The differences we found in the clinical and hemodynamic manifestations of CHF demonstrated that patients with AF, who made up 1 subgroup, were most susceptible to ADD. Various mechanisms of development of such reactions are possible. On the one hand, we observe an increase in somatogenic disorders as CHF and AF become more severe (somatogenic changes). On the other hand, it is not exception yet it is assumed the fact of the traumatic impact on the identity of the patient the diagnosis of serious, incurable diseases of the heart, with the inevitable emergence of painful feelings of insecurity, lack of prospects for the future the decline of self-esteem and level of social functioning, which affect patient behavior (psychogenic changes). This, in fact, closes the vicious circle of psychosomatic disorders in CHF, especially in CHF with AF and reduced LVEF, which must be broken in order to improve the prognosis for the patient.

### Conclusion

Thus, there is a close relationship between AF and the frequency and severity of ADD in patients with CHF, which is significantly higher than in patients with CHF, but with a sinus rhythm (92% and 38%, respectively). The frequency and severity of ADD correlates directly with the heart rate and volume of the left atrium. In patients with CHF, the addition of AF negatively affects the nature of psychosomatic relationships and leads to the formation or aggravation of psychological disorders of the anxiety-depressive circle. The resulting "three - component" comorbidity adversely affects the clinical course of CHF, quality of life indicators, especially in patients with CHF and reduced LVEF.

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