

Relationship of Pain, Dyspnea and Quality of Life in Chronic Heart Failure of Ischemic Genesis

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ABSTRACT

Aim: To assess the relationship between pain, dyspnea and quality of life in patients with chronic heart failure (CHF) of ischemic genesis.

Methods: 120 patients with CHF, mean age 54.1 ± 4.3 years, were examined, 70 had Functional class (FC) II, 39 - FC III, 11 - FC IV according to NYHA classification. The duration of CHF signs was $17.5 \pm .2$ months. Half of patients had an arterial hypertension. Dyspnea was measured by the visual analogue scale (VAS) and the Borg scale. Pain was assessed using the Rose questionnaire. The quality of life of patients was analyzed.

Results: During the two-year follow-up, an increase in CHF symptoms was noted, the number of patients with NYHA FC III and IV increased by 40 (33%). The number of patients with exertional angina FC III decreased by 36%, with mild exertional angina of FC II increased by 40%. In 1/3 of CHF patients with a dynamic two-year follow-up, there is a "replacement" of pain syndrome with dyspnea as the severity of CHF increases. The severity of dyspnea according to the Borg scale and VAS significantly increases. A moderate inverse correlation was obtained between the degree of dyspnea and the level of pain ($r = -0.42$). The quality of life worsened in all patients during dynamic observation.

Conclusion: As CHF of ischemic genesis progresses, dyspnea increases in many patients, the anginal syndrome decreases or disappears. The quality of life suffers both with increased dyspnea and with an increase in FC of angina pectoris.

Keywords: Chronic heart failure, dyspnea, pain, angina pectoris, quality of life.

INTRODUCTION

Heart failure (HF) - a syndrome characterized by certain symptoms (dyspnea, swelling of the ankles, fatigue, palpitations) and clinical signs (swelling of the cervical veins, small bubbling rales in the lungs, displacement of the apical impulse to the left), resulting from a violation of the structure or function of the heart. In the Russian Federation, the prevalence of CHF in the population is about 7% (clinically expressed HF - 4.5%; in 2.1% - terminal stage), CHF significantly increases overall mortality^{1,2,3}.

The main etiological factors of CHF are arterial hypertension (AH) and coronary heart disease (CHD); their combination is found in half of CHF patients. In the population of patients with CHF, certain gender differences in the causes of occurrence are found - for men, myocardial infarction (MI), stroke are more priority. AH, diabetes mellitus, heart defects, myocarditis are more often detected in women. From year to year, the contribution of CHD to the structure of CHF is growing due to all clinical forms: postinfarction atherosclerosis, exertional angina, coronary X-syndrome, painless myocardial ischemia^{1,4,5}.

The history of the study of CHD dates back to the works of Heberden H. (1710-1801), who more than 200 years ago described a typical attack of angina pectoris, characterizing it as a feeling of compression and discomfort in the chest during physical load, calling this attack angina pectoris⁶. The English-Russian Medical Encyclopedic Dictionary (adapted translation of the 26th edition of Stedman's) states: angina pectoris - Heberden's disease, stenocardia - severe, compressing chest pain, often

radiating from the precordial zone to the left shoulder and down on the arm (a consequence of myocardial ischemia).

Angina pectoris is a clinical syndrome manifested by a feeling of oppression or pain in the chest of a compressing, pressing character, which is localized most often behind the sternum and can radiate to the left arm, neck, lower jaw, and epigastric region. The pain is provoked by physical exertion, going out into the cold, eating plentifully, smoking, emotional stress, goes away at rest, and is eliminated by taking nitroglycerin for a few seconds or minutes.

When CHF joins in patients with CHD, a new symptom naturally appears - dyspnea, which will accompany them throughout the disease. Shortness of breath is one of the main complaints of CHF patients; the modern classifications of CHF are based on the interpretation of dyspnea depending on the level of exercise tolerance^{7,8,9,10}. Functional classes (FC) of the New York Heart Association (NYHA) are traditionally used to assess the severity of CHF¹.

There are a number of scales used to more accurately assess the severity of CHF, in particular, the MRC (Medical Research Council) scale, Borg scale, and visual analogue scale (VAS)^{11,12}. To assess the quality of life (QOL), appropriate scales and questionnaires are used. The analysis of the key symptoms of CHF is closely related to the concept of QOL. It is advisable to assess QOL in patients with CHF using the specific Minnesota Living With Heart Failure® Questionnaire (MLHF), which allows, firstly, to assess how much CHF limits physical capabilities and functional state, the ability to cope with normal daily activities; secondly, it reflects the socio-economic aspects

and social connections of the patient; thirdly, it characterizes a positive emotional outlook on life^{13,14,15}.

The following interpretation of dyspnea is common: "Dyspnea is a term used to characterize the subjective sensation of respiratory discomfort, differing in the quality of sensations and their varying intensity. Dyspnea is the result of the interaction of numerous physiological, psychological, social and environmental factors that can initiate secondary physiological and behavioral responses" (International Working Group of the National Institute for the Study of the Heart, Lung and Blood (USA)). In the analysis of the pathophysiological mechanisms of respiratory disorders, categories such as "respiratory" sensation and "perception" are key. Perception is a psychological process of object recognition, including such aspects as perception, awareness, understanding (receptivity), a person's reaction to a sensation, influenced by many objective and subjective factors. Respiratory sensation reflects a consequence of neural activation^{7,8,16}.

Pain and dyspnea are the most frequent clinical symptoms of patients with CHF of ischemic origin. The practicing physician has to assess the significance of these symptoms in the cardiovascular continuum, the existence of synergy or antagonism between them, the presence or absence of the phenomenon of replacing one symptom with another.

When CHF is attached to CHD, a certain evolution occurs, the dynamics of the leading clinical symptoms - pain and dyspnea, which often change places. Some clinical observations indicate that in the terminal stage of CHF, as the severity of dyspnea increases, the intensity and duration of angina attacks decreases. There is an opinion that "with the addition of heart failure, the patient changes the pain to dyspnea," or it simply fades into the background as a less painful symptom. One of the most popular, but least studied aspects of the relationship between angina pain and dyspnea is the concept of "dyspnea - the equivalent of pain". This phenomenon is especially typical for elderly patients, as well as with concomitant diabetes mellitus. Interesting data were obtained in experimental studies on volunteers, where it was noted that the feeling of dyspnea is somewhat reduced with tourniquet pain, while pain can be reduced with the addition of dyspnea¹⁷. Dyspnea is often more severely tolerated by patients than pain, and in 4 cases out of 5 it is possible to relieve the pain of a dying person and only in 1 out of 5 the feeling of dyspnea can be relieved¹⁸. Dyspnea becomes a factor limiting the ability to work, physical activity and quality of life of patients.

The aim of the study was to assess the relationship between pain, dyspnea, and quality of life in patients with CHF of ischemic genesis during a two-year dynamic follow-up.

METHODS

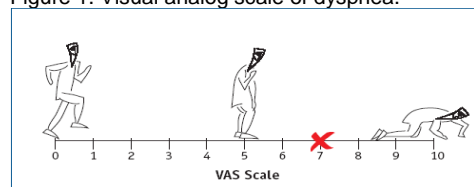
The survey included 120 patients with CHF, mean age 54.1 ± 4.3 years, an equal number of men and women. 70 patients had FC II; at 39 - III FC; 11 - IV FC according to NYHA classification. Duration of CHF symptoms 17.5 ± 2.2 months. In all patients, CHF was caused by CHD, in 50% of them in combination with arterial hypertension.

Anamnesis of patients - transferred large-focal (Q-wave myocardial infarction from 1 to 4); after which there were attacks of angina pectoris from II to IV FC (according to the Canadian classification of cardiologists), of which FC II - 9, FC III - 102, FC IV - 9 patients and CHF developed, verified in accordance with the clinical recommendations¹.

Along with the physical examination, all patients underwent laboratory and instrumental studies (complete blood count, lipid profile, coagulogram, electrolytes, "liver", "kidney" tests, blood glucose, glycated hemoglobin, ECG, Holter monitoring, 6-minute walk test, computed spirometry according to the standard technique, ultrasound examination of the heart, in some patients - coronary angiography). Dyspnea was assessed using the Borg J. scale, VAS^{11,12}.

The Borg Scale is a rating for the dyspnea category, ranging from 0 (none at all) to 10 - very, very strong. VAS is one of the most popular methods for assessing dyspnea. It is depicted as a straight line segment 10 cm long. Its starting point indicates the absence of dyspnea, and the final point is the most severe dyspnea (Fig.1).

Figure 1. Visual analog scale of dyspnea.



Chest pains were analyzed using the Rose questionnaire¹⁹. Scaling of anginal attacks was carried out according to the generally accepted method, it was evaluated in points:

- 0 points - no pain;
- 1 point - pains lasting less than 20 minutes without ECG dynamics;
- 2 points - pains lasting less than 20 minutes with ECG dynamics;
- 3 points - pains lasting 20 minutes or more without ECG dynamics;
- 4 points - pains lasting 20 minutes with ECG dynamics, as well as accompanied by symptoms of acute heart failure.

The quality of life was assessed according to the criteria of the Minnesota Questionnaire - MLHF, which is an available method for assessing the quality of life and correlates with the results of stress tests. The questionnaire contains 21 questions (3 sections, 7 questions each) reflecting the physical, psycho-emotional and social status. For each section, the quality of life index was determined in the range from 0 (ideal quality of life) to 35 (worst quality of life)¹⁵.

Statistical analysis of the obtained data was carried out using the application package Statistica 10.0. The arithmetic mean (M), the error of the arithmetic mean (m). Differences were considered statistically significant at $p < 0.05$. When comparing the indicators of dependent groups with a normal distribution of the trait in the groups, the paired Student's t-test was used. The data obtained during the study were subjected to Spearman's correlation analysis.

RESULTS AND DISCUSSION

Table 1 presents the baseline parameters of patients, in table 2 - the dynamics after 2 years.

Table 1: Baseline parameters of patients (CHF, angina pectoris, dyspnea, quality of life)

Amount of patients (n=120)	FC of CHF	FC of stenocardia			Severity of dyspnea (Borg, VAS)	Pain level (Rose questionnaire)	Quality of life		
		II	III	IV			physical	psycho-emotional	social
70	II	9	61		2,7 ± 0,7*	3,1 ± 0,5*	6,1 ± 0,3*	12,4 ± 0,4*	15,1 ± 1,2*
39	III		39		2,9 ± 0,8*	3,2 ± 0,7*	7,3 ± 0,7*	12,8 ± 0,6*	16,0 ± 1,2*
11	IV	2	9		3,1 ± 0,9*	3,6 ± 0,4*	7,7 ± 0,7*	13,7 ± 0,6*	16,7 ± 1,7*

*p < 0.05 (when comparing groups)

Table 2: Patient indicators in dynamics after 2 years of follow-up

Amount of patients (n=120)	FC of CHF	FC of stenocardia			Severity of dyspnea (Borg, VAS)	Pain level (Rose questionnaire)	Quality of life		
		II	III	IV			physical	psycho-emotional	social
30	II	3	27		3,7 ± 0,4*	1,9 ± 0,5*	11,7 ± 4,0*	17,2 ± 2,2*	24,3 ± 1,2*
70	III	55	15		5,9 ± 0,7*	1,3 ± 0,6*	19,9 ± 5,3*	25,8 ± 3,9*	30,2 ± 4,9*
20	IV		17	3	6,25 ± 0,9*	1,6 ± 0,4*	35,0 ± 4,0*	25,7 ± 7,1*	31,7 ± 7,0*

*p < 0.05 (when comparing groups)

During dynamic two-year follow-up, an increase in the number of patients with FC III NYHA CHF from 39 to 70 and FC IV NYHA CHF from 11 to 20, i.e. by 40 people (33%) was noted. The group of patients with FC II of NYHA CHF decreased by 40 people, part of the patients moved to FC III, the other part (patients with 3-4 heart attacks in history, multivessel lesion) into FC IV.

As follows from tables 1 and 2, after 2 years, it was in patients with FC III and IV that the degree of dyspnea severity increased. The Borg score and VAS increased by more than 50%. In parallel with the aggravation of the severity of CHF, primarily its key symptom - dyspnea, there was a change in the clinical picture of postinfarction angina - the number of patients with FC III angina decreased from 102 to 59 (by 36%). An interesting point is the increase in the number of patients with FC II angina pectoris (from 9 to 58). Perhaps this is due to the optimization and personalization of antianginal therapy, the wider use of new oral anticoagulants and the mandatory (in the absence of contraindications) the use of lipid-lowering therapy, mainly statins, with the achievement of the target LDL level of 1.6-1.4 mmol/l. The decrease in angina FC is confirmed by the data of the Rose questionnaire (table 1, 2) - the pain level decreased from 3.1 to 1.9 (with FC II) and from 3.2 to 1.3 (with FC III). Consequently, in one third of patients with CHF of ischemic genesis with a dynamic two-year follow-up, there is a "replacement" of the pain syndrome with dyspnea as the severity of CHF increases, the "devaluation" of pain, which has receded into second place. This fact is illustrated by the dynamics of dyspnea according to the Borg scale and VAS, where an increase in scores from 2.9 to 5.9 is observed, almost 2 times. A moderate inverse correlation was obtained between the degree of dyspnea and the level of pain ($r = -0.42$).

In patients with CHF with an increase in FC, the quality of life also suffered, and the quality of life also changed with the aggravation of FC angina, which was

confirmed by an increase in the QOL index both with an increase in dyspnea and with an aggravation of anginal syndrome.

As the FC of CHF increased after two years, the QOL index changed as follows: FC II - the physical component of the QOL 11.7 ± 4.0 , the psycho-emotional component of the QOL 17.2 ± 2.2 , the social component of the QOL 24.3 ± 1.2 . FC III - the physical component of QOL 19.9 ± 5.3 , psycho-emotional component of QOL 25.8 ± 3.9 , social component of QOL 30.2 ± 4.9 . FC IV - the physical component of QOL 35.0 ± 4.0 , the psycho-emotional component of QOL 25.7 ± 7.1 , the social component of QOL 31.7 ± 7.0 . It should be stated that, first of all, the QoL deterioration affected the physical component, then the psycho-emotional and social components. It should be noted that in the first year of observation, the deterioration in the quality of life was mainly due to the social component (loss of usual work, friendships). After 2 years, the deterioration in the quality of life continued to affect the social component, along with which the significance of the physical component increased 3 times, which was especially evident in the group of patients IV and III of NYHA FC

CONCLUSION

With an increase in dyspnea in 1/3 of patients with CHF of ischemic origin, anginal syndrome decreases or disappears. There are probably certain predictors of the evolution of angina pectoris under the influence of CHF, which requires further clinical analysis.

For an adequate assessment of the manifestations of CHF, it is rational to analyze the QOL components (physical, psycho-emotional, social) using the Minnesota Life Quality Questionnaire.

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