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THE POSSIBILITIES OF COENZYME Q10 AS PART OF THE COMPLEX THERAPY OF PATIENTS WITH CHRONIC HEART FAILURE

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Abstract
The aim of the study was to study the effect of coenzyme Q10 as part of the complex therapy of patients with chronic heart failure (CHF) on quality of life in comparison with traditional therapy without the addition of coenzyme Q10. The study included 75 patients with CHF 1-3 FC, which complicated the course of coronary heart disease (CHD) with a history of myocardial infarction. In a comparative aspect, the dynamics of the physical and psychological components of the quality of life of patients with CHF 1-3 FC under the influence of traditional therapy and traditional therapy with the addition of Coenzyme Q10. The quality-of-life indicators determined on the basis of the EQ-5D-DL and SF-36 questionnaires, complementing the picture of the disease, are a multifactorial criterion for assessing the condition of patients with CHF 1-3 FC. The improvement in quality of life is more pronounced under the influence of traditional therapy with the addition of coenzyme Q10.

Keywords: coenzyme Q10, coronary heart disease, quality of life, chronic heart failure.

Introduction

Chronic heart failure (CHF) is a major medical and social problem that belongs to the priorities of national health systems in most countries of the world. Despite significant achievements in modern cardiology, the widespread introduction of new effective therapies into medical practice, CHF It is one of the most common, progressive and prognostically unfavorable diseases of the cardiovascular system. The modern approach to the treatment of patients with coronary heart disease (CHD) complicated by the development of CHF involves solving problems aimed not only at increasing the patient's life expectancy, but also at improving its quality. "Quality of life" (QOL) an extremely broad, multifaceted concept, incomparably broader than the "standard of living". This is a category that goes far beyond economics. Firstly, it is a sociological category that covers all spheres of society, since they all encompass people's lives and its quality. Secondly, QOL has two sides: objective and subjective. The criterion for an objective assessment of quality of life is the scientific standards of people's needs and interests, by which one can objectively judge the degree of satisfaction of these needs and interests.

On the other hand, people's needs and interests are individual and only the subjects themselves can assess the degree of their satisfaction. They are not fixed by any statistical values and practically exist only in the minds of people and, accordingly, in their personal opinions and assessments. Thus, the assessment of quality of life comes in two forms: the degree of satisfaction of scientifically based needs and interests and satisfaction the lives of the people themselves. Thirdly,

QOL is not a category separated from other socio-economic categories, but unites many of them, includes them in a qualitative aspect. In this regard, along with others (economic, psychosocial, technological, etc.), the medical aspects of QOL were also highlighted. The medical aspects of QOL should be understood as the effect of the disease itself (its symptoms and signs); limitation of functional ability resulting from the disease; as well as the effect of treatment on the daily life of the patient. The tools for assessing QOL are general and specific questionnaires developed by experts from the world's leading clinical centers in accordance with the principles of evidence-based medicine and the requirements of Good Clinical Practice, which created the opportunity to quantify this subjective concept, which allowed the doctor to expand his understanding of the patient's condition as a whole. The most common and frequently used general questionnaires for assessing QOL are SF-36 (Short Form Medical Outcomes Study) and the EQ-5D-5L questionnaire. The aim of the study was to study the effect of coenzyme Q10 as part of the complex therapy of CHF patients on QOL indicators in comparison with traditional therapy without the addition of coenzyme Q10.

MATERIALS AND METHODS OF RESEARCH

75 patients with CHF were under observation (54 men (72%) and 21 women (28%), the average age was 56.5 ± 18.5 years) 1-3 FC (according to NYHA), which complicated the course of coronary heart disease. All patients had a history of myocardial infarction. The functional class of CHF was distributed as follows: 1 FC was diagnosed in 13 patients (17.3%), 2 FC – in 58 patients (77.4%), 3 FC – in 4 patients (5.3%); the average FC CHF was 1.88 ± 0.46. The average duration of CHF was 48 months. Before the start of the study, all patients received traditional CHF therapy, which included ACE inhibitors or angiotensin II receptor antagonists, beta-blockers, aldosterone antagonists, diuretics. In addition, patients also received antiplatelet agents, anticoagulants, statins, nitrates, and calcium channel blockers for coronary heart disease. To achieve the goal of this study, 2 groups of patients were randomly formed: group 1 consisted of 42 patients (male – 33 (78.6%), female – 9 (21.4%), average age 63.5 ± 6.1 years), who were additionally prescribed coenzyme Q10 (water–soluble form) to traditional CHF therapy, at a dose of 2.0 ml/ day); Group 2 consisted of 33 patients (male - 21 (63.6%), female – 12 (36.4%), average age 59.1 ± 7.7 years) who received only traditional CHF therapy without the addition of coenzyme Q10. The groups of patients were comparable in the main demographic and clinical and anamnestic indicators. The duration of follow-up was 12 weeks. In the course of the study, the dynamics of the physical and psychological components were analyzed in a comparative aspect as the most significant indicators determining the level of QOL in patients. Objective assessment The daily activity of patients was carried out using a six-minute walk test (TSMW), which allows to determine the degree of physical activity of the patient and his tolerance to physical exertion. The test was carried out in a 35 m long corridor with additional markings on the floor every meter. The execution time was controlled by a stopwatch. At the end of the test, the patient was interviewed regarding the occurrence of specific complaints: shortness of breath, chest or leg pain, dizziness, etc. The test was performed twice: at the beginning of the study and after 3 months of treatment. Traditionally, the criteria for the effectiveness of treatment in clinical trials are physical and laboratory-instrumental indicators. However, they are not able to characterize the patient's well-being and functioning in everyday life, therefore, the assessment of patients' QOL was carried out using two questionnaires: EQ-5D-DL and SF-36. The EQ-5D-DL questionnaire is a European QOL assessment questionnaire. It

does not have any specificity and can be used for any diseases, therefore it provides the most generalized information about human maladjustment in connections with the disease based on subjective perception. The EQ-5D-DL questionnaire consists of two parts. The first part of the questionnaire evaluates the health status based on five components: mobility, self-care, activity in daily life, pain or discomfort, anxiety and depression. Each of the questions has five possible answers, depending on the severity of the problem. The respondent is asked to choose one answer for each question. The second part of the questionnaire is a "health scale" – a vertical graduated ruler on which "0" means the worst the state of health, and "100" is the best. The patient is asked to choose his current state of health in the range from 0 to 100 points. Thus, the QOL indicators determined on the basis of the EQ-5D-5L questionnaire are a multifactorial criterion for assessing the condition of patients. General Health Questionnaire MOS SF-36 is one of the most common methods of measuring health-related quality of life. According to MedLine data from 2006, SF-36 is currently used in 95% of scientific research on the quality of life in various diseases. The SF-36 questionnaire includes 36 items on 8 scales. The following characteristics are used for quantitative assessment:

1. Physical Functioning –PF), reflecting the degree to which physical condition limits the performance of physical activity (self-care, walking, climbing stairs, carrying heavy loads, etc.). Low indicators on this scale indicate that the patient's physical activity is significantly limited by the state of health.
2. Role-based functioning due to physical condition (Role-Physical Functioning – RP) –the influence of physical condition on everyday life role-playing activities (work, performing daily duties). Low scores on this scale indicate that daily activities are significantly limited by the patient's physical condition.
3. Pain intensity (Body pain – BP).
4. General health (General Health – GH) – assessment of the patient's current state of health and treatment prospects. The lower the score on this scale, the lower the health score.
5. Vital activity (Vitality – VT).
6. Social functioning (Social Functioning – SF).
7. Role-based functioning due to an emotional state (Role-Emotional – RE).
8. Mental health (Mental Healf – MH).

For all scales, in the complete absence of restrictions or health disorders, the maximum value was equal to 100. The higher the score on each scale, the better the quality of life in this parameter. Before calculating the indicators of the scales, the responses were recoded (the procedure for converting the raw scores of the questionnaire into QL scores). In our work, we used an assessment of only the physical component of health (PF and RP scales). All questionnaires were filled out by patients independently before the start of the study and after 12 weeks of follow-up. Quantitative variables in two independent groups were compared nonparametrically using the Mann–Whitney U test. The reliability (p) of the differences between independent groups on qualitative grounds was determined by a nonparametric method using the Pearson criterion χ^2. $P < 0.05$ was taken as the level of statistical significance.

THE RESULTS AND THEIR DISCUSSION

According to the results of the TSMWC conducted before the start of the study, a decrease in exercise tolerance was revealed in all CHF patients who complicated the course of coronary heart

disease with a history of MI receiving traditional therapy. The average distance traveled by patients of the 1st group was 376.76 ± 9.2 m, and by patients of the 2nd group - 381.39 ± 7.64 m, which corresponds to 2 FC CHF. There were no significant intergroup differences in the results of the test conducted before the start of the study ($p > 0.05$). When repeated TSMW was performed after 12 weeks of treatment in the group of traditional CHF therapy with the addition of coenzyme Q10, the average distance traveled was 444.4 ± 10.44 m, and in the group of traditional CHF therapy alone – 384.33 ± 8.41 m. Thus, in the 1st group of patients, a significant increase in the average distance traveled was revealed by 17.96% (p □ 0.01). The specified level of tolerance to physical activity according to TSMW corresponds to 1 FC of CHF. There were no similar changes in the 2nd group of patients, since the average distance traveled after 12 weeks treatment practically did not change – the increase was 0.21% ($p > 0.05$). Thus, in group 2, there were no significant changes in the tolerance of physical activity against the background of traditional CHF therapy. The analysis of QOL in patients with CHF is based on the subjective assessment of their condition by patients, however, the information obtained using questionnaires is standardized. During the study, according to data obtained from the EQ-5D-DL questionnaire, it was found that patients of both groups suffering from CHF and having suffered a myocardial infarction had a decrease in quality of life. However, before the start of the study, patients of group 1 had a decrease in QOL in some points slightly more pronounced than patients of group 2. The greatest difficulties patients experienced walking. At the same time, 20 (47.6%) patients of group 1 and 17 (51.5%) patients of group 2 experienced minor difficulties; moderate difficulties – 10 (23.8%) patients of group 1 and 2 (6.1%) patients of group 2; pronounced difficulties – 1 (2.4%) and 0 (0%) patients of the 1st and 2nd groups, respectively, had no difficulty walking 11 (26.2%) patients of the 1st group and 14 (42.4%) patients of the 2nd group. Self-care caused some difficulties in an average of 33-40% of patients in both groups, while there were no patients who experienced pronounced difficulties in self-care in either group. Difficulties in the usual daily activities from a minor to a pronounced degree were generally noted by almost 27 (64.3%) patients of the 1st group, whereas in the 2nd group there were 14 such patients (42.4%). 10 (23.8%) patients in group 1 did not experience pain or discomfort, and a significantly larger number of patients in group 2 - 17 (51.5%). The number of patients experiencing anxiety or depression of varying severity in both groups was comparable: 27 (64.3%) patients in the 1st group group and 21 (63.7%) patients in group 2. After 12 weeks of treatment, both groups showed an improvement in quality of life according to the results of the EQ-5D-DL questionnaire with an advantage in group 1. Moreover, the most significant increase was noted on the scales of mobility, habitual daily activities, anxiety and depression. In group 2, the dynamics of QOL indicators turned out to be less pronounced, but the most significant The increase was also noted on the scales of mobility and habitual daily activities. In the second part of the EQ-5D-DL questionnaire, patients assessed their state of health at the time of filling in units from 0 to 100 on a visual analog scale, where 0 is the worst state of health, 100 is the best the state of health. The average score on the visual analog scale before the start of the study in patients in both groups did not significantly differ and amounted to 53.8 ± 10.7 in group 1, 57.1 ± 13.1 in group 2. After 12 weeks of treatment, a significant increase in the average score on the visual analog scale to 65.5 ± 8.0 points was noted in the 1st group of patients, whereas this indicator did not change significantly in patients of the 2nd group and amounted to 57.8 ± 11.3. However, there are significant intergroup differences after 12 weeks, it was not revealed. The results are presented in the form of scores, compiled in such a way that a higher score indicates a higher level of quality

of life. The mandatory conditions of the questionnaire were the individuality and independence of filling out the questionnaire by the respondents. The organic manifestations of somatic disease directly affect the patient's QOL, introducing various restrictions into his life. Indicators of physical functioning in patients suffering from CHF, in the time of the study was reduced mainly due to the scales of vital activity, energy and physical pain, discomfort. During the study of the physical component of health, represented by data from the scales of physical functioning (PF) and role functioning due to physical condition (RP), the lowest values were noted on the RP scale in patients in both groups without significant intergroup differences. However, after 12 weeks of treatment, the most significant improvement in the indicators of the physical component of health on both scales was revealed only in the 1st group of patients, whereas in the group of traditional therapy, the indicator of physical functioning increased slightly, and the indicator of role functioning had a clear downward trend. There were no significant differences in the indicators of both scales of patients in both groups when they were divided by gender: among both men and women, the lowest scores were found precisely on the scale of role functioning. Thus, the reduction physical functioning due to the underlying disease, in this case CHF, leads to a significant decrease in role functioning, while erasing gender differences between patients. The largest increase in quality of life indicators in the first group of patients was observed on the RP scale, while in the second group on the same scale it was noted a sharp decline, which indicates a significant limitation of the physical condition of patients in daily activities, unlike the first group. Against the background of coenzyme Q10 intake, group 1 patients also showed an increase on the PF scale, while in patients taking only alternative therapy, this indicator remained at a low level, which indicates that the patient's physical activity is significantly limited by his state of health.

CONCLUSIONS:

Thus, the study of the effect of coenzyme Q10 as part of the complex therapy of patients with CHF 1-3 FC on QOL indicators in comparison with traditional therapy without the addition of coenzyme Q10 showed that:

1. Chronic heart failure of 1-3 FC, which complicated the course of coronary heart disease, leads to a significant decrease in the physical and psychological components of the quality of life of patients.
2. For a general assessment of the quality of life of patients with CHF 1-3 the SF-36 and EQ-5D-5L questionnaires can also be used.
3. The use of coenzyme Q10 in a dose of 2.0 ml in the composition complex therapy of CHF 1-3 FC in comparison with traditional therapy has a significant positive effect on exercise tolerance, increasing the distance traveled according to the six-minute walk test.
4. The inclusion of coenzyme Q10 in the complex therapy of patients with CHF 1-3 FC for 12 weeks has a significant effect on the quality of life of patients, significantly improving the physical and psychological components of health according to the EQ-5D-5L and SF-36 questionnaires.

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