REHABILITATION OF PATIENTS WITH ISCHEMIC HEART DISEASE FOLLOWING MYOCARDIAL REVASCULARIZATION

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A – study design, **B** – data collection, **C** – statistical analysis, **D** – interpretation of data, **E** – manuscript preparation, **F** – literature review, **G** – sourcing of funding

ABSTRACT

Background: Rehabilitation of patients following myocardial revascularization remains major problem in today's world. Through psychological support and training, it is possible to develop a positive attitude to health and illness, optimize an individual's inner health perception, and improve a person's self-image as healthy and their knowledge of how to maintain that health.

Aim of the study: To examine new rehabilitation interventions for patients following myocardial revascularization.

Material and methods: 60 patients were reviewed following myocardial revascularization, using clinical-anamnestic, instrumental methods, assessment of quality of life, cognitive therapy and physical rehabilitation. Rehabilitation of the patients was performed using the author's program "Psychological rehabilitation of patients with ischemic heart disease and myocardial infarction by optimization of the inner picture of health".

Results: Training by optimization of the patients' inner picture of health leads to a reduction in the manifestations of anxiety and depression, improves subjective and objective indicators, quality of life, and changes the patient's attitude to illness. At the beginning of the observation period, there were subclinical signs of anxiety in the majority of patients, with an average score of 11.23±0.70. During the course of treatment, there was a decrease in the mean score of anxiety in the group receiving suggestive therapy of 7.58±0.69 (22.6%), and in the group using of optimization of IPH there was a decrease of 7.69±0.63 (30.8%). A reduction in manifestations of depression was found, from 8.89±0.64 at the beginning of treatment to 7.65±0.51 after 1 month of the treatment. For patients participating in the optimization of IPH program, the average score was 8.85±0.65 and 6.85±0.49, respectively. In terms of indices of quality of life, after 6 months an increase in most scales was noted. The use of suggestive therapy contributed to a gradual decrease in volumetric indices of LV EDV, from 135.61±10.66 cm^3 at the beginning of the observation to 108.90±5.98. During the same period of observation, there was a decrease in the values of EDD and ESD and a significant increase in EF from 49.65±1.93% to 55.29±1.88.

Conclusions: In order to maximize the benefits of rehabilitation, it is important to develop strategies for the optimization of the inner picture of health. A change in attitude to disease leads to an improved perception of the patient to health, motivation for treatment, and the need for active participation in rehabilitation interventions.

KEYWORDS: ischemic heart disease, aortocoronary bypass, rehabilitation, suggestive therapy, inner picture of health

BACKGROUND

Ischemic heart disease (IHD) remains a major problem in today's world. Surgical revascularization of the myocardium, in particular, aortic coronary artery bypass graft (CABG), is an important treatment for patients with IHD. Every year, CABG techniques are improving [1,2].

Compulsory components of cardiac surgery are multidisciplinary rehabilitation that require active collaboration between patient and specialist, as well as targeted and disciplined approaches to the patient's behavior (to change his/her behavior), lifestyle and levels of physical activity [3].

Many researchers have found that, in patients with cardiovascular disease, there is a psychological component. Often, there are emotional disorders such as anxiety and depression. Patients live with constant fears of recurrence of IHD, become over-focused on cardiac

activity, reacting to the least unpleasant sensations in the area of the heart. Heart health becomes the main focus of their lives [4].

The inner picture of health (IPH) is a multi-dimensional system in which various components of human health are represented including physical, psychological, social and spiritual. The IPH model consists of the following components; sensory, emotional, cognitive, value-motivational and behavioral [5].

The ability to see disease only as part of health is a strategy for self-preservation and self-rehabilitation. Quality of life in patients after cardiac surgery is not only effected by physical symptoms, but by limited activity, social support and participation, as well as personal perceptions [6,7].

Therefore, it is important to develop a positive, conscious attitude to health and disease, with the construction of an optimal IPH through psychological support and training. Psychological support is an integral part of the rehabilitation program, with the special attention being paid to the interaction between the doctor and the patient [8,9].

Aim of the study

To examine new rehabilitation interventions for patients following myocardial revascularization.

Material and methods

Study design

60 patients with IHD who had CABG were reviewed, using the following assessments and treatments: clinical-anamnestic, diagnostic, instrumental, psychometric (HADS), assessment of quality of life, suggestive therapy and education through IPH optimization.

Depending on the type of rehabilitation employed, the patients were respectively divided into 3 groups, 20 patients in each group. Patients in group I received traditional therapy. Patients in group 2 received suggestive therapy in addition to traditional therapy. Patients in group 3 received training in the optimization of IPH following the "Program of clinical-psychological rehabilitation of cardiologic patients by optimization of the inner picture of health".

Methods

To assess the psycho-emotional state of the patients, the Hospital Scale of Anxiety and Depression (HADS) was used. According to the scale, results patients were divided into groups with absence of symptoms of anxiety/depression (0-7 points), subclinical anxiety/depression (8-11 points) and clinical anxiety/depression (points more 11 than).

Quality of life was assessed using to the "Seattle Angina Questionnaire – SAQ" and its scales "Physical Limitation-PL", "Stability of Angina Pectoris-AS", "Angina Frequency-AF", Treatment Satisfaction-TS and

Disease Perception-DP. Depending on the answer to the questions, quality of life was rated on a scale of 1 to 5.

Cardiac and systemic hemodynamics were studied by echocardiography using the "CARIS-PLUS" apparatus ("Biomedice", Italy). The size of the left atrium (LA), the size of the left ventricle (LV) in systole (ESD) and diastole (EDD), the thickness of the interventricular membrane (TIM) and the posterior wall (PW) of LV in diastole were determined. The discharge fraction (DF) of LV, stroke volume (SV), end-diastolic volume (EDV), end-systolic volume (ESV) were calculated. In all three groups, observations were performed at admission, after 1 month and after 6 months.

Setting

Traditional treatment included a medical component (both pharmacological and non-pharmacological) and a physical component. Suggestive therapy was an auto-training intervention with music therapy every other day for 20 minutes, with classes held in the wards.

The training of patients was performed using the author's program "Psychological rehabilitation of patients with ischemic heart disease and myocardial infarction by optimization of the inner picture of health", which included 5 interactive exercises with a duration of 60 minutes. Classes, performed by a cardiologist and a psychologist, were constructed taking into account components of the IPH, with each component considered as a separate lesson. Classes were cyclic, groups were open, and each patient could join the group during the activity without losing the training logic. During the course of the program, patients completed diaries in which, after each lesson, they recorded changes that took place [10].

Statistical processing was performed using "Microsoft Excel" and "Statistica" v. 10.0 StatSoft, USA. The assessment of the probability of the difference in mean values was performed using the Student paired t-criterion. Mean values are given as (M±m), where M – is the mean value of the indicator, m – is the standard error of the mean. The results were considered statistically significant at a value of $p < 0.05$. Before conducting the comparative analysis (or descriptive statistics), it was observed that the experimental data corresponded to the normal distribution law. Verification was performed using Kolmogorov-Smirnov criteria.

Results

Analyzing the clinical-anamnestic data of patients who had CABG, it was observed that the average age was 63.42±1.52 years, and there were both city and village patients. The majority of patients were people with AH of the II degree. 26.67% had a history of type II diabetes mellitus, the majority of patients had signs of CHF of the IIIA degree, and manifestations of acute heart failure (tab. 1).

A level of anxiety (HADS) corresponding to subclinical anxiety was found in most patients, and was the

Table 1. Clinical-anamnestic characteristics of patients who were performed CABG.

Index		Patients who were performed CABG (n = 60)	
		n	%
Average age, years		63.42±1.52	
Gender:	female	22	36.67
	male	38	63.33
Residents of the city		34	56.67
Residents of the village		26	43.33
Without AH		-	-
AH I		-	-
AH II		40	66.67
AH III		20	33.33
DM II type		16	26.67
Without CHF		-	-
CHF I		9	15.00
CHF IIA		38	63.33
AHF according to Killip I		-	-
II		3	5.00
III		2	3.33
IV		3	3.33
Notes:	1. The absolute number of patients is indicated. 2. The percentage to the absolute number of the examined patients is represented in brackets		

Table 2. Dynamics of indices of depression (HADS) in patients who were performed CABG.

Index, units of measure		At admission to the hospital	1 month	6 months
Traditional treatment (n = 20)				
Manifestations of depression:	– absence of symptoms	7 (35.0%)	9 (45.0%)	11 (55.0%)
	– subclinically expressed	8 (40.0%)	7 (35.0%)	6 (30.0%)
	– clinically expressed	5 (25.0%)	4 (20.0%)	3 (15.0%)
Mean score of depression		8.91±0.65	7.70±0.61	6.68±0.59
Δ			-13.5	-25.0
Traditional treatment with suggestive therapy (n = 20)				
Manifestations of depression:	– absence of symptoms	8 (40.0%)	13 (65.0%)	15 (75.9%)
	– subclinically expressed	8 (40.0%)	4 (20.0%)	3 (15.0%)*
	– clinically expressed	4 (20.0%)	3 (15.0%)	2 (10.0%)
Mean score of depression		8.89±0.64	7.65±0.51	6.45±0.46*
Δ			-14.1	-27.5
Traditional treatment with IPH optimization (n = 20)				
Manifestations of depression:	– absence of symptoms	7 (35.0%)	14 (70.0%)	16 (80.0%)*
	– subclinically expressed	9 (45.0%)	4 (20.0%)	3 (15.0%)*
	– clinically expressed	4 (20.0%)	2 (10.0%)	1 (5.0%)
Mean score of depression		8.85±0.65	6.85±0.49	5.97±0.44**
Δ			-22.6	-32.5
Notes:	1. The reliability of the difference between the indices compared with the values before treatment: * < 0.05; ** < 0.01. 2. Δ – percentage of increase (+)/decrease (-) in comparison with the values before treatment.			

groups in 45.0%, 50.0%, 30.0% respectively in groups 1, 2 and 3 and clinical anxiety was found in 40.0%, 35.0%, 45.0%, respectively in groups 1, 2 and 3 with an average score of 11.23±0.70. After 1 month, there was a decrease in the percentage of patients with clinical manifestations of anxiety, and an increase in patients with a lack of severe symptoms of anxiety. There was also a decrease in the mean score of anxiety in the group receiving suggestive therapy 7.58±0.69 at 22.6%, and in group receiving optimization of IPH 7.69±0.63 at 30.8%. After 6 months in the group receiving suggestive therapy and the optimization of IPH, these indices were significantly higher (p < 0.01). Dynamics of indices of depression according to the scale of HADS in patients who underwent CABG are presented in tab. 2.

When analyzing quality of life at admission to the hospital, in all groups of patients low values of limitation of physical activity were noted. In groups 1, 2 and 3, these values were 38±4%, 37±4% and 35±4%, the stability of angina Pectoris (AS) was 36±7%, 34±6% 36±7%, the angina frequency (AF) was an average 29±5%, and there was a low index of disease perception (DP). After 6 months, an increase in the indices according to most scales was noted. However, the most pronounced changes in the index regarding the disease perception (DP) were in the groups receiving the suggestive therapy intervention and optimization of IPH from 30±4%, at admission to 79±5% after 6 months of observation (fig. 1)

Among patients with SCAD after CABG who had traditional treatment, only a tendency to decrease (p > 0.05) of volume and metric indices of the left ventricle was

observed. At the same time, there was no significant increase in EF during the 6 months of treatment (fig. 2).

Suggestive therapy contributed to a gradual decrease in volumetric indices of LV. Both EDV and ESV were reduced during treatment, but these indices became reliable only after 6 months of treatment. For example, EDV was 135.61±10.66 cm^3 at the beginning of observation, but it reduced after the 6-month treatment period up to 108.90±5.98 (p < 0.05). The program resulted in a decrease in EDV after 6 months of treatment to 19.9% (p < 0.05), ESV – at 24.9% (p < 0.05) and an increase in EF at 10.45, only after 6 months of observation (p < 0.05).

Discussion

The CROS study documented the effectiveness of cardiac rehabilitation in the reduction of mortality after coronary artery bypass surgery, and rehabilitation into a "new era" of finding ways to improve outcomes in patients with various manifestations of IHD is a subject of ongoing debate [11].
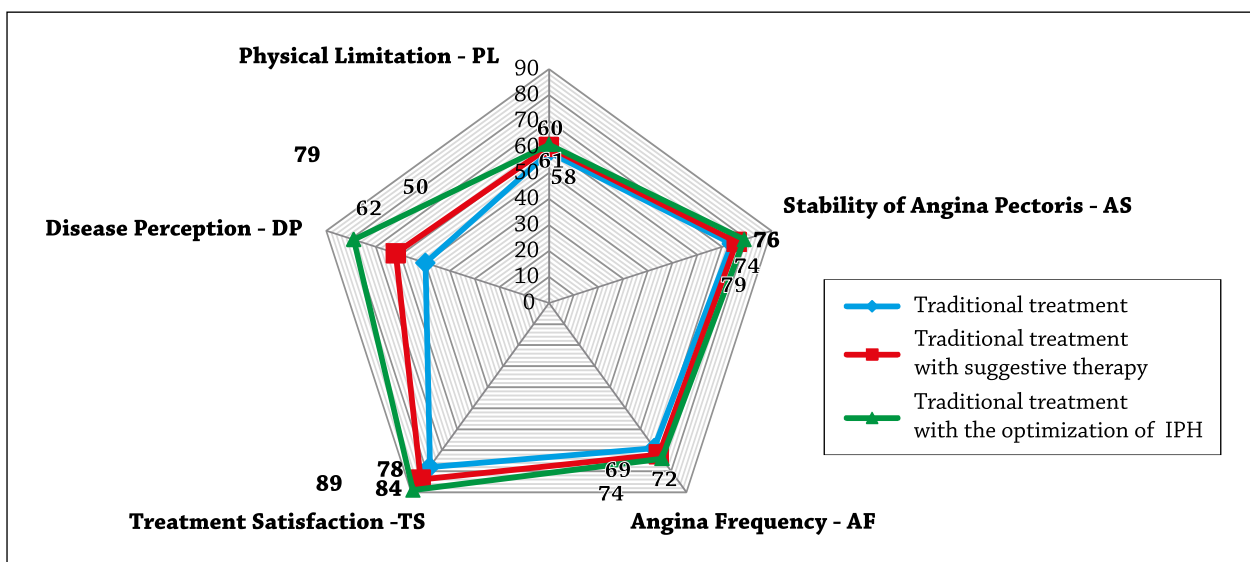
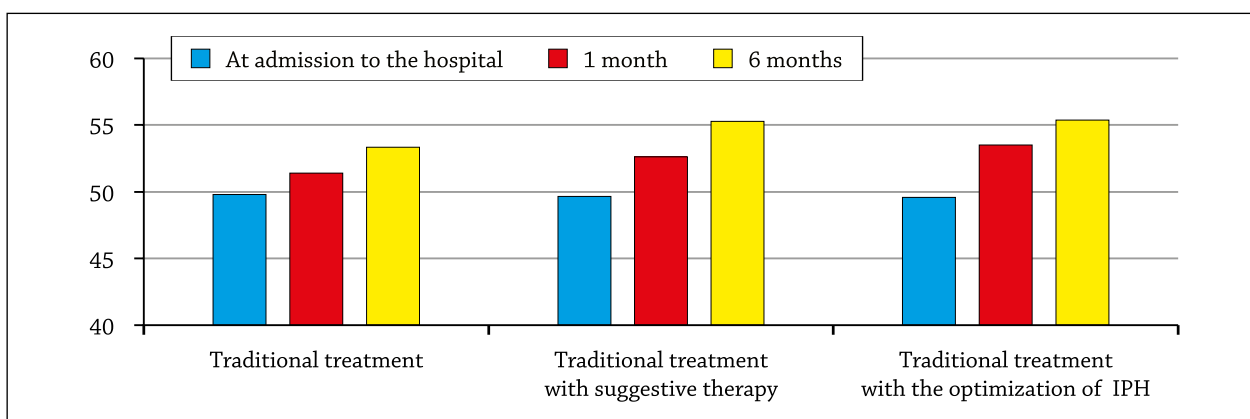Figure 1. Dynamics of life quality of patients, who were performed CABG after 6 months.

Figure 2. Dynamics of EF of LV in the process of observation.

Reasons for reductions in the quality of life of in patients are age, individual-psychological differences, as well as social factors and attitude towards disease. Differentiation of these factors will allow for the development of programs for rehabilitation of patients, taking into account influencing factors of and involvement of relevant specialists [12].

Our data, on the one hand, indicate that, in patients after myocardial revascularization, there is a cascade of restorative pathogenetic changes. These include coronary bed restructuring, changes in adaptation to chronic ischemia and processes of reoxidation, changes in central and peripheral hemodynamics and, as a result, improvement of peripheral and cerebral blood flow. In addition, there is a significant increase in the tolerance to physical activity and cardioprotection in general.

This cascade of restorative processes improves quality of life and promotes correction of the psychosomatic component of the patient's condition.

Another side of this process is the growing commitment of the patient to effective physical and social rehabilitation. Psychological adaptation is an important component of rehabilitation.

The "Program of clinical-psychological rehabilitation of cardiologic patients by optimizing the inner pic-ture of health" was the basis of the author's certificate for a scientific work [13].

The procedure for participation of patients in the program was as follows. All patients in the rehabilitation department were encouraged to participate in the program of psychological rehabilitation. The program was not imposed, but only recommended, therefore the choice was based on the individual's awareness and the patient's needs. Lessons were performed by a cardiologist and a psychologist. Collaboration with the patient took place using the following steps: introductory conversation, clarification of the motivation for participation in the program; introduction of program of optimization of IPH: 5 interactive lessons using different training elements, with a duration of 60 minutes; individual psychological counseling (60 minutes) upon request of individual subjects. Post-diagnostic analysis of the results of program's impact occurred after 1 month, 6 months after the program has been finished.

Lessons take into account the different components of the internal picture of health (IPH) intervention, each component being considered in every lesson. As described earlier, classes were cyclic, groups were open, and each patient could join the group during the activity

without losing the training logic. During the individual lessons, significant components for each patient were determined and correction applied. If necessary, and on request, an individualized program was followed.

Conclusions

1. In order to improve the rehabilitation of patients after cardiac surgery, it is important to develop strategies to optimize the components of the IPH with the objective of defining individual rehabilitation paths.

2. The use of psychological and educational components of IPH, along with traditional treatment, reduces manifestations of anxiety and depression, improves quality of life, including alteration of the patient's perception towards both the disease and the necessity for active participation in rehabilitation activities.

3. Changes in disease perception lead to an improved outlook of the patient regarding health and motivation for treatment that in turn improves subjective and objective measures and promotes psychological well-being.

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