

Optimization of Cardiorehabilitation Methods of Treatment of Patients with Cardiovascular Diseases After Receiving High-Tech Medical Care

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Abstract Cardiological rehabilitation (CR) is a comprehensive (comprehensive) long-term program that includes a medical assessment of a patient's functional condition, prescribed physical exercises (workouts) based on individual stress tolerance, modification of cardiac risk factors, and patient education and counseling. These programs are designed to limit the physiological and psychological effects of heart disease, reduce the risk of sudden death or recurrent myocardial infarction, control the symptoms of heart disease, stabilize and reverse the development of the atherosclerotic process, and improve the psychological and professional status of selected patients. Programs consisting only of physical training cannot be considered cardiological rehabilitation. Comprehensive care for a patient with heart and vascular disease is recognized by the fact that comprehensive programs of cardiological rehabilitation/secondary prevention are applied to him. The study evaluated the methods of rehabilitation of patients with HCV who received high-tech medical care. The study included 410 patients with CVD aged 22 to 69 years, with an average age of 43.4 ± 16.6 years. All patients, depending on the rehabilitation method, were divided into 2 groups. The 1st group included 208 patients who underwent the traditional rehabilitation method, the 2nd group included 202 patients who underwent an improved 5-stage rehabilitation method. Rehabilitation in the 2nd group proved to be more effective. The clinical and physical condition of the patients improved significantly. In group 1, rehabilitation was less effective, and improvements in clinical and physical condition were weak.

Keywords High-tech medical care, Cardiac rehabilitation, Left ventricular ejection fraction, Quality of life, etc.

1. Introduction

To this day, cardiovascular diseases (CVD) remain one of the most pressing problems of world and national medicine, which in most countries of the world still occupy a leading position among the causes of mortality and early disability of the population and thus largely determine the state of public health and public health. CVDs are mainly the cause of mortality and disability of the young and adult population, which poses an acute socio-economic problem due to early disability and a decrease in the quality of life of people in this category, since this part of the population is the main labor and intellectual potential in society [1,11]. According to WHO, in recent decades, in economically developed and developing countries of the world, despite the achieved medical and wellness successes, the introduction of new high-tech equipment in cardiology practice, the daily improvement of modern diagnostic research methods and high-tech treatment

methods, and the high cost of financing aimed at diagnosis, treatment, rehabilitation and prevention of diseases, there is still a high mortality from cardiovascular diseases (CVD). Timely detection of patients with CVD at the early stages of the disease development, using high-tech diagnostic and therapeutic methods, is one of the urgent problems of modern cardiology. Along with these urgent problems, scientific research on the early detection and prediction of CVD risk for the provision of high-tech medical care (HMP) is considered the most important [6,15].

Our republic, like many other countries in the world, belongs to countries with a high risk of developing CVD. At the same time, statistical studies show that in the first 10 months of 2023, of all reported deaths in Uzbekistan, 59.7% of reported deaths were due to diseases of the circulatory system (CVD). The objectives of the state and the healthcare system have always been to strengthen the health of the population, on the way to which it is necessary to improve medical organizations according to the appropriate methodology for reorganizing the healthcare system [2,7,12,16]. Since 2010, other systems and Government projects have been in

place to help reduce the incidence of diseases, disabilities, and deaths among the population. To this end, the basis for the implementation of these mechanisms were identified as: improving prevention, establishing and strengthening primary health care and providing the population with high-quality, timely and high-tech medical care [3,8,13,17,24].

The number of CVD patients in the Republic of Uzbekistan is increasing every day, and accordingly, the opening of departments or centers of vascular surgery and cardiac surgery in all regions is increasing for the early and timely detection, timely elimination and treatment of these diseases. The opening of these centers has made it possible to carry out high-tech operations and procedures in our country (CABG, operations to eliminate various heart defects, detect and treat arrhythmias, restore vascular endovascular permeability, etc.), while these types of procedures and operations are among the introduced standards of patient care. At the moment, it is necessary to take into account this situation, that is, high-tech interventions and operations do not lead to a full recovery of patients with CVD, since for a full recovery of the patient, rehabilitation of patients after operations and procedures is necessary. dispensary control is considered very important, and the correctness and completeness of these measures is transferred to the patient, determines the subsequent quality of high-tech operations and interventions [21,22,23,25].

The need for high-tech treatment methods is progressively increasing in proportion to the prevalence of CVD, while medical care, including high-tech and rehabilitation measures, should be available to all citizens of the Republic of Uzbekistan, providing high-tech medical care and rehabilitation of patients after these interventions to the population is an obligation of the state. The use of high-tech medical care will allow timely detection of diseases of the cardiovascular system and proper treatment of this pathology, thereby increasing their economic efficiency. From 2018 to 2023, the population's provision of high-tech medical care and rehabilitation of patients after high-tech interventions in the medical and preventive institutions of the healthcare system of the Republic of Uzbekistan increased 2.7 times and a further increase in the format of the state assignment for the provision of high-tech medical care is projected [4,9,14,18].

Numerous studies have been conducted in our republic, which are limited to analyzing the dynamics of general assessments of public satisfaction with the state of health care, there is no comparison of data on the availability, timeliness and quality of high-tech medical care and rehabilitation measures after these interventions for the population with CVD in various regional cardiological medical organizations and specialized medical institutions involved in the provision of high-tech medical care and rehabilitation of patients. Some scientific papers have identified differences in the assessment of public satisfaction with high-tech medical care between public and private medical institutions, which are the subject of many other studies. In addition, the results on comparing the availability and quality of high-tech medical care in a number of countries around the world, including in our country, are of particular interest [3,8,13,17].

Cardiological rehabilitation (CR) is a comprehensive (comprehensive) long-term program that includes a medical assessment of a patient's functional condition, prescribed physical exercises (workouts) based on individual stress tolerance, modification of cardiac risk factors, and patient education and counseling. These programs are designed to limit the physiological and psychological effects of heart disease, reduce the risk of sudden death or recurrent myocardial infarction, control the symptoms of heart disease, stabilize and reverse the development of the atherosclerotic process, and improve the psychological and professional status of selected patients. Programs consisting only of physical training cannot be considered cardiological rehabilitation. Comprehensive care for a patient with heart and vascular disease is recognized by the fact that comprehensive programs of cardiological rehabilitation/secondary prevention are applied to him [5,10,19,20].

Thus, despite the rapid development and application of new expensive medical technologies in cardiological and cardiac surgery practice, accessibility to all types of VMP and organizational processes in the field of rehabilitation of patients with CVD have not been sufficiently studied and are not provided properly, there is little data assessing the group of patients with CVD who need rehabilitation after high-tech medical care. There are practically no studies related to activities in the field of organization and provision of high-tech medical care in the Republic of Uzbekistan, which determines the relevance, purpose and subject of the study [5,10,19,20].

The purpose of the study: optimization of cardiorehabilitation methods of treatment of patients with cardiovascular diseases after receiving high-tech medical care.

2. Materials and Methods

This study was conducted in the departments of ACS and coronary heart disease of the Samarkand regional branch of the Republican Scientific and Practical Medical Center of Cardiology. The study included 410 patients with CVD aged 22 to 69 years, whose average age was 43 ± 16 years, who underwent a general clinical examination (collection of anamneses of the disease, anthropometric and physical examination of the patient, measurement of blood pressure, heart rate, blood saturation), laboratory and instrumental studies, which included clinical blood tests, biochemical blood analysis, ECG, holter ECG, echocardiography on admission and over time. All patients, depending on the rehabilitation method, were divided into 2 groups. The 1st group included 208 patients who underwent the traditional rehabilitation method, the 2nd group included 202 patients who underwent an improved 5-stage rehabilitation method.

All patients were subject to standard examination and daolash methods, which include: 1. general clinical examinations, patient requests (complaints, Anamnesis data); 2. instrumental examinations (ECG, ExoKG, Holter-ECG, Exo-kg through esophagus, electrophysiological examinations, etc.); 3. biochemical blood test (determination of the amount of creatinine, mochevina, residual nitrogen, lipid spectrum, etc.).

3. Results

The dynamics of blood pressure and heart rate in patients in the rehabilitation groups shows that in patients of the 1st group, systolic blood pressure (SAD) before treatment was 130.7 mm Hg, after 3 months - 125.4 mm Hg, after 6 months — 122.6 mm Hg, after 12 months — 120.1 mm Hg. A decrease in SAD indicates a decrease in the load on the cardiovascular system, which confirms the high effectiveness of antihypertensive therapy. The heart rate (HR) before rehabilitation was 88.4 beats/min; after 3 months — 80.3 beats/min; after 6 months — 73.2 beats/min; after 12 months — 69.4 beats/min. A decrease in heart rate indicates a decrease in sympathetic tone and restoration of parasympathetic tone in the autonomic nervous system. In patients of the 2nd group, systolic blood pressure (SBP) before treatment was 135.2 mm Hg; after 3 months — 133.8 mm Hg; after 6 months — 132.4 mm Hg; after 12 months — 130.6 mm Hg. A slight decrease in blood pressure indicates insufficient effectiveness of hypotensive therapy. The heart rate did not reach stability, while maintaining the dominance of the sympathetic tone of the nervous system.

The level of NT-proBNP is the main biomarker for assessing cardiac load and circulatory insufficiency. In group 1, the level of NT-proBNP before treatment was 1247 pg/ml, and after 12 months it reached 302 pg/ml. The level of NT-proBNP in patients of the 2nd group before treatment was 1068 pg/ml, after 12 months it was 645 pg/ml. The differences between the groups were as follows: the dynamics of the level of NT-proBNP in group 1 showed a significant decrease, which confirms the high effectiveness of the treatment. In group 2, the dynamics were weak, and long-term stabilization was not achieved. To summarize, we can say that the rehabilitation methods used in group 1 have demonstrated high effectiveness. Restoring the functional state of the cardiovascular system and ensuring long-term results in group 1 showed a clear advantage over group 2.

The dynamics of hemodynamic parameters in patients from group 1 (208 people) was as follows: the left ventricular ejection fraction (LVEF) before the procedure was 50.7%, after 3 months - 54.2%, after 6 months - 56.6%, and after 12 months - 56.8%. This significant improvement in LVEF dynamics indicates the high efficiency of the revascularization procedure, which confirms a decrease in myocardial ischemia and restoration of the pumping function of the heart ($P \geq 0.001$). In patients from group 2 (202 people), the left ventricular ejection fraction was 51.7% before the procedure, 53.3% after 3 months, 54.8% after 6 months, and decreased to 52.6% after 12 months. The weak dynamics of LVEF improvement indicates the insufficient effectiveness of the treatment method used to improve the pumping function of the heart.

All parameters of the lipid profile (OHC, LDL, HDL, TG) in group 1 showed significant improvement, which confirms the high effectiveness of lipid-lowering therapy and the clinical significance of treatment aimed at eliminating atherosclerosis. The dynamics of improvements in the lipid

spectrum in group 1 demonstrates the high effectiveness of therapy and rehabilitation. Changes in the lipid profile in group 2 remain insufficient, which indicates the need to revise the therapeutic strategy to improve lipid metabolism. The weak dynamics of lipids indicates the inability to completely eliminate atherosclerotic processes. It is necessary to review the treatment methods in the 2nd group. A comparative analysis shows the clinical advantage of the group 1 strategy in improving lipid metabolism.

The scale of assessment of the clinical condition (SHOCK) in the 1st group before treatment was 10 points, after 12 months - 0.8 points. In group 2, the SHOCK before treatment was 9 points, and after 12 months it remained at 4 points. The low dynamics of the SHOCK indicators indicates the lack of significant improvement in the clinical condition of patients. Maintaining the level of 4 points even after 12 months demonstrates insufficient effectiveness of treatment in the second group of patients. Group 1 patients showed a significant improvement in the dynamics of the 6-minute walk and SHOCK test ($P \geq 0.01$). This confirms the high effectiveness of treatment and rehabilitation. The state of the respiratory and circulatory systems has returned to normal, and the clinical condition has completely stabilized. High results were achieved, and the 6-minute walk and SHOCK test scores improved significantly. The treatment methods have proven their reliability in restoring the functional state of patients.

In group 2, the dynamics was weak, and the 6-minute walk and SHOCK test scores did not significantly improve. The effectiveness of rehabilitation has been limited, and additional therapeutic strategies need to be implemented. The low effectiveness of treatment and rehabilitation has led to unsatisfactory results, which requires a review of the treatment strategy. Conclusions: thus, the rehabilitation methods used in group 1 have shown their advantage in clinical practice. Rehabilitation in the 1st group proved to be more effective. The patients' clinical and physical condition improved significantly. In group 2, rehabilitation was less effective, and improvements in clinical and physical condition were weak. This analysis provides important information for evaluating rehabilitation methods. The measures applied in the 1st group ensured the achievement of high efficiency.

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