

The effectiveness of hospital rehabilitation of patients after coronary artery bypass based on a comparison between the standard and modified model

Introduction

New opinions on secondary prevention are constantly being developed in the world, in the area of risk factors of atherosclerosis. In recent years own recommendations regarding this area of expertise were issued by the largest cardiologists organizations, such as: The European Association for Cardiovascular Prevention and Rehabilitation (EACPR), American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) and the European Society of Cardiology (ESC). All recommendations emphasize that a properly selected model of rehabilitation should result in the increase of physical fitness and improvement of exercise tolerance.

Cardiac rehabilitation (CR) has evolved over several decades, from simple, basic monitoring of the process of safe return towards basic physical activities, to a multidisciplinary approach, which is based on patient education, lifestyle modification, psychosocial rehabilitation, clinical assessment, diagnostics, progress monitoring PM and conducting a properly selected rehabilitation program through physical training. This multidisciplinary approach is today called, as comprehensive cardiac rehabilitation (CCR).

In recent years, CR has developed primarily due to results of scientific research. During this time, knowledge about atherosclerosis and the role of risk factors was also deepened. According to the American Heart Association's from 2007 year, on physical training under medical supervision in cardiac patients, the risk of major cardiac events due to physical stress is only present in one case at 60-80,000 patient-hours. Such data proves, that properly selected and conducted exercises are safe for patients.

Objective

The main objective of the study is to compare, in terms of the therapeutic effectiveness of two rehabilitation models, in the early hospital period, in patients after surgical revascularization of the myocardium in the treatment of coronary heart disease.

Additional objectives: assessment of the effects, resulting from increasing the intensity of exercises and evaluation of the training models, used in terms of safety.

Material and methods

The study was conducted from January 2015 until September 2018 at the Department of Cardiac Surgery at the First Department of Cardiology of the Medical University of Warsaw. The study included 100 men, with stable coronary disease who underwent a surgical treatment of coronary artery bypass grafts, in a planned mode. After meeting the eligibility criteria, patients were randomly assigned, by using closed and secured envelopes, to two groups of 50 people.

Group A was rehabilitated in accordance with the recommendations of the Cardiological Rehabilitation and Physiology of Effort Section of PTK according to Rudnicki in 2004, which were obligatory during the study period. Group B was rehabilitated according to the original author's program. The main program differences between the two groups are:

- dosing of training burden,
- length of exercise time,
- type and progression of exercises,
- scope of functionality

The 6 MWT test was used to verify the effects of the rehabilitation programs used, which was performed twice. The first attempt was made before the surgery, for enrolling purposes and for the need to determine the physical and functional status. The second attempt, which aimed to reassess the physical and functional status and the comparison of both research groups, took place on the 6th post surgery day.

Results

Basic demographic data in groups A and B did not differ significantly.

Comparing groups A and B, statistically significant differences were found with $p < 0.05$.

- In the initial 6 MWT test, in terms of verifying and the determination of the initial values, the subjects in group A obtained higher SpO₂ (*Me*: gr. A = 97%, 98%; gr. B = 96%, 97%). The remaining results did not differ significantly.

- In the final 6 MWT test, in terms of assessing the effects of rehabilitation programs applied, the subjects in group B achieved higher SpO₂ (*Me*: gr. A = 96%, 97%; gr. B = 97%, 98%), lower starting HR (*Me*: gr. A = 84; gr. B = 78) (closer to normal values) and lower post-exercise HR (*Me*: gr. A = 92,5; gr. B = 84,5), longer distance traveled (*Me*: gr. A = 312m; gr. B = 359m), lower fatigue level according to Borg (*Me*: gr. A = 3; gr. B = 1) and shorter time of stay on the ward in the post surgical period. The remaining results did not differ significantly.

Comparing results in a given group, statistically significant differences were found with $p < 0.05$.

- In group A: SBP and SpO₂ in the initial test was higher than in the final one 6 MWT test, HR in the initial test was lower than in the final 6 MWT test, the distance traveled in the initial test was shorter than in the final 6 MWT test and fatigue level according to Borg in the initial test was smaller than in the final 6 MWT test. The remaining results did not differ significantly.

- In group B: SBP in the initial test was higher than in the final 6 MWT test, SpO₂ and HR in the initial test was lower than in the final 6 MWT test. The remaining results did not differ significantly.

Conclusions

1. An original author's rehabilitation program that was used in the early hospital period in patients after surgical revascularization of the myocardium in the treatment of coronary heart disease it is more beneficial in improvement of the physical and functional condition, than the standard program.
2. Increasing burden, extending the time of training sessions and extending the scope of functionality is safe for patients, and the proposed physical effort is well tolerated by them.