

Study on Graded Exercise Intervention and Its Application in Patients with Cardiovascular Disease

Longqiang Chen, Fugui Huang*

Ministry of Public Sports, Fujian Agriculture and Forestry University, Fuzhou 350002, China

Fujian Polytechnic of Information Technology, Fuzhou 350002, China

*Corresponding Author e-Mail:915990486@Qq.Com

ABSTRACT: To further explore the safety and effectiveness of exercise intervention in cardiovascular disease, 606 patients with coronary heart disease were divided into Observation Group (306 cases) and Control Group (300 cases) according to the time of admission. The Control Group was given routine exercise instruction, and the observation group was given early graded exercise intervention. Cardiac function was evaluated at admission and discharge, and exercise capacity was evaluated at discharge. Heart rate, chest tightness / chest pain, cardiac arrest and sudden death were observed during early staged exercise intervention. The results showed that the ejection fraction of the Observation Group was higher than that of the Control Group, and the incidence of abnormal left ventricular segmental wall motion was lower than that of the control group. The six-minute walking distance of the Observation Group (291.8861.63 m) was higher than that of the Control Group (268.5660.95 m) . The difference of heart rate between exercise and rest was less than 20 times / min, and no sudden cardiac arrest or sudden death occurred in the Observation Group. Early staged exercise intervention is safe and helpful to improve cardiac function and exercise load of patients with cardiovascular disease.

KEYWORDS: Exercise intervention, Cardiovascular disease, Applied research

1. Introduction

In today's society, as a result of the rapid development of the productive forces, the level of material productivity immediately increased by a very significant margin. That is, under such superior living conditions, people's way of life changed. For example, irregular daily life, partial diet, overeating, imbalance of meat and vegetable, etc. , induce many cardiovascular disease, of which heart disease is the most common one, and it is difficult to cure. This happens at all ages, from congenital heart defect to acquired heart disease, and the number of people with cardiovascular disease is increasing, even in eastern European countries, leading to

social awareness.

The Global Register of acute coronary events (GRACE) data show that mortality, stroke and readmission rates are as high as 25% within six months after discharge, and the cumulative mortality rate is 22.6% over four years, with 50% of deaths due to re-infarction. As a measure to prevent and cure diseases, sports has been recognized and put into practice by medical circles. It is suggested that effective exercise stimulation can improve the function of vascular endothelium, stabilize the plaque of coronary artery, promote the establishment of collateral circulation and improve the cardiac function. On the basis of stable condition, the earlier exercise intervention begins, the greater the cardiovascular benefits and the higher the quality of life. After an acute cardiac event, most patients have uncertainty about exercise and concern about the risk of exercise, which leads them to avoid early exercise. At present, the domestic research still adopts the passive exercise of the patients whose vital signs are stable 24 hours after PCI, and the intervention measures are different, so the unified standard has not been formed yet. According to the Chinese experts' consensus on exercise therapy for cardiovascular disease patients, this study made an early graded exercise intervention program and evaluated the safety and effectiveness of the intervention program, in order to provide basis for clinical practice.

2. Methodology

2.1 Subjects

In during July to October, 2018, our hospital heart coronary artery stent implantation in patients with coronary heart disease, with no new or recurrence within the past 12 h chest pain, troponin levels without further increases ,there are no new decompensated heart failure(dyspnea with wet then sound) when resting, no new arrhythmia obviously within the past 12 h or dynamic electrocardiogram change, physiological parameters to 50-90 times/min resting heart rate, blood pressure above 90-150 MMHG,SPO295%, the patients were conscious and had normal physical activity ability. EXCLUSION CRITERIA: risk factors for disease were not controlled, patients with malnutrition and metabolic disorders, patients with bone and joint diseases. FALL OFF STANDARD: can not complete the researcher such as the automatic discharge.

2.2 Methodology

This research is based on the American Heart Association (AHA) exercise therapy guidelines and the consensus of Chinese experts on exercise therapy for patients with coronary heart disease. Ejection Fraction (EF) and abnormal left ventricular segmental wall motion (RWMA) were measured at admission and discharge. EF refers to the percentage of the end-diastolic volume of the Stroke volume, which is related to the contractility of the myocardium. The stronger the

contractility of the myocardium, the more the Stroke volume, the greater the EF. RWMA is one of the characteristic changes in myocardial ischemia and early myocardial infarction. Through the ECHOCARDIOGRAPHY, the local myocardial function of myocardial infarction patients was evaluated, and the regional wall motion and deformation were observed to judge the changes of global and local myocardial mechanical motion of left ventricle in patients with myocardial infarction. On the day of discharge, the two groups of patients were given a 6-minute free-hand walking test. The test measured the distance the patient walked rapidly on a flat, hard surface within 6 minutes. The heart rate of the patients in the observation group during exercise intervention was collected at rest and during exercise. Resting Heart rate was measured at half an hour after three meals a day (average) , and during exercise in the morning and afternoon (average) . The incidence of chest tightness / chest pain, cardiac arrest and sudden death in the course of exercise intervention were observed. SPSS20.0 was used to input and analyze the collected data.

3. Results and Discussion

3.1 Early Graded Exercise Intervention Program for Patients with Cardiovascular Disease is Safe and Feasible

Conventional Wisdom holds that cardiovascular disease has unpredictable risks and requires rest, especially during the acute phase of myocardial infarction. For this reason, routine nursing and exercise guidance are often used in clinical practice, such as absolute bed rest in acute stage, stable and appropriate activities, which make many patients less exercise or even unwilling to exercise in early stage. The exercise tolerance of the patients decreased and the physical ability decreased obviously. Inadequate physical activity is associated with approximately one-third of coronary heart disease mortality, according to the WHO guidelines for assessment and management of cardiovascular risk factors, published in 2007. Exercise is an independent risk factor for cardiovascular disease and related mortality, independent of gender and age. Early physical activity and activity can help increase cardiopulmonary exercise tolerance and improve cardiovascular function, while regular physical activity can help lower body fat and reduce cardiovascular risk factors such as triglyceride levels. In addition, bed rest increases the risk of postural hypotension, exercise tolerance decline and thromboembolism, which is not conducive to the establishment of early self-confidence and cardiac function recovery. In this study, we designed an early 4-step graded exercise intervention program, which included the time, frequency, form and intensity of exercise. The protocol also allows for individual adjustments based on the patient's daily exercise and heart function, with the intensity of exercise gradually increased, while the whole exercise process is monitored by ECG and blood pressure. The responsible nurse guides and supervises the whole process to ensure the safety of patients. The results showed that the difference of heart rate between exercise state and resting state was less than 20 times / min, and no abnormal physiological indexes caused by

exercise interrupted the exercise process .No sudden cardiac arrest or sudden death occurred during exercise in 1 case, which suggested that this study is safe and feasible for this kind of patients.

3.2 Early Graded Exercise Intervention Can Improve the Cardiac Function of Patients

Exercise can improve the function of vascular endothelium, promote neovascularization and endothelium repair by increasing the shear force mediated by blood flow in arterial wall, and reduce the remodeling of myocardial tissue after myocardial infarction, and improve the compliance of myocardial tissue. EF is an important index to reflect the global left ventricular systolic function and pump blood function, RWMA is an important index to evaluate the regional left ventricular systolic function quantitatively. Quantitative monitoring values at this level will decrease or even reverse, showing as segmental wall motion abnormalities of the left ventricle. The results of this study showed that after early graded exercise intervention, the EF of the patients in the observation group was higher than that of the Control Group , and the number of RWMA in the observation group decreased compared with that of the control group. At the same time, the decrease level was higher than that of the Control Group, the difference was statistically significant. It is suggested that early exercise intervention can effectively improve left ventricular functional reserve and local exercise capacity of patients with coronary heart disease.

3.3 Early Staged Exercise Intervention Can Improve Exercise Load of Patients with Cardiovascular Disease

The free-hand six-minute walking test is a common exercise load test, and it is an important content of evaluation at the end of Cardiac Rehabilitation Program. It provides data on cardiopulmonary function, changes in Hemodynamic during exercise, Myocardial Ischemia, and whether exercise induces or aggravates Arrhythmia. The results showed that the average walking distance (291.88 ~ 61.63 m) in the observation group was higher than that in the control group, suggesting that early exercise intervention program can effectively improve the exercise load of patients with coronary heart disease.

3.4 Research Limitations and Sustainability of Future Research

This study only discussed the effect of early exercise intervention in hospitalized patients, and did not follow up the long-term cardiovascular events after discharge, incidence, readmission rate and mortality. Further research will combine in-hospital exercise intervention and out-of-hospital exercise intervention to help patients develop standardized exercise habits, thereby improving the quality of life and long-term prognosis of patients with cardiovascular disease.

4. Conclusion

The effect of graded exercise intervention on patients with cardiovascular diseases is better, and patients with cardiovascular diseases are more suitable for doing some aerobic endurance exercises, such as swimming, jogging and walking. In order to regulate fatigue, you can do Tai Ji, Qing Kung or gymnastics in the morning. The duration can be between 20 and 40 minutes, and you should formulate a reasonable exercise prescription and a reasonable amount of exercise. Because the intensity of aerobic exercise is generally low, exercise frequency can be higher, every day or every other day can be, that is, three to four times a week exercise is the best. Patients can be based on the actual situation of the body every time pay attention to their own physical condition to do some gentle exercise, try to avoid high-intensity exercise, improve cardiopulmonary endurance exercise. If there is no obvious condition can be aerobic exercise every day and after exercise adjustment to quiet state heart rate back to 70 times. Cardiovascular system on time detection, cardiovascular system can be effectively adjusted to improve. Reduce the incidence of cardiovascular disease.

References

- [1] Le Min Wang . Attaching importance to exercise therapy in rehabilitation program of Coronary Heart Disease. (J). Chinese Journal of Cardiovascular Disease, 2015,43(7) : 570-572.
- [2] Prevention Group, Chinese Society of Cardiovascular Diseases, Chinese Society of Rehabilitation Medicine. The consensus of Chinese experts on exercise therapy for patients with coronary heart disease.(J). Chinese Journal of Cardiovascular Disease, 2015,43(7) : 575-588.
- [3] Haykowsky M.Scott J.Esch B,et al. A meta-analysis of the effects of exercise training on left ventricular remodeling following-myocardialinfarction: start carly and go longer for greatest exercise benefits on remodeling[J].Trials,2011,12:92.
- [4] Jiang sheng liu. The significance of exercise in patients with heart disease and exercise prescription.(J). Chinese Journal of Physics and Rehabilitation Medicine, 2018,30(1) : 64-66.
- [5] Lenk k,Uhlemann M, Schuler G,et,al.Role of endothelialpro-genitor cells in the beneficial effects of physical exercise on a the rosclerosis and coronary artery disease[J].J Appl Physiol,2011,111(1):321-328.