Effect of Cardiac Rehabilitation on Cardiopulmonary Function in Patients with Ischemic Cardiomyopathy

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Abstract  
Ischemic cardiomyopathy (ICM) refers to chronic myocardial insufficiency due to long-term coronary atherosclerosis, dystrophic and atrophy of myocardial tissue, resulting in myocardial remodeling, limited or diffuses heart. Pathophysiological changes such as fibrosis eventually lead to a group of clinical syndromes with arrhythmia, progressive heart enlargement and heart failure. Therefore, heart failure is the end stage of ischemic cardiomyopathy, and once it progresses to the heart failure stage, the mortality rate will increase significantly. Although ACEI and ARB drugs are widely used in clinical practice, the heart of patients with ischemic cardiomyopathy is progressively enlarged, and heart failure occurs repeatedly, leading to adverse reactions after recovery. In this paper, 78 patients who underwent interventional treatment of ischemic cardiomyopathy treated in hospital from January 20 to 2018 in 2018 were enrolled. The patients were divided into experimental groups (n=39 cases) and Control group (n=39 cases). Patients in the control group received routine care after admission. The experimental group increased cardiac rehabilitation care based on routine care. The cardiac function indexes of the two groups were observed. The cardiac function index of the experimental group was better than that of the control group. The data were statistically significant (P<0.05). The results show that cardiac rehabilitation of patients after ischemic cardiomyopathy can effectively improve the cardiopulmonary function of patients, and the nursing effect is ideal and worthy of promotion.

Key words: Ischemic Cardiomyopathy, Cardiac Rehabilitation, Nursing Method, Cardiopulmonary Function.
Efecto de la Rehabilitación Cardíaca en la Función Cardiopulmonar en Pacientes con Miocardiopatía Isquémica

Resumen
La cardiomiopatía isquémica (ICM) se refiere a la insuficiencia miocárdica crónica debida a la aterosclerosis coronaria a largo plazo, distrofia y atrofia del tejido miocárdico, lo que resulta en remodelación miocárdica, corazón limitado o difuso. Los cambios fisiopatológicos, como la fibrosis, eventualmente conducen a un grupo de síndromes clínicos con arritmia, agravamiento progresivo del corazón e insuficiencia cardíaca. Por lo tanto, la insuficiencia cardíaca es la etapa final de la cardiomiopatía isquémica, y una vez que progresa a la etapa de insuficiencia cardíaca, la tasa de mortalidad aumentará significativamente. Aunque los fármacos ACEI y ARB se utilizan ampliamente en la práctica clínica, el corazón de los pacientes con cardiomiopatía isquémica se agranda progresivamente y la insuficiencia cardíaca se repite, lo que provoca reacciones adversas después de la recuperación. En este trabajo, 78 pacientes que se sometieron a tratamiento intervencionista de cardiomiopatía isquémica tratados en el hospital desde el 20 de enero hasta el 2018 en 2018 fueron incluidos. Los pacientes se dividieron en grupos experimentales (n = 39 casos) y grupo de control (n = 39 casos). Los pacientes en el grupo de control recibieron atención de rutina después del ingreso. El grupo experimental aumentó la atención de rehabilitación cardíaca basada en la atención de rutina. Se observaron los índices de función cardíaca de los dos grupos. El índice de función cardíaca del grupo experimental fue mejor que el del grupo control. Los datos fueron estadísticamente significativos (p <0.05). Los resultados muestran que la rehabilitación cardíaca de los pacientes después de la cardiomiopatía isquémica puede mejorar efectivamente la función cardiopulmonar de los pacientes, y el efecto de enfermería es ideal y digno de promoción.

Palabras clave: Cardiomiopatía Isquémica, Rehabilitación Cardiaca, Método de Enfermería, Función Cardiopulmonar.

1. Introduction

Ischemic cardiomyopathy (ICM) is a special type or advanced stage of coronary heart disease, which refers to long-term myocardial ischemia caused by coronary stenosis, resulting in extensive fibrosis of the myocardium, formation and primary dilated cardiomyopathy (DCM) Similar clinical syndrome [1, 3]. The mortality rate of coronary heart disease has declined over the past few decades, but as a result, the prevalence of ischemic cardiomyopathy is rising, which is currently the most common cause of heart failure in developed countries [4]. Almost 60% of patients with heart failure who are hospitalized in the United States have a history of coronary heart disease. According to US epidemiological data, there are about 7 million patients with heart failure, at least 70% of which are left ventricular systolic dysfunction caused by ischemic cardiomyopathy [5, 6].

According to the 2018 annual epidemiological survey in China, the incidence of coronary heart disease (120~140)/100,000 is more than 40 years old. Coronary heart disease can further progress to ischemic cardiomyopathy, and the medical community has listed the treatment of ischemic cardiomyopathy as an important topic [7]. Such patients have enlarged heart and decreased cardiac function. Ischemic cardiomyopathy combined with heart failure and non-ischemic heart failure has poor therapeutic effects. Despite advances in medical technology, the mortality rate of ischemic cardiomyopathy remains high. Left ventricular function has been considered as one of the strongest prognostic factors. The 5-year mortality rate is about 50% to 84%. The long-term survival rate is much lower than that of primary dilated cardiomyopathy. 2017 Chinese Medical Association Cardiovascular Disease The guidelines for the diagnosis and treatment of chronic heart failure in the credit club show that the causes of death of ischemic cardiomyopathy are: pump failure 59%, sudden death 13%, arrhythmia 13%, which is a difficult problem in the field of cardiovascular disease research at home and abroad [8, 10].

The concept of cardiac rehabilitation first came from the mid-19th century and was first advocated by the German Holman Institute for the exercise prescription for cardiovascular disease [11, 13]. Cardiac rehabilitation (CR) is defined by the World Health Organization (WHO) as: ensuring that patients with heart disease are physically and mentally healthy, that their social functions are at their best, and that they can restore their normal functions through their own efforts, thus proposing exercise prescriptions. It has been widely recognized internationally [14]. The application of rehabilitation therapy in patients with ischemic cardiomyopathy ranges from absolute bed rest to a small number of activities to the transitional stage of early rehabilitation. After 30 years of hard work, the concept and theoretical system of cardiac rehabilitation have been gradually improved [15]. A large number of studies have confirmed the benefits of early rehabilitation exercise for cardiovascular disease, and most Western developed countries have established a complete cardiac rehabilitation system.
With the concept that heart patients began to recover from hospitalization, the American cardiologist Wenger took the lead in clinical application, which will be one of the important advances in the development of cardiovascular health therapy in the history of cardiovascular medicine, and has received great attention from the medical community with emphasis [19, 20]. At present, although many heart rehabilitation centers have been established in China, they are still in the stage of promotion and development. It is also necessary to strengthen the coverage of cardiac rehabilitation and establish a cardiac rehabilitation system in line with China's national conditions.

Cao X C and other scholars believe that rehabilitation exercise can help patients recover their physical and mental health as soon as possible and improve their postoperative cardiac function. However, in the implementation process, it is inseparable from the professional support and monitoring of nurses. It is necessary to carefully observe and flexibly grasp the training methods and understand the patients. The psychology in the premise of ensuring safety, promptly encourage and help patients [21]. Li Yun adopted the effect of cardiac rehabilitation nursing on the recovery of cardiac function in patients with coronary heart disease after interventional therapy. He believed that cardiac rehabilitation nursing is beneficial to control the symptoms of patients with coronary heart disease, stabilize or reverse the progress of atherosclerosis, and improve the psychology and society of patients. And occupational adaptability, reduce the risk of myocardial infarction recurrence and sudden death, it is worthy of clinical application [22]. Cao Yingdi believes that intervention in patients with myocardial infarction intervention to choose cardiac rehabilitation care can successfully improve the patient's psychological state and cardiac function, highlighting the clinical intervention value of cardiac rehabilitation nursing for patients with myocardial infarction intervention [23]. Huang Changjing, He Min et al., in investigating the influence of cardiac rehabilitation nursing on the psychological state of patients after myocardial infarction, believe that the use of cardiac rehabilitation nursing in patients with myocardial infarction can not only relieve the anxiety and depression of patients, but also improve The patient's heart function is worthy of clinical application [24]. Li Yuhua analyzed the application of cardiac rehabilitation nursing method in the psychological state of patients after myocardial infarction interventional therapy. It is considered that the method of cardiac rehabilitation nursing for patients undergoing myocardial infarction intervention therapy can effectively improve the patient's cardiac function and adjust. The negative psychology of depression and anxiety reduces the mortality rate of patients and the occurrence of various complications, improves the rehabilitation of patients' physical function, and reduces the bedridden and hospitalization time of patients. The curative effect is remarkable and it is worthy of widespread implementation in the clinic [25].

This article is selected January 2018 - 78 patients after ischemic cardiomyopathy in October 2018 in a hospital for treatment intervention for patients grouped according to the order before and after hospitalization, were used as the experimental group (n = 39 patients) And control group (n=39 cases). Patients in the control group after admission with conventional care. The experimental group increased cardiac rehabilitation care based on routine care. Two groups of patients observed cardiac function, cardiac function index found in patients in the experimental group than in the control group of patients, the data was statistically significant (P <0.05). The results showed that ischemic heart disease after interventional treatment of patients with cardiac rehabilitation care, can effectively improve heart and lung function in patients, the results are satisfactory care, should be introduced.

2. Ischemic Cardiomyopathy and Cardiac Care Methods

2.1. Ischemic Cardiomyopathy

(1) Causes of the onset

The underlying cause of the disease is coronary stenosis or occlusive disease caused by coronary motility and/or resistance. The heart is different from other organs in the human body. Its oxygen uptake rate accounts for about 75% of the coronary blood flow in the basal state. When the myocardial oxygen consumption increases, it can only meet the oxygen consumption by increasing the coronary blood flow. The need for myocardial ischemia occurs when various causes of long-term severe stenosis of the coronary lumen cause a significant reduction in local blood flow. The causes of myocardial ischemia are as follows: 1. Coronary atherosclerosis. 2. Thrombosis. 3. Vasculitis. 4. Other factors that can cause chronic myocardial ischemia include coronary microangiopathy (X syndrome) and abnormal coronary structure.

(2) Clinical manifestations

According to the different clinical manifestations of patients, ischemic cardiomyopathy can be divided into two categories, namely, congestive ischemic cardiomyopathy and restricted ischemic cardiomyopathy. The corresponding clinical manifestations are described according to different types of the disease.

First, congestive ischemic cardiomyopathy

1) Angina is one of the common clinical symptoms in patients with ischemic cardiomyopathy. There is a clear history of coronary heart disease, and the vast majority has more than one history of myocardial infarction.
However, angina is not a necessary symptom of patients with myocardial ischemia. Some patients may also present with asymptomatic myocardial ischemia, and there is no manifestation of angina or myocardial infarction. However, in such patients, asymptomatic myocardial ischemia persists and damage to the myocardium persists until congestive heart failure occurs. The symptoms of angina pectoris in patients with angina may gradually worsen with congestive heart failure as the disease progresses. The onset of angina pectoris gradually disappears or even disappears. It is only manifested as chest tightness, fatigue, dizziness or difficulty in breathing.

2) Heart failure is often a manifestation of the development of ischemic cardiomyopathy to a certain stage, early progress is slow, and heart failure progresses rapidly once heart failure occurs. Most patients have heart failure in the onset of chest pain or early myocardial infarction due to myocardial diastolic and systolic dysfunction caused by acute myocardial ischemia. Often manifested as labor dyspnea, severe cases can develop left ventricular dysfunction such as sitting breathing and nocturnal paroxysmal dyspnea, accompanied by fatigue, weakness symptoms. The first heart sound of the heart auscultation is weakened, and the middle and late gallops can be heard. The bottom of the lungs can be smelled and scattered in the wet sound. In the late stage, if there is a combination of right ventricular failure, there are symptoms such as loss of appetite, peripheral edema, and swelling of the right upper quadrant. Physical examination showed that the jugular vein was full or engorged, the heart was enlarged, the liver was enlarged, tenderness, and the positive jugular vein was positive.

3) Arrhythmia Long-term, chronic myocardial ischemia leads to myocardial necrosis, myocardial stun, myocardial hibernation and focal or diffuse fibrosis until scar formation, leading to myocardial electrical activity disorders, including impulse formation, release and conduction. An exception was generated. Various types of arrhythmias can occur in the course of congestive ischemic cardiomyopathy, especially ventricular premature contraction, atrial fibrillation and bundle branch block.

4) Thrombosis and embolization in the heart chamber to form thrombosis and embolism are more common in: 1. the heart chamber is significantly enlarged; 2. Atrial fibrillation without anticoagulant therapy; 3. significantly reduced cardiac output.

Second, restricted ischemic cardiomyopathy

Although most patients with ischemic cardiomyopathy behave like dilated cardiomyopathy, the clinical manifestations of a small number of patients are mainly left ventricular diastolic dysfunction, and myocardial contractile function is normal or only mild abnormal, similar to restrictive cardiomyopathy. Symptoms and signs, it is called restricted ischemic cardiomyopathy or hard heart syndrome. Patients often have exertional dyspnea and/or angina, so activity is limited. He often sees a doctor because of repeated pulmonary edema.

(3) Examination of ischemic cardiomyopathy

1) Congestive ischemic cardiomyopathy: 1. many abnormalities of electrocardiogram can be manifested in various types of arrhythmia, sinus tachycardia, frequent multi-source ventricular premature contraction and atrial fibrillation and left bundle branch block is the most common. At the same time, there are often pathological Q waves of ST-T abnormalities and old myocardial infarction. 2. X-ray examination can show the heart's whole heart enlargement or left ventricular enlargement signs, including pulmonary congestion, pulmonary interstitial edema, alveolar edema and pleural effusion. Coronary and aortic calcifications are sometimes seen. 3. Echocardiography showed a general enlargement of the heart, often with left ventricular enlargement, with increased end-diastolic and end-systolic ventricular lumen diameter, increased end-systolic and end-diastolic volume, decreased left ventricular ejection fraction, and more wall Segmental motion is weakened, disappeared, or stiffened. Sometimes a wall thrombus is seen in the heart chamber. 4. Ventricular radionuclide angiography showed enlarged heart chamber, wall motion disorder and decreased ejection fraction. Myocardial imaging showed a multi-segment myocardial radionuclide perfusion abnormal area. 5. Cardiac catheter examination of left ventricular end-diastolic pressure, left atrial pressure and pulmonary wedge pressure increased, ventricular angiography showed local or diffuse multi-segment multi-regional wall motion abnormalities left ventricular ejection fraction significantly reduced, mitral regurgitation Wait. 6. Patients with coronary angiography often have multiple vascular lesions with more than 70% stenosis.

2) Restricted ischemic cardiomyopathy: 1. X-ray chest radiographs have pulmonary interstitial edema, pulmonary congestion and pleural effusion, and there is no heart cavity expansion. Coronary and aortic calcifications are sometimes seen. 2. ECG can be expressed as a variety of arrhythmia, sinus tachycardia, early atrial, atrial fibrillation, ventricular arrhythmia and conduction block. 3. Echocardiography often shows diastolic-restricted ventricular muscle with a general mild contractile force weakening, no ventricular aneurysm local wall motion disorder. No mitral regurgitation. 4. Cardiac catheter showed a slight increase in left ventricular end-diastolic pressure and a decrease in left ventricular ejection fraction and a slight decrease in left ventricular ejection fraction, even after pulmonary edema subsided. 5. Coronary angiography often has more than 2 diffuse vascular lesions.

(4) Treatment of ischemic cardiomyopathy

Because the main cause of this disease is coronary heart disease, the clinical manifestations are the same as
primary dilated cardiomyopathy. Therefore, its treatment mainly focuses on early diagnosis and early treatment of myocardial ischemia, control coronary heart disease, prevent and treat risk factors of coronary heart disease, actively treat various forms of myocardial ischemia, delay or slow the occurrence and development of congestive heart failure, control heart The function is further deteriorated.

First, reduce or eliminate risk factors for coronary heart disease

Recognized risk factors for coronary heart disease include smoking, elevated blood pressure, diabetes, hypercholesterolemia, overweight, family history of coronary heart disease, and men, with the exception of family history and gender, other risk factors can be treated or prevented.

1) Lowering blood pressure: In general, patients with ischemic cardiomyopathy have normal or reduced blood pressure, and a few patients have elevated blood pressure. Both systolic and diastolic hypertension are extremely unfavorable for patients with myocardial ischemia and cardiac insufficiency. Controlling diastolic or systolic blood pressure and reducing left ventricular ejection resistance can prevent the deterioration of heart failure and prevent progressive damage of left ventricular function. If you are actively treating patients with elevated blood pressure, lowering blood pressure, the incidence of heart failure and total mortality will decrease.

2) Lowering serum cholesterol: Foreign clinical studies have shown that the decline in risk factors for coronary heart disease is directly related to the magnitude and duration of the decrease in serum cholesterol levels. For patients with elevated serum total cholesterol and/or low-density lipoprotein (LDL), it should be controlled by a reasonable diet, and if necessary, combined with lipid-lowering drugs. Eat foods rich in protein and cholesterol, such as lean meat, fish (except fish), shrimp, beans and soy products, vegetables and fruits; eat foods high in saturated fatty acids and cholesterol, such as animal offal, fish unpeeled chicken and fatty meat. Lipid-lowering medications may be considered for those who are ineffective in diet and lifestyle improvement. Commonly used lipid-lowering drugs: 1. Drugs that mainly reduce LDL production or increase LDL clearance include lovastatin, niacin, and cholestyramine; 2. Drugs that mainly reduce VLDL synthesis, such as clofibrate; 3. Mainly Reduce drugs that modify LDL, such as probucol (probucol); 4. Drugs that mainly reduce triacylglycerol: natural fish oil concentrate pills, gemfibrozil and so on.

3) Treatment of diabetes: It is necessary to actively treat diabetes and control blood sugar levels within a reasonable range.

4) Control or weight loss: There is a positive correlation between obesity and overweight and plasma total cholesterol, triglyceride, LDL, VLDL, plasma insulin, glucose levels and blood pressure; negatively correlated with HDL levels. This can be achieved by reducing calorie intake and increasing exercise. Therefore, people who are overweight and obese should reduce their caloric intake, but it is not advisable to achieve rapid weight loss through extremely low calorie intake or complete hunger. Moderate physical activity can reduce weight, lower blood pressure, lower serum triacylglycerol, and increase HDL.

5) Smoking cessation: Most foreign studies support smoking as an independent risk factor for coronary heart disease, such as co-existing with other risk factors. Nicotine and carbon monoxide in tobacco smoke can affect the blood coagulation mechanism in the body, promote myocardial hypoxia and induce coronary spasm, promote platelet adhesion and fibrinogen levels, and accelerate the development of coronary atherosclerosis. Therefore, it is very important for patients with coronary heart disease to quit smoking.

Second, improve myocardial ischemia

For patients with angina pectoris or electrocardiogram with ischemic changes without significant reduction in blood pressure, vasodilators may be considered to improve myocardial ischemia.

1) Nitroglycerin: Oral nitroglycerin has a significant "first pass effect" and the bioavailability is extremely low, so the oral nitroglycerin preparation is very ineffective. Sublingual administration can be quickly absorbed by the oral mucosa, and it takes effect in 1 to 3 minutes, and the blood concentration can reach a peak in 4 to 5 minutes. Each time the sublingual dose is 0.3-0.6 mg, the effective action time can be maintained for 10 to 30 minutes. The intravenous dose of nitroglycerin can be maintained at 10 ~ 30g / min, when the dose is greater than 40g / min, not only dilate the venous system, but also play a role in arterial resistance vessels. Prevention of angina pectoris can also be applied with a sustained release agent or a dermal patch.

2) Isosorbide dinitrate (isosorbide dinitrate): a fast-acting long-acting nitric acid preparation. There are tablets, aerosols, sustained release agents, ointments, intravenous injections. Tablets containing 5 ~ 10mg each time under the tongue or chewed in the mouth, blood concentration of 6min peak, effective duration of about 10 ~ 60min, oral or effective, usually dose of 10 ~ 30mg, every 4 ~6hours 1 time. Intravenous infusion, 2~7mg / h, about 30min plasma drug concentration can be stable. The drug also has a sustained release preparation to reduce the number of medications. In addition, the isosorbide dinitrate oral spray, which is sprayed on the buccal mucus of the oral cavity, can be quickly absorbed, and the liquid sprayed every two times is equivalent to the effect of 0.3 mg of nitroglycerin or 5 mg of isosorbide dinitrate.

2.2. Heart Care Methods

The American Health Service Center proposes that cardiac rehabilitation care refers to a comprehensive

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and long-term care plan. The main procedures include medical assessment, sports, education counseling, and risk factor control. At present, clinical definition of cardiac rehabilitation is that after the patient is admitted to the hospital, the medical staff actively evaluates the status of the disease, analyzes various cardiovascular risk factors, conducts targeted health education, actively corrects the patient's bad life behavior, and improves their mental health. Reduce cardiovascular morbidity. Evaluate cardiac function grading for patients, develop targeted rehabilitation programs, conduct secondary prevention, correct disease risk factors, and reduce patient recurrence and mortality. Supervise patients to actively use drugs, effectively control the onset of symptoms, and lead patients to exercise properly, improve physical strength, and delay the progress of the disease.

(1) Sports rehabilitation care

Studies have shown that exercise is the core of cardiac rehabilitation procedures. In recent years, the safety and usefulness of exercise rehabilitation have been confirmed by a large number of studies. The American Cardiopulmonary Rehabilitation Association recommends that the different stages of cardiac rehabilitation of coronary heart disease be divided into three phases, namely, stage I rehabilitation (mainly limb strength training and breathing exercise), and phase II rehabilitation (mainly aerobic endurance training, resistance resistance). Training, flexibility training and balance training), stage III rehabilitation (mainly home rehabilitation, and follow-up patient exercise rehabilitation). The composition of exercise prescription includes: the form of exercise, exercise intensity, duration, frequency of exercise, health education, etc. In the development of exercise prescriptions, comprehensive patient medical history, physical examination and laboratory tests are needed for evaluation and risk stratification. Exercise load test is indispensable. On the one hand, it can be observed whether the patient has any discomfort during exercise, such as myocardial deficiency. The blood and blood pressure are unstable, on the other hand, the patient's actual exercise ability is observed, the evaluation work is done, and the manner and exercise intensity matching the patient are specified in the subsequent exercise treatment for the best results.

(2) Nutrition intervention

Nutritional problems are common in patients with coronary heart disease, and high-risk factors include nutritional deficiencies, metabolic syndrome, and obesity. The purpose of the nutritional intervention is to help the patients to choose a diet scientifically and rationally. It is necessary to evaluate the patient and formulate a personalized nutritional prescription. In the prevention and control of chronic diseases, nutrition and health education is a more scientific and efficient measure. The introduction of dietary diversity scores will help to objectively manage nutritional prescriptions for patients with cardiac rehabilitation.

(3) Psychological rehabilitation

There is evidence that patients with cardiovascular disease are prone to mental problems such as anxiety and depression, and this mental problem can also increase the severity of cardiovascular disease. Important factors affecting the rehabilitation of coronary heart disease include long-term lack of psychological support [26]. The sooner the psychological intervention, the better, and the more beneficial to rehabilitation. Psychological intervention is crucial in cardiac rehabilitation. With the advent of "double heart medicine", some researchers have launched the concept of "double heart care" on this basis. The “Double Heart Care Model [25]" is a modern care model that strengthens psychological care in patients' attention to holistic care. Therefore, while treating the patient's disease, the patient is psychologically comforted, and the psychological state of the patient is positively affected through various ways and means to achieve a state of "physical and mental" coordination. Regular follow-up and timely adjustment of treatment plan, so that patients can successfully cross different psychological crisis, thus promoting the early recovery of the disease.

3. Experiments

3.1. Experimental Object

In this paper, 78 patients were treated with ischemic cardiomyopathy treated in the hospital from January 2018 to October 2018. The patients were divided according to the order of admission and were set as study group (n=39 cases). The reference group (n=39 cases), the experimental object information is shown in Table 1. The reference group received routine nursing after admission; the study group increased cardiac rehabilitation care based on routine care. The experimental procedure is shown in Figure 1.

| Table 1. Patient condition measurement value statistics table |
|------------------------|-----------------|------------------|-----------------------|-----------------------|
| Test group             | Control group   |                  |                       |                       |
| Age                    | 58.62±5.77      | 57.91±6.34       | 0.53±0.03             |
| Height(cm)             | 161.3±7.21      | 163.1±7.76       | 0.52±0.03             |
| Body weight(kg)        | 70.16±8.19      | 69.32±8.30       | 0.54±0.03             |
| Left inner diameter(cm)| 5.24±0.19       | 5.41±0.16        | -1.658                |
| Heart-thorax ratio     |                 |                  |                       |                       |
| t                      | 2.093           | -0.413           | >0.05                 |
| p                      | <0.05           | >0.05            | >0.05                 |

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1. Those who meet the conditions of this experiment are used as research samples
2. Sign the experimental informed consent form

Test group

Assessment using the exercise cardiopulmonary test

Conventional treatment + cardiac rehabilitation

Observation value before and after treatment analysis

Control group

Assessment using the exercise cardiopulmonary test

Conventional treatment

Observation value before and after treatment analysis

Two-sample t test was used to evaluate the clinical efficacy between the two groups.

Figure 1. Experimental flow chart

3.2. Experimental Instruments

Germany CosmosPulsar4.0 activity running platform, American Mortara 12 lead dynamic electrocardiograph, Germany Cortex Biophysik Metamax II gas analyzer, American Tango electronic blood pressure monitor, Finland RS800CXPolar watch and chest strap, domestic RGT-140 cursor weight human scale (accuracy 0.1Kg), domestic TG-1 height meter (accuracy is 0.1cm), domestic sunshine brand ECG electrode sheet.

3.3. Patient Assessment

The patient's condition was assessed by collecting medical history, improving chest X-ray, cardioplegia, and exercise cardiopulmonary test. Including the following aspects 1. Psychological assessment: the purpose is to understand the psychological problems of patients such as fear, anxiety, great joy, anger, depression, and other psychological states are not conducive to the recovery of heart disease. If there is a mild psychological problem to give psychological counseling, there is a suggestion for serious psychological problems. 2. Assessment of living conditions: By understanding their daily lifestyles, finding problems that are unhealthy and not conducive to disease rehabilitation, guide and correct them. 3. Evaluation of patient weight, abdominal circumference, blood pressure, blood sugar, blood lipid levels: the predisposition factors of patients and the difference with the target value were found in order to give correct and effective intervention. 4. Assessment of the condition: through the assessment of the patient's condition, to understand the patient's dangerous situation, to guide the medication and determine the amount and degree of rehabilitation training. 5. Assessment of cardiopulmonary function: The cardiopulmonary exercise instrument is used to detect the rate of exercise center, blood pressure, electrocardiogram and respiratory index, and determine the amount of exercise metabolism that the patient's heart and lung function can tolerate. Based on this, the exercise should be based on appropriate exercise program. In addition, an objective evaluation of the effects of cardiac rehabilitation can be made.

4. Discussion

4.1. Comparison of Cardiopulmonary Related Indicators

As seen in Table 2 and Figures 2, 3 and 4, there were no significant differences in AT, VO2max, O2 pules, FVC, FEV1, and MVV between the control group and the experimental group before the cardiac rehabilitation experiment (P>0.05). After the rehabilitation experiment, the AT, VO2max, O2 pules, and MVV indexes of the experimental group were higher than those of the control group, and the difference was statistically significant (P<0.05). The control group had AT, VO2max, O2 pules, FVC, FEV1 before and after cardiac rehabilitation experiments. There was no significant change in MVV (P>0.05). The scores of AT, VO2max, O2 pules and MVV in the experimental group were higher than those before cardiac rehabilitation. The difference was
statistically significant (P<0.05). There was no significant change before and after the rehabilitation experiment (P>0.05).

Table 2. Comparison of AT and VO2max between the two groups before and after the experiment

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>AT (ml·min⁻¹·kg⁻¹)</th>
<th>VO2max (ml·min⁻¹·kg⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre intervention</td>
<td>Interventio n</td>
<td>T(Pair)</td>
</tr>
<tr>
<td>Control group</td>
<td>39</td>
<td>9.09±1.01</td>
<td>9.20±1.22</td>
</tr>
<tr>
<td>Experience group</td>
<td>39</td>
<td>9.39±1.37</td>
<td>11.40±1.58</td>
</tr>
<tr>
<td>t</td>
<td></td>
<td>1.40</td>
<td>7.01</td>
</tr>
<tr>
<td>p</td>
<td></td>
<td>0.17</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Figure 2. Comparison of AT and VO2max between the two groups before and after the experiment

Figure 3. Comparison of O2pules and MVV between the two groups before and after the experiment
In this paper, after the cardiac rehabilitation experiment, the observation values of AT, VO2max, O2pulse, etc. in the experimental group were significantly higher than those before treatment, suggesting that the cardiac function was improved. However, the FVC, FEV1 and MVV responses to respiratory function in this paper only showed an increase in MVV values after cardiac rehabilitation, while other indicators showed no significant changes.

4.2. Comparison of Plasma NT-ProBNP Levels

As shown in Table 3 and Figure 5, before the cardiac rehabilitation experiment, the difference of NT-proBNP levels between the two groups was not statistically significant (P> 0.05). After the cardiac rehabilitation experiment, the NT-proBNP level of the experimental group was higher than that of the control group. The difference was statistically significant (P < 0.05). However, there was no significant change in the level of NT-proBNP in the control group before and after the test. The difference was not statistically significant (P>0.05). The NT-proBNP was observed after intervention in the experimental group. The level was lower than that before the intervention, and the difference was statistically significant (P<0.05).

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>Pre intervention</th>
<th>Intervention</th>
<th>T(Pair)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>39</td>
<td>430.56±71.21</td>
<td>424±72.08</td>
<td>1.38</td>
<td>0.18</td>
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<tr>
<td>Experience group</td>
<td>39</td>
<td>420±67.12</td>
<td>266±41.36</td>
<td>13.91</td>
<td>0.00</td>
</tr>
<tr>
<td>t</td>
<td></td>
<td>0.78</td>
<td>13.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P</td>
<td></td>
<td>0.451</td>
<td>0.00</td>
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</tr>
</tbody>
</table>

Figure 4. Comparison of FVC and FEV1 between the two groups before and after the experiment

Figure 5. Comparison of NT-ProBNP between the two groups of patients
It is widely believed that plasma NT-proBNP levels are sensitive serological indicators of cardiac function and can determine the severity of CHF patients. In this study, it was found that after 10 months of exercise rehabilitation, the level of NT-proBNP in the plasma of patients was significantly improved; the level of plasma NT-proBNP was closely related to cardiac function, and the heart function was poor when the concentration was increased, and vice versa with plasma NT-proBNP. The reduced heart function is improved by the concentration.

5. Conclusions

(1) This article briefly introduces the pathogenesis of ischemic cardiomyopathy and analyzes two different clinical manifestations of ischemic cardiomyopathy, namely, congestive ischemic cardiomyopathy and restricted ischemic cardiomyopathy. The two clinical manifestations and methods of treatment. This article also introduces three common cardiac rehabilitation methods: sports care, nutritional care and psychological rehabilitation.

(2) The cardiac function index of the experimental group in this study was significantly superior to the control group, and the data were statistically significant (P<0.05). The results show that patients with cardiac rehabilitation after interventional treatment of ischemic cardiomyopathy can effectively improve the cardiopulmonary function of patients, and the nursing effect is ideal and worthy of promotion.

(3) This study shows that cardiac rehabilitation can significantly improve exercise cardiopulmonary function in patients with ischemic cardiomyopathy, significantly increase the patient's maximum metabolic equivalent, maximum oxygen pulse and maximum oxygen uptake. Effectively improve exercise cardiopulmonary function, can promote the rehabilitation of patients, improve the patient's life treatment, cardiac rehabilitation treatment has a significant effect in the clinical treatment of ischemic cardiomyopathy.

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