

Exercise in Patients with Non-cardiac Myocardial Injury under Optical Microscope

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Abstract. In recent years, the incidence of cardiovascular disease has been increasing year by year, has gradually developed into a global health problem, in the world wide concern. Non - cardiac injury is one of the most common cardiovascular diseases. The rehabilitation of patients with non-cardiac myocardial injury is related to their life and quality of life. Rehabilitation exercise is helpful to improve the therapeutic effect of patients. The purpose of this paper is to explore the specific effects of rehabilitation exercise on non-cardiac myocardial injury and to promote the full play of the role of rehabilitation exercise in the treatment of non-cardiac myocardial injury. First to illustrate the application of optical microscope, and then from the specific reflection of non cardiac myocardial damage and formation mechanism are introduced, based on the cases were retrospectively analyzed experiment, to explore the rehabilitation exercise in the cardiac effects of myocardial injury treatment, and on the basis of this puts forward the corresponding scientific rehabilitation exercise plan. Experimental results show that compared with the rehabilitation exercise intervention before and after rehabilitation exercise intervention, non cardiac myocardial injury in the therapeutic effect of 17% or so, in the treatment of speed increased by about 21%, in the recurrence rate was reduced by 17% or so, so sports in promoting the cardiac myocardial injury treatment has good effect.

1 Introduction

The incidence of cardiovascular disease is increasing year by year. As one of the common cardiovascular diseases, non-cardiac myocardial injury poses a serious threat to human life. Over the years, the medical community has been paying more attention to this type of disease as it continues to develop and poses a growing threat to humans. Many experts believe that rehabilitation exercise training after treatment has a good promoting effect on the recovery of patients of this type. Based on this, it is particularly important to explore the specific impact of rehabilitation exercise on patients with non-cardiac myocardial injury and to formulate a reasonable and scientific rehabilitation exercise program.

Based on the important impact of non-cardiogenic myocardial injury diseases on human health, many scholars at home and abroad have conducted relevant studies on it and made a series of research results^[1]. In literature^[2], based on the results of clinical trials, the author made an in-depth analysis of the clinical risk factors affecting patients with non-cardiac myocardial injury, and by means of case retrospective analysis, explored the specific effects of Cardiac troponin on patients' recovery. In the literature^[3], the author from the perspective of children, to explore the early diagnosis of the cardiac myocardial injury in the treatment of the important role, and the mechanism of this kind of disease

is illustrated, emphasis from myocardial enzymes, biochemical index and fatty acid binding protein detection, has proved to specific aspects of early diagnosis; In literature^[4], the author summarized the specific clinical manifestations and characteristics of patients with severe myocardial injury through the detection of severe patients. And from the perspective of drug treatment, put forward specific coping strategies; In literature^[5], based on clinical trials and tests, the author analyzed the dysfunction and specific mechanisms of non-cardiac myocardial injury, and proposed specific treatment plans from the perspectives of drug therapy, surgical treatment and rehabilitation.

In order to explore the concrete impact of rehabilitation exercise on non-cardiac myocardial injury, a scientific and reasonable rehabilitation exercise program was developed to promote the continuous improvement of its overall therapeutic effect^[6]. The author first illustrated the application of optical microscope, and then from the specific reflection of non cardiac myocardial damage and formation mechanism are introduced, based on the cases were retrospectively analyzed experiment, to explore the rehabilitation exercise in the cardiac effects of myocardial injury treatment, and on the basis of this puts forward the corresponding scientific rehabilitation exercise plan^[7]. The research in this paper not only promotes the further improvement of the treatment level of non-cardiac myocardial injury, but also lays a certain theoretical foundation for the subsequent studies in related aspects^[8].

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2 Overview of Expertise and Research Methods

2.1 Optical Microscope

On the basis of optical principle, the extremely small objects that cannot be distinguished by the naked eye are amplified and imitated, so as to realize the effective extraction of the information of fine structure. This optical instrument is called optical microscope^[9]. The development of optical microscope has a long history. With the continuous improvement of microscope technology, its application fields are also expanding, and it has applications in geology, biology, medicine, chemistry and other fields^[10]. The system of optical microscope mainly includes four parts, which are objective lens, eyepiece mirror and condenser lens. The objective lens aims to enlarge the object, and the eyepiece can further distinguish the object that has been enlarged by the objective lens and clearly enlarge it^[11]. The classification of the electron microscope varies according to its classification and the field of application. In order to ensure that the microscope can give full play to its functions, the operation of the microscope must be carried out according to strict procedures^[12]. At present, optical microscope has been widely used in medical field, and observation of non-cardiac myocardial injury also needs to be carried out by optical microscope.

2.2 Non-cardiogenic Myocardial Injury

The most important dynamic organ in the human circulatory system is the heart, which plays a key role in the normal maintenance of life activities. Under the influence of various factors, some of the original normal myocardial function will be damaged by various eye diseases such as circulation disorder, hypoxia and internal environment disorder, thus causing the dysfunction of the systolic and diastolic functions of the heart to a certain extent, which is also known as non-cardiac myocardial injury. Non-cardiac myocardial injury refers to the decrease in the overall ability of myocardial contraction, and the failure of cardiac blood supply to satisfy the normal metabolic activities of the body to increase the overall load of the heart, resulting in the appearance of corresponding myocardial injury, which we call myocardial injury. In the following, the author will introduce the non-cardiac myocardial injury from the perspectives of specific reaction and mechanism.

2.2.1 Specific reaction performance

Myocardial injury produced by the direct consequence is heart liquid discharge decrease, making the tissues and organs in a state of low irrigation, resulting in difficulty in breathing, a cough, and edema, clinical symptoms and the main performance characteristics, such as lung auscultation ways to hear the body's internal will produce different degrees of wet then, the results of cardiac auscultation is brief and subdued.

2.2.2 Occurrence mechanism

The main mechanisms of non-cardiogenic myocardial injury are as follows: the decrease of myocardial systolic function, the decrease of cardiac ejection fraction, and the aggravation of myocardial injury with time. When the myocardial injury develops to a certain extent, there will be various types of inflammatory response, a large number of release of humoral factors and energy metabolism disorders. Most importantly, if no appropriate treatment is taken at the initial stage of non-cardiogenic myocardial injury, severe cardiac pump dysfunction can occur. The specific mechanism of myocardial injury includes inflammation, neuroendocrine and humoral factor secretion. First, noncardiogenic myocardial injury caused by inflammation. Makes systemic inflammation in infective factors, when produce inflammation, the body will release a great deal of kill inflammation cells of material, this material can to a certain extent, help to increase the overall permeability of the blood vessels, causing the expansion of blood vessels, making myocardial cell appears edema near phenomenon, cause myocardial cell injury. Second, noncardiogenic myocardial injury caused by neuroendocrine response. Due to the influence of various other factors, there may be a strong neuroendocrine reaction inside the body, which will increase the load of the heart to a certain extent and reduce the overall working efficiency of the myocardium. The increase of cardiac load will increase the energy consumption of the myocardium to a certain extent, resulting in myocardial ischemia and other conditions, which eventually lead to the phenomenon of myocardial cell damage. Thirdly, myocardial injury caused by the massive release of humoral factors. Specific humoral factors, including sinatra endothelin, are released in large quantities, which will make the whole humoral environment in a state of disorder.

2.3 Exercise Therapy

With the help of devices and the strength of patients themselves, through a specific or comprehensive exercise mode, to promote the effective recovery of patients' local or overall motor function, we call this training mode exercise therapy. The specific treatment of patients with sports therapy is completed with the help of "exercise", a physical factor with mechanical properties. The key sports training sites include the trunk and limbs, and the main training contents include joint function, muscle strength, aerobic, balance, translocation and non-walking training. At the present stage, sports therapy is becoming more and more prominent in rehabilitation treatment, which is a key physical therapy. In the medical field, kinesiotherapy is applicable to the treatment of various diseases, including internal and surgical diseases and neurological diseases, among which the internal medical diseases are mainly cardiac diseases. With the help of kinesiotherapy, the overall function of the body's heart can be effectively improved, so as to achieve the effective treatment of cardiac diseases. However, since the exercise therapy should be operated according to the actual situation of the patients, if the exercise therapy is not used properly, it will

also have certain side effects, and in serious cases, it will pose a serious threat to the safety of the patients' lives. Based on this, the use of exercise therapy should not only be made in strict accordance with the patient's condition, but also patients should be guided by a special person to strictly control the frequency and frequency of exercise therapy. The common methods of exercise therapy include medical gymnastics, aerobic training, etc. At the present stage, with the continuous update of the treatment concept and method, the application of sports therapy in the medical field is also gradually extensive, and the scientific nature of this treatment method has been proved by many existing research data and clinical practice.

3 Rehabilitation Exercise Experiment

Above, the author has the concept of non cardiac myocardial damage are introduced, in previous studies, scholars generally agree that the cardiac myocardial injury after treatment must keep quiet state of rest in bed, but with the enrichment of clinical practice experience and more show of treatment theory, the existing many studies proved that rehabilitation exercise in promoting the important role of cardiac myocardial damage. According to the existing research data, rehabilitation exercise can promote the improvement of the overall exercise tolerance of patients with myocardial injury to a great extent, and realize the effective recovery of various cardiac functions of patients. In order to explore the specific effects of rehabilitation exercise on the treatment and recovery of non-cardiac myocardial injury, and to provide specific guiding experience for the actual treatment and recovery, the author conducted rehabilitation exercise experiments. The specific experimental steps are as follows:

3.1 Acquisition of original materials

In order to ensure the accuracy and scientificity of the experimental results in this paper, and to provide sufficient experimental data for the experiment in this paper, the author first logged on the relevant paper information websites such as wanfang and CNKI, and collected the research data in this aspect. The author collected a total of 36 research literatures on non-cardiac myocardial injury, and systematically sorted out the research data and conclusions in these 36 research literatures. In addition, the author also USES the online questionnaire and data analysis way, for the present stage our country non - cardiac the onset of myocardial injury and treatment conditions carried on the thorough investigation, the investigation of the object including non cardiac myocardial injury patients, doctors and health department related personnel, this experiment a total of 300 questionnaires, 287 valid questionnaires taken back. The above two kinds of data together constitute the original data of the experiment in this paper, which provides sufficient data support for the rehabilitation exercise experiment in this paper.

3.2 Experimental subjects

In this paper, drew a finger 3 armour hospital in 2019, the year of 76 in patients without cardiac attack injury cases in detail, and the distribution way of 76 patients according to randomly divided into two groups, observation group and control group, each group of 38 people, including 24 male patients in observation group, 14 patients with female, age of the patients between 61-80 years, the average age of the patients was 68.72 years. According to the cardiac function division, the group includes 22 grade II, 12 patients with III level and four IV level; The control group included 23 male patients and 15 female patients. The average age of the patients was between 61 and 80 years old, and the average age of the patients was 68.82 years old. This group of patients with cardiac function classification is as follows: 21 II level, 13 III level and four IV level. Through the statistical analysis of the basic data of age, gender and cardiac function of the patients in the observation group and the control group, the statistical results show that there is no statistical difference in the basic data of the patients in the two groups, which can be used in comparative analysis of the experiment.

3.3 Experimental methods

Patients in the control group only received routine nursing after treatment, explained the relevant knowledge of patients with non-cardiac myocarditis, and closely observed the specific vital signs of patients, guided the scientific diet and rest of patients of this type, and urged patients to carry out acute scientific and reasonable training. In the observation group patients rehabilitation exercise training of scientific planning, rehabilitation exercise rehabilitation intervention, specific rehabilitation exercise program is as follows: first, to patients with specific body status thoroughly, a comprehensive evaluation of and for the patients with non cardiac myocardial injury nursing knowledge of the specific stones, to fully understand the types of disease patients, well prepared, and the relative motion nursing enthusiasm to cooperate. Patients hospitalized within 1 to 5 days later, first of all to guide patients to a smaller rehabilitation exercise, such as flex movement, such as roll over waybill, then after the patient's condition gradually stabilized on its specific range of increase gradually, make the patients bed can be gradually, to guide the patient sits in a chair, and the body as far as possible will be close to the back of a chair, continue this action about 10 minutes, there is need to emphasize that for patients with specific treatment of ambulation need to be determined in accordance with the actual condition of patients with. If the patient's physical condition recovers well, the patient can be arranged with an appropriate amount of high intensity rehabilitation exercise, such as walking up and down stairs. II level in patients with cardiac function, the degree of myocardial injury is lower, the patient can be in interior space for some relatively simple walking training, walk training of about 500 m, the distance control for 1 to 2 times daily walking training; III level in patients with cardiac function, the higher the degree of myocardial injury, can carry on some simple movement on the

patients know, including the bedside stand and walk activities, as long as appear abnormal phenomenon, immediately to suspension of rehabilitation exercise, allowing patients to get a more adequate rest; IV levels of patients with cardiac dysfunction, myocardial injury of the highest grade, thus to ensure patients based on the adequate rest in concreteness intervention for patients in rehabilitation exercise, in patients with early stage can guide to some of the more simple joint training, wait until after the patient completely stable in helping patients in the bed of the related sports training. Moreover, in order to ensure the scientific nature of patients' rehabilitation exercise training, it is also necessary to provide patients and their families with scientific training in rehabilitation exercise, so that family members can provide substantive and scientific assistance for patients' rehabilitation exercise.

3.4 Experimental indicators

After the rehabilitation exercise of the two groups of patients was completed, the left ventricular ejection fraction, myocardial mass index and 6 min walking distance of the observation group and the control group were statistically analyzed, and the comprehensive treatment methods of the experimental group were comprehensively analyzed from the comprehensive aspects.

3.5 Statistical analysis of experimental data

During the experiment, data of rehabilitation exercise were recorded at all times. After the end of the experiment, SPSS statistical analysis software was used to conduct in-depth analysis of the relevant experimental data, and computer graphics software was used to form data charts. On the basis of in-depth analysis of the data charts, relevant experimental conclusions were drawn.

4 Research Results and Discussion

4.1 Experimental Results

Through the case retrospective analysis and rehabilitation exercise training above, the author obtained the following experimental data. The specific experimental data are shown in the chart below. The data in the chart are the results of the author's experimental arrangement.

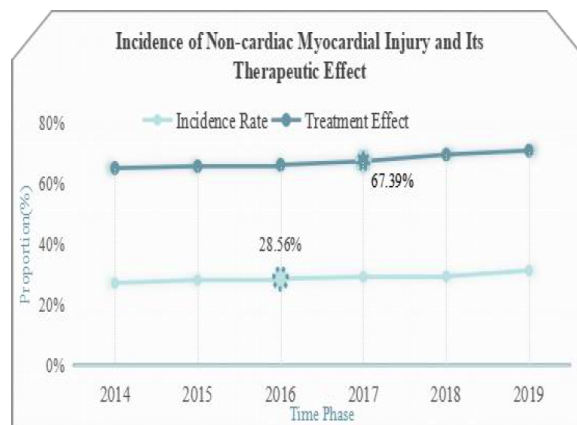


Figure 1. Incidence rate and therapeutic effect of non-cardiac myocardial injury

Figure 1 shows the overall trend of the incidence of non-cardiac myocardial injury and the treatment effect in China in recent years. It can be seen from the data in the figure that the incidence of non-cardiac myocardial injury in China has been increasing from 2014 to 2019, and the incidence rate remains at about 28.56%. Since 2014 to 2019, the therapeutic effect of non-cardiac myocardial injury in China also tends to rise, but the overall therapeutic effect remains at about 67.39%, which has not yet reached the ideal training effect. This is largely due to the lack of treatment methods, so promoting the update of treatment methods is an urgent problem in the current treatment of this disease.

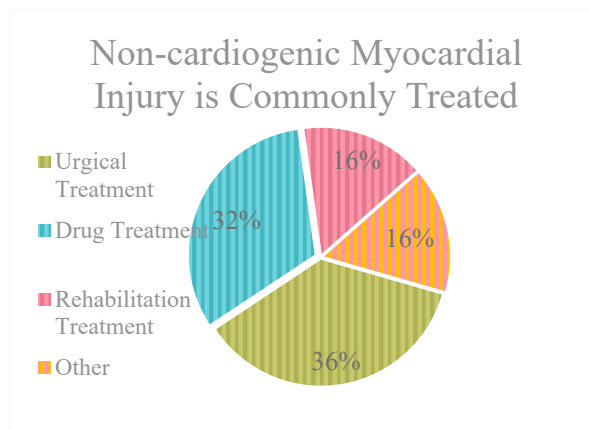


Figure 2. Common treatment of non-cardiac myocardial injury

Figure 2 is a common cardiac myocardial injury treatment, from the data can be seen in the figure, at present the treatment of cardiac myocarditis ways mainly have the surgical treatment, drug therapy, rehabilitation therapy and other treatments, accounted for 36%, 32%, 16% and 16% respectively, the treatment of myocardial damage is given priority to with drug therapy and surgery, the proportion of smaller rehabilitative training treatment, the single way of traditional treatment is the overall treatment effect this type of disease was an important reason for low.

Table 1. Comparison of data before and after exercise training intervention

Period of time	Group	Left ventricular ejection	6min walking distance	Myocardial weight
Before the intervention	Observation group	42.13%	191.08%	93.42%
	Control group	42.16%	191.92%	93.46%
After the intervention	Observation group	58.71%	135.58%	248.86%
	Control group	48.42%	170.14%	155.68%

*Data were derived from the results of the experimental analysis

Table 1 shows the changes in the therapeutic indicators of non-cardiac myocardial injury before and after rehabilitation exercise intervention. From the data in the table, we can see that the myocardial weight, left ventricular ejection fraction and 6-minute walking data of the observation group before intervention treatment were all lower than those of the control group. After rehabilitation exercise intervention, myocardial weight, left ventricular ejection fraction, and 6-minute walking were all higher in the observation group than in the control group. This suggests that rehabilitation exercise has a significant effect on promoting the improvement of various functional indicators in patients with myocardial injury.

4.2 Effects of Exercise on Patients with Non-cardiac Myocardial Injury

In clinical practice, the incidence of non-cardiac myocardial injury is increasing, and dyspnea, fatigue and cardiac dysfunction are the specific manifestations of this disease. In the specific treatment of this kind of diseases, in order to effectively alleviate the symptoms and guarantee the quality of life of patients, it is necessary to reconstruct the cardiac working mechanism, promote the continuous improvement of cardiac function, minimize the risk of its onset, so as to maximize the safety of patients' lives. Appropriate to the existing research data show that myocardial injury in patients with rehabilitation exercise, can effectively adjust the renin-angiotensin-aldosterone system, and effectively activate the specific activity of the sympathetic nervous system, inhibit the body's internal the expression of inflammatory cytokines, in a larger extent, promote the aerobic capacity of the myocardial and skeletal muscle of the overall recovery, also can to a certain extent, improve vascular endothelial function, reduce its near vascular resistance; Moreover, the overall cardiac function and exercise endurance of the patients were greatly improved, which played an important role in promoting the improvement of patients' quality of life and greatly reduced the recurrence rate of myocardial injury diseases.

In this paper, 76 cases of patients with non-cardiac myocardial injury were analyzed retrospectively to explore the specific effects of rehabilitation exercise on non-cardiac myocardial injury. The experimental results show that after exercise care after treatment, patients in the control group of the left ventricular ejection fraction were significantly lower than group refers to score, the cardiac mass index was significantly higher than in observation group, patients with 6 min short many specific rehabilitation exercise than group, the experimental results show that for patients without cardiac myocardial injury of rehabilitation nursing of breeding, not only can promote the effectively improve overall heart function in patients with type. In the process of rehabilitation exercise in patients with nursing, related to nursing staff in the first place for patients and their families for this kind of disease related knowledge and nursing knowledge in detail, to make patients and their families on the specific cognition of the disease has been deeply, make patients to disease treatment adherence to get better promotion, and in the process of exercise care, according to specific illness condition and cardiac function in patients with grade for targeted rehabilitation exercise, make the patient's rehabilitation exercise is still slow transition between passive to active, making the cardiac myocardial injury rehabilitation effect are the effective guarantee.

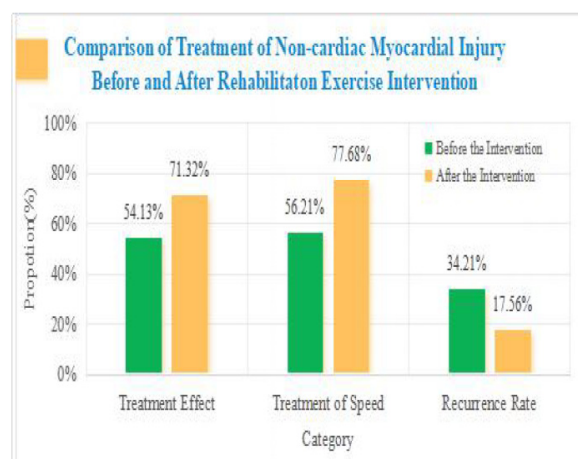


Figure 3. Comparison of treatment of non-cardiac myocardial injury before and after rehabilitation exercise intervention

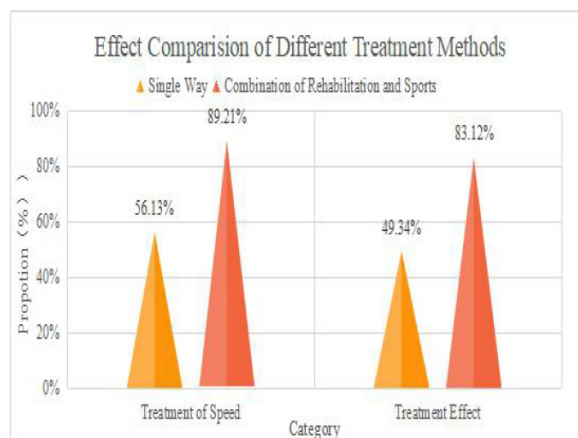


Figure 4. Effect comparison of different treatment methods

Figure 3 for rehabilitation exercise intervention of cardiac myocardial damage before and after treatment, the data of data to be able to see from the picture, than it was before the rehabilitation exercise intervention, rehabilitation exercise intervention, non cardiac myocardial injury in the therapeutic effect of 17% or so, in the treatment of speed increased about 21%, in the recurrence rate was reduced by 17% or so, so sports in promoting the cardiac myocardial injury treatment has good effect. Figure 4 shows the comparison of the effects of different treatment methods. It can be seen from the data in the figure that, compared with the single treatment method, the treatment effect and the overall treatment speed of the treatment method combined with rehabilitation exercise are much better than that of the single treatment method, with the treatment effect improved by about 33% and the treatment speed improved by about 34%.

Acute rehabilitation exercise training can not only effectively improve the overall activity endurance of patients and promote the effective improvement of the quality of life, but also has high clinical practice value. However, it must be emphasized that the available data indicate that if patients are given intensive rehabilitation exercise without any scientific guidance and supervision, the duration of such intensive rehabilitation exercise training is relatively long, resulting in cardiac hypertrophy and cardiac enlargement. Therefore, when carrying out rehabilitation exercise, it is necessary to pay attention to the prevention of sports risks in the process. Medical staff should closely observe the patients' various examinations, including electrocardiogram, heart rate and blood pressure at any time, and make scientific risk assessment according to the actual situation of patients. It is not only necessary to guide the rehabilitation exercise, but also to have an in-depth understanding of the various signals of the patient's body. Once the abnormal situation of the body occurs, the rehabilitation exercise of the patient must be terminated. In summary, rehabilitation and sports treatment for patients with non-cardiac myocardial injury is conducive to improving the patient's physical endurance, promoting the overall cardiac function and promoting the overall improvement of life treatment, which is suitable for the widespread promotion in the clinical treatment of this type of disease.

4.3 Exercise Program Formulation

4.3.1 Intensity of exercise

The intensity of rehabilitation exercise must be controlled within a reasonable range. Exercise intensity is too small, improve the role of the overall function of the heart can not be achieved. Current studies show that the maximum heart rate is controlled between 60 and 80 percent, and natural walking is generally considered to be the most effective way to increase the cardiometabolic rate. On the basis of professional cardiopulmonary examination equipment, it is best to measure the maximum heart rate suitable for patients by the way of ending the exercise experiment. In the course of actual operation training, the

specific level of conscious fatigue should be made clear, and the standard rate should not be pursued simply according to the table checked. Moreover, the specific intensity of exercise should be adjusted according to the dosage of the medicine according to the specific situation of the patient's medication.

4.3.2 Exercise time

The research shows that the length of exercise time is not in a direct proportion to the effect of exercise. When the oxygen consumption of human movement reaches 75%, the exercise time between 20 and 30 minutes can achieve the best effect of exercise. This means that as long as the individual patient's heart rate is maintained in a reasonable range, the rehabilitation exercise can achieve a relatively ideal effect. For example, when the individual heart rate is maintained at about 60%, the effect of exercise time between 45 minutes and 60 minutes is the best. Generally speaking, this kind of low-intensity exercise is suitable for elderly patients with myocardial injury. In general, the specific control of exercise time should also be determined according to the specific situation of patients.

4.3.3 Monitoring means

For patients with low degree of myocardial injury, there is no need for continuous detection during exercise. Patients with myocardial injury in the middle level should be monitored for a short time when their exercise intensity is increased and their exercise time is increased. At other times, only patients or their family members are needed. Patients with a higher degree of myocardial injury must undergo continuous testing during rehabilitation.

4.3.4 Exercise style

The choice of rehabilitation exercise mode can be varied, which can be based on the interests of patients. It can greatly improve the enthusiasm of patients to participate in rehabilitation exercise and the formulation of rehabilitation plan, but it should also be combined with the actual exercise situation of patients to some extent. Generally speaking, endurance exercise, cycling, hiking and strength exercise are recommended. It is not recommended for patients to take some stimulating exercise.

5 Conclusion

This paper, by means of retrospective case analysis, explores the specific effect and influence of exercise therapy on the treatment of non-cardiac myocardial injury, which plays an important role in promoting the specific application of exercise therapy. The research in this paper is not only conducive to the improvement of exercise therapy, but also lays a theoretical foundation for the future research in related aspects. This paper draws the following conclusions through research:

(1) In this paper, the mechanism of non-cardiac myocardial injury was explained from the aspects of

inflammatory response, large release of humoral factors and energy metabolism disorder, and the specific reactions were also explained.

(2) With the help of retrospective case analysis, this paper proves that exercise plays an important role in the treatment and recovery of patients with non-cardiac myocardial injury.

(3) This paper proposes specific rehabilitation exercise programs for patients from the perspectives of exercise time, exercise intensity, exercise mode and exercise detection.

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