

# *Pulmonary Rehabilitation on Prognosis of Patients with Acute Ischemic Stroke*

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**Abstract:** With the improvement of people's material level, the incidence of stroke is increasing year by year. Studies have shown that the mortality rate of stroke in my country has also greatly increased in recent years. Cerebrovascular disease has a high mortality rate and high disability rate. About three-quarters of patients with stroke, especially acute ischemic stroke, will experience physical impairment, aphasia, agnosia, and even serious sequelae such as mental decline. This is a heavy blow to the patient, and it also makes the patient's family worried, and the treatment of the disease is a huge expense, which further increases the economic burden of the patient's family. Early detection and the use of active and effective interventions can significantly improve the prognosis and quality of life of patients. In this paper, patients were divided into two groups for a controlled trial. One group received conventional rehabilitation therapy, and the other group received pulmonary rehabilitation therapy. The NIHSS score, Barthel index and FMA evaluation were used to evaluate the degree of neurological deficit, daily living ability and limbs respectively. The changes of function were analyzed by t test to compare the prognostic effect of the two groups.

## 1. Introduction

Acute ischemic stroke often leads to patients with varying degrees of disability or even death. In recent years, studies have found that pulmonary rehabilitation can maintain the blood supply in the ischemic penumbra of the brain through exercise training and breathing training, thereby reducing the damage of lack of perfusion brain tissue. Therefore, the compensatory effect of pulmonary rehabilitation changes the prognosis of ischemic stroke patients to some extent [1].

At present, there are various treatment methods for the treatment of acute ischemic stroke patients, such as antihypertensive treatment, early pulmonary rehabilitation treatment, ASL combined with SWI observation, etc. Many scholars have also studied the impact of different treatment methods on the prognosis of patients. Animal nervous system injury experiments have shown that after cerebral infarction in animals causes central nervous system damage, if the animal

does not stretch its limbs, the nerve dendrites will not be able to generate transmission media, and the nerve signal transmission will not be able to aggravate the inhibition of nerve conduction function. Early intervention and rehabilitation can promote The sprouting of dendrites stimulates synaptic transmission and increases blood flow in the cerebral cortex [2]. Some medical researchers have conducted clinical research on pulmonary rehabilitation of patients with acute ischemic stroke. From the results of the study, the patient's limb motor function was improved after pulmonary rehabilitation, and the patient's self-care ability in life was also better. In acute ischemic stroke patients, interventional standardized pulmonary rehabilitation therapy can provide nerve conduction for the brain through the proprioceptive movement of muscles and joints, increase local cerebral blood flow, increase the neural excitability of nerve cells that have not been necrotic in the lesion, and further retain residual function, and avoid muscle weakness and even muscle atrophy in patients by establishing a normal movement pattern [3,4]. Some studies have confirmed that induction of arterial blood pressure in the acute phase of animal models of ischemic cerebrovascular disease and increase of blood volume in animal models can reduce the localized brain damage caused by ischemia, but pressor therapy can improve neurological deficits. There are few clinical trials in China, so there is a lack of clinical experience in this research in China [5]. In recent years, studies have found that cerebral collateral circulation, as the "bypass" of cerebral blood vessels, maintains the blood flow reserve in the ischemic area of the brain. It can prevent or delay permanent nerve damage and improve the prognosis of patients. It is a new target for ischemic stroke treatment and research [6,7]. Although there are many studies on the effect of pulmonary rehabilitation on the prognosis of patients with acute ischemic stroke, in order to restore the patient's health, it is necessary to do a good job of psychological counseling for the patient, so that the patient can maintain a relaxed state and actively cooperate with the treatment.

This paper realizes and explains the concept of pulmonary rehabilitation and acute ischemic stroke, and then selects the research objects for the research experiment in this paper, then analyzes the experimental method and experimental process, and uses the t test method to test the prognostic effect of different rehabilitation treatment methods on patients, the effectiveness of pulmonary rehabilitation therapy was obtained by analyzing the results of the evaluation experiment in this paper.

## 2. Research Interpretation

Pulmonary Rehabilitation (PR) is defined as: after a comprehensive examination of the patient, a certain treatment plan is given for the patient's lesions, that is, intervention measures, including exercise training, psychoeducation, and changing attitudes toward the disease, etc. Its purpose It is to improve the physical and psychological status of patients with chronic respiratory diseases and promote their long-term adherence to health-promoting behaviors [8]. There is no uniform program for PR and no single testing regimen has been definitively identified as the most appropriate for all patients. Upper-body training and lower-body training together are a routine part of pulmonary rehabilitation. The benefits of this kind of training to patients vary from person to person. Limb training can increase the strength of the patient's limb muscles and bring different degrees of happiness to the patient [9].

Acute ischemic stroke is a disease caused by cerebral blood circulation disorder and is a widespread and multiple neurological disease. Stroke, acute cerebral infarction, and cerebral infarction are the clinical manifestations [10]. Clinical studies have shown that it is safe and effective to start standardized rehabilitation therapy within 72 hours after the onset of acute ischemic stroke. Early self-care activities and comprehensive rehabilitation support for patients and their families are particularly important. By encouraging patients to actively carry out pulmonary

rehabilitation training, combined with cerebral circulation therapy and EMG biofeedback therapy, the phenomenon of muscle twitching and paralysis can be reduced [10-12].

### 3. Experiment Preparation

#### 3.1. Experimental Subjects

A total of 72 patients participated in this study, all of whom were inpatients with acute ischemic stroke in a large hospital in the past two years. The inclusion criteria are as follows:

- (1) Aged between 45-80 years old;
- (2) Confirmed by cranial CT or MRI with clear lesions;
- (3) With cognitive impairment, it is recommended that the Mental State Rating Scale (MMSE) be greater than or equal to 21;
- (4) The vital signs are stable and the consciousness is clear;
- (5) Cooperate with the rehabilitation training.

Exclusion criteria:

- (1) Serious lung infection, liver and kidney disease, heart disease and other important organ damage;
- (2) With cognitive impairment, it is recommended that the Mental State Rating Scale (MMSE) be less than 21 points;
- (3) Those with intellectual disability or conscious disorder who cannot cooperate with rehabilitation training;

#### 3.2. Experimental Method

Grouping: The patients were divided into two groups for a controlled trial, one group was treated with conventional method, the other group was treated with pulmonary rehabilitation method, and the therapeutic effects of the two groups were compared. The number of people in the two groups is the same, and there is no significant difference in gender, disability, disease location, and routine treatment of basic drugs. The two groups are comparable. The treatment period was all 3 months, and from admission, a check-up was performed at the end of one month and three months of treatment.

Conventional rehabilitation is to carry out appropriate training under the guidance of medical staff, and pulmonary rehabilitation is mainly about breathing training and exercise training. Breathing training such as letting patients do some breathing gymnastics to increase lung capacity, and exercise training such as walking and climbing stairs All are feasible, but also pay attention to cooperate with breathing when exercising.

Two groups of acute ischemic stroke patients started rehabilitation training after the status and stability of neurological symptoms were confirmed. Methods Bobath rehabilitation technology combined with cerebral circulation therapy instrument and electromyography biofeedback technology were mainly used. Bobath rehabilitation technology: (1) Correct posture. That is, keep the patient's limbs in good posture, and if the patient cannot move freely, turn over with the assistance of family members or nursing staff, and remind the patient to turn over every 2 hours to avoid all forms of upper extremity changes, swelling, foot drop and internal turn. (2) Lie on the training mat for joint activities. Put your hands and fingers together, with the index finger on the affected side on top, and use your healthy limbs to drive the whole body. (3) Walking training. To achieve the purpose of improving muscle strength and motor function. These rehabilitation training activities were carried out every day and lasted for 3 months.

Before rehabilitation treatment, 1 month and 3 months after treatment, NIHSS was used to

evaluate the degree of neurological deficit; Modified Barthel Index (MBI) was used to evaluate activities of daily living; FMA was used to assess limb motor function, and a unified form was made to record the data.

Statistical methods: This paper adopts the T test method to analyze the prognostic effect of patients, and analyzes whether there is a significant difference between different rehabilitation methods through the size of the P value.

$$n_1 = n_2 = \left(1 + \frac{1}{k}\right) \left(\sigma \frac{z_{1-\alpha/2} + z_{1-\alpha}}{\mu_1 - \mu_2}\right)^2 \quad (1)$$

$$z = \frac{\mu_1 - \mu_2}{\sigma \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \quad (2)$$

Among them,  $n_1$  and  $n_2$  represent the number of samples in the two groups,  $\sigma$  is the standard deviation,  $z$  is the two-sided test,  $\mu$  is the mean, and  $\alpha$  and  $\beta$  are the difference levels.

#### 4. Analysis of Results

Table 1: Degree of neurological deficit in the two groups of patients

	On admission		1 month later		3 month later	
routine rehabilitation	13.68	P>0.05	8.43	P<0.05	5.64	P<0.01
PR	14.35		6.78		4.29	

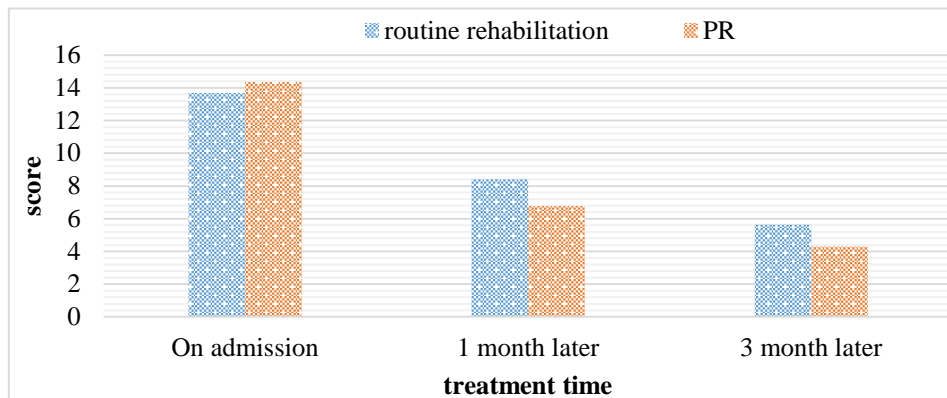


Figure 1: NIHSS scoring results

As shown in Table 1 and Figure 1 are the NIHSS scores of the two groups of patients. From the displayed data, it can be seen that at the time of admission, the NIHSS score of the conventional rehabilitation group was 13.68, the NIHSS score of the pulmonary rehabilitation group was 14.35, and the P value is greater than 0.05, indicating that there is no significant difference between the two groups in the admission examination results, and after one month of treatment, the NIHSS scores of both groups have decreased, indicating that rehabilitation therapy can help improve the patient's neurological function, but the NIHSS score of the rehabilitation group decreased more than that of the conventional rehabilitation group, indicating that the effect of pulmonary rehabilitation therapy was more obvious ( $P < 0.05$ ). Sexual differences were significant, meaning that pulmonary rehabilitation was more able to reduce the degree of neurological damage in patients. This is because pulmonary rehabilitation training can promote neuroplasticity. Since the inflammatory response of patients in the acute phase of stroke is obvious, after the brain cells of patients are damaged, the control of physical activity by the brain may be related to the direct

symptoms of neurological deficits. Cells inhibit nerve conduction. Therefore, patients in the acute phase obviously hinder the recovery of brain cell damage and affect the recovery effect. Therefore, early interventional pulmonary rehabilitation therapy may reduce or relieve this remote suppression effect, reduce the inflammatory response as soon as possible, and improve the rehabilitation effect.

Table 2: Daily life of the two groups of patients

	On admission		1 month later		3 month later	
routine rehabilitation	45.76	P>0.05	52.45	P<0.01	58.07	P<0.001
PR	45.38		58.62		69.33	

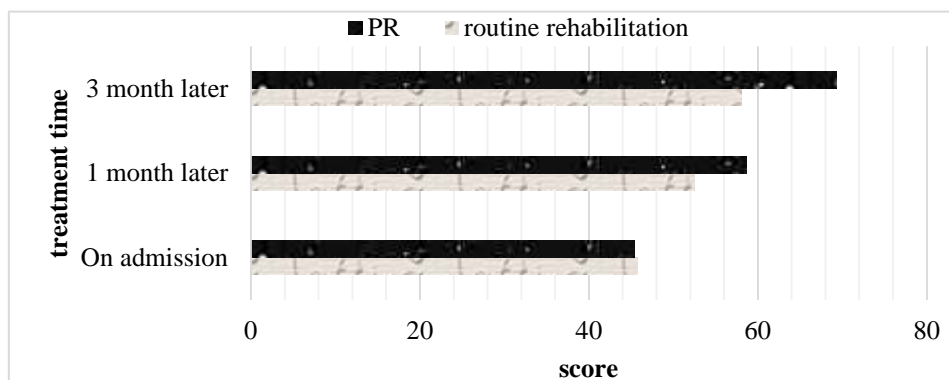


Figure 2: MBI assessment results

As shown in Table 2 and Figure 2, the MBI scores of the two groups of patients were shown. The results showed that the MBI scores of the two groups of patients were 45.76 and 45.38 respectively at admission, the difference was not large, and the P value was greater than 0.05, indicating that the daily life of the two groups of patients was similar. After one month of rehabilitation training, the scores of the two groups have improved, indicating that the living ability of the two groups has improved, but the score of the pulmonary rehabilitation group is higher than that of the conventional rehabilitation group, P is less than 0.01, indicating that the pulmonary rehabilitation training has no effect on the patients. The improvement of the patient's daily living ability was more helpful, which was confirmed by the MBI score results at the end of March, with a P value of less than 0.01, which was very significant.

Table 3: Results of FMA assessment of motor function in two groups of patients

	On admission		1 month later		3 month later	
routine rehabilitation	51.06	P>0.05	54.87	P<0.05	59.65	P<0.001
PR	48.97		65.62		73.58	

Table 3 shows the FMA scores of the two groups of patients. From the data in the table, it can be seen that the FMA scores of the two groups of patients were 51.06 and 48.97 on admission, respectively, and the P value was greater than 0.05, indicating that there was no significant difference in the motor function of the two groups of patients. After one month of rehabilitation training, the FMA score of the conventional rehabilitation group increased by about 4 points, the FMA score of the pulmonary rehabilitation group increased by about 11 points, and the score of the pulmonary rehabilitation group improved to a greater extent, and the P value was less than 0.05, indicating that the lung Rehabilitation training can effectively improve the motor function of patients. This is because pulmonary rehabilitation training often allows patients to do exercise training. Under the condition of maintaining stable breathing, patients can exercise limbs, exercise the functions of upper and lower limbs, improve limb motor function and strengthen muscles. Strength, the FMA score results at the end of March further confirmed that pulmonary rehabilitation

training can improve the motor function of patients.

In conclusion, the therapeutic effect of pulmonary rehabilitation is significant, and the neurological function, daily living ability and motor function of patients with acute ischemic stroke are significantly improved.

## 5. Conclusion

The intervention of early rehabilitation therapy for ischemic stroke patients is particularly important. Early rehabilitation therapy plays an important role in improving the quality of life of patients and returning to society to the greatest extent, and saves costs for my country's health economics. This paper studies the effect of pulmonary rehabilitation on the prognosis of patients with acute ischemic stroke. After comparing the prognostic effect of conventional rehabilitation and pulmonary rehabilitation, it is found that the NIHSS score of patients after pulmonary rehabilitation treatment is lower, while the MBI score and FMA score are higher. Compared with the conventional rehabilitation method, the pulmonary rehabilitation treatment method can significantly reduce the neurological deficit of the patient and improve the daily living ability and motor function of the patient.

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