

INFLUENCES OF AEROBIC EXERCISE ASSOCIATED WITH THE PHARMACOLOGICAL TREATMENT OF COPD



INFLUÊNCIAS DO EXERCÍCIO AERÓBICO ASSOCIADO AO TRATAMENTO FARMACOLÓGICO DA DPOC

INFLUENCIAS DEL EJERCICIO AERÓBICO ASOCIADO AL TRATAMIENTO FARMACOLÓGICO DE LA EPOC

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ABSTRACT

Introduction: Chronic obstructive pulmonary disease (COPD) is a type of inflammatory respiratory system disease characterized by chronic airflow limitation. Aerobic exercise training is believed to influence the drug treatment of this disease positively. **Objective:** Study the impact of complementary aerobic exercise intervention on pharmacological treatment in patients with COPD. **Methods:** In a controlled experiment, 40 volunteers under pharmacological treatment for COPD were selected and equally divided into two groups. The experimental group was treated with aerobic exercise training and drug treatment, while the control group was treated with regular drug treatment only. The exercise protocol lasted 60 minutes daily for a total period of eight weeks. Borg scale, oxygen saturation, and six-minute walk test among other markers were checked before and after the intervention. **Results:** According to the data obtained from the experiment, the peak oxygen consumption of aerobic exercise combined with the drug group was from $1,205.42 \pm 293.74 \text{ ml/min}$ to $1,301.84 \pm 293.91 \text{ ml/min}$, peak ventilation started at $37.85 \pm 11.67 \text{ L/min}$ to $48.81 \pm 13.11 \text{ L/min}$. However, the variations in the control group were not significant. **Conclusion:** Aerobic exercise associated with pharmacological intervention positively influenced the treatment of patients with COPD. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.**

Keywords: Aerobic Exercise; Drug Therapy; Pulmonary Disease, Chronic Obstructive.

RESUMO

Introdução: A doença pulmonar obstrutiva crônica (DPOC) é um tipo de doença inflamatória do sistema respiratório caracterizada pela limitação crônica do fluxo de ar. Acredita-se que o treinamento com exercícios aeróbicos possa influenciar positivamente no tratamento medicamentoso dessa enfermidade. **Objetivo:** Estudar os impactos da intervenção complementar com exercícios aeróbicos sobre o tratamento farmacológico em portadores de DPOC. **Métodos:** Através de um experimento controlado, 40 voluntários sob tratamento farmacológico para DPOC foram selecionados e igualmente divididos em dois grupos. O grupo experimental foi tratado com treinamento de exercício aeróbico combinado com o tratamento medicamentoso, enquanto o grupo controle foi tratado apenas com o tratamento medicamentoso regular. O protocolo de exercícios teve duração de 60 minutos diários, num período total de oito semanas. A escala de Borg, saturação de oxigênio, teste de caminhada de seis minutos entre outros marcadores foram verificados antes e após a intervenção. **Resultados:** De acordo com os dados obtidos do experimento, o pico de consumo de oxigênio do exercício aeróbico combinado com o grupo de fármacos foi de $1.205,42 \pm 293,74 \text{ ml/min}$ para $1.301,84 \pm 293,91 \text{ ml/min}$, pico de ventilação iniciou em $37,85 \pm 11,67 \text{ L/min}$ para $48,81 \pm 13,11 \text{ L/min}$. Porém as variações no grupo controle não foram significativas. **Conclusão:** O exercício aeróbico associado à intervenção farmacológica representou uma influência positiva no tratamento dos pacientes portadores de DPOC. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.**

Descriptores: Exercício Aeróbico; Tratamento Farmacológico; Doença Pulmonar Obstrutiva Crônica.

RESUMEN

Introducción: La enfermedad pulmonar obstrutiva crónica (EPOC) es un tipo de enfermedad inflamatoria del sistema respiratorio caracterizada por la limitación crónica del flujo aéreo. Se cree que el entrenamiento con ejercicios aeróbicos puede influir positivamente en el tratamiento farmacológico de esta enfermedad. **Objetivo:** Estudiar el impacto de la intervención complementaria con ejercicios aeróbicos sobre el tratamiento farmacológico en pacientes con EPOC. **Métodos:** Mediante un experimento controlado, se seleccionaron 40 voluntarios bajo tratamiento farmacológico para la EPOC y se dividieron equitativamente en dos grupos. El grupo experimental fue tratado con entrenamiento de ejercicio aeróbico combinado con tratamiento farmacológico, mientras que el grupo de control fue tratado únicamente con tratamiento farmacológico regular. El protocolo de ejercicio duró 60 minutos diarios durante un período total de ocho semanas. Se comprobaron la escala de Borg, la saturación de oxígeno y la prueba de la marcha de seis minutos, entre otros marcadores, antes y después de la intervención. **Resultados:** Según los datos obtenidos del experimento, el consumo máximo de oxígeno del grupo de ejercicio aeróbico combinado con fármaco fue de $1.205,42 \pm 293,74 \text{ ml/min}$ a $1.301,84 \pm 293,91 \text{ ml/min}$, la ventilación máxima comenzó en $37,85 \pm 11,67 \text{ L/min}$ a $48,81 \pm 13,11 \text{ L/min}$. Sin embargo, las variaciones en el grupo de control



no fueron significativas. Conclusión: El ejercicio aeróbico asociado a la intervención farmacológica tuvo una influencia positiva en el tratamiento de los pacientes con EPOC. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.**

Descriptores: Ejercicio Aeróbico; Farmacoterapia; Enfermedad Pulmonar Obstructiva Crónica.

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) refers to a kind of respiratory system disease characterized by progressive increase of incomplete reversible ventilation restriction.¹ Aerobic exercise, in fact, means to fully stimulate the physical and mental functions of individuals through long-term and effective physical exercise, so that people's heart and lungs can be fully stimulated, so as to promote the metabolism of the human body and the blood circulation of various tissues around the body, so that the body can get sufficient aerobic support and nutrition supply, and then improve the body's cardiopulmonary function, enhance cardiopulmonary endurance, improve physical labor level, and improve physical fitness, Maintain good body function.² Aerobic exercise is a safe, efficient and simple exercise method. It can not only strengthen the body and health, but also strengthen the heart, and can also improve the operation function of human organ management system mechanism. Many data have proved that aerobic exercise is a natural green antioxidant and an effective way to improve chronic diseases.³ Through aerobic exercise, it can improve human body function, enhance the exercise ability of the main systems of the human body, strengthen the physique, and improve the body ability and exercise tolerance level. Aerobic exercise can promote and improve heart function, and also have good preventive effect on people's cardiovascular diseases.⁴ And long-term regular aerobic exercise has a good effect on the health of the elderly and patients with chronic diseases. In addition, it also plays an important role in helping people change their bad mood and increase their confidence. For patients with chronic obstructive pulmonary disease, aerobic exercise can improve their cardiopulmonary function.⁵ Scientific research shows that aerobic exercise and drug intervention rehabilitation training can improve the ventilator performance and quality of life of patients with chronic obstructive pulmonary disease. At present, there are relatively few studies on the intervention of patients' self-care function by oxygen exercise combined with drug nursing in China.⁶ This article mainly aims at the rehabilitation nursing intervention of aerobic exercise combined with drugs for patients with chronic obstructive pulmonary disease, and studies the effect of improving the respiratory function, self-care function and quality of life of patients.

METHOD

Research object

In order to further study the effect of aerobic exercise combined with drug nursing intervention in the treatment of chronic obstructive pulmonary disease, 40 patients with chronic obstructive pulmonary disease were selected as the subjects of this experimental study. The study and all the participants were reviewed and approved by Ethics Committee of Changchun Medical College (NO.CMCU21Z055). Table 1 shows the experimental data of basic condition measurement for patients before the experiment.

Research methods

The 40 patients with chronic obstructive pulmonary disease were tested for 8 weeks. The 40 patients with chronic obstructive pulmonary disease were randomly divided into aerobic exercise combined with drug care group and drug care group. Among them, the aerobic exercise

Table 1. Basic information of two groups of patients.

Variable	Aerobic exercise combined with drug care group	Drug care group	P value
Age (years)	70.242±8.3980	69.183±9.0873	0.8893
Course of disease (year)	10.884±5.6198	9.612±5.4989	0.7422
Number of hospitalizations last year (times)	2.184±1.2506	2.157±1.1983	0.8220
BMI($\text{kg}^{\wedge}\text{m}^2$)	21.402±3.6825	21.050±3.9997	0.6303

combined with drug care group performed aerobic exercise training and combined with drug care treatment, while the drug care group only performed drug care treatment, Conduct aerobic exercise training for the aerobic exercise combined with drug care group for 60 minutes every day. In the process of aerobic exercise training, it is necessary to record the experimental data of the experimental subjects in time, and use professional software to record and sort out the data so as to analyze the data results after the experiment. Because the experimental subjects are older, they should always pay attention to the changes of heart rate during aerobic exercise training.

RESULTS

Effect of aerobic exercise combined with drug nursing intervention on patients' physique

The experimental data results in Table 2 were obtained after the 8-week experimental test.

After comparing the four indicators of SPO2 (%), 6MWD, Borg fatigue and ADL in the aerobic exercise combined with drug care group and the drug care group in Table 2, it was found that the experimental data of the aerobic exercise combined with drug care group after nursing was significantly better than that of the drug care group only receiving drug care, especially the two indicators of 6MWD and Borg fatigue, which proved that the aerobic exercise combined with drug care intervention had a positive impact on the patient's physique.

Therapeutic effect of aerobic exercise combined with drug nursing intervention on chronic obstructive pulmonary disease

The therapeutic effect of aerobic exercise combined with drug nursing intervention on chronic obstructive pulmonary disease is shown in Table 3 after the 8-week experiment.

After comparing the results of the three experimental data of peak oxygen uptake, peak ventilation and anaerobic threshold in Table 3, the experimental data of the aerobic exercise combined with drug care group after nursing were significantly improved, while the experimental data of the drug care group did not change significantly, which proved that the aerobic exercise combined with drug care intervention had significant effect on the treatment of chronic obstructive pulmonary disease.

Figure 1 is the experimental data result of the treatment effect of COPD self-evaluation test on chronic obstructive pulmonary disease. Among them, the data of COPD self-evaluation test before and after

Table 2. Effect of aerobic exercise combined with drug nursing intervention on patients' physique.

		SPO2 (%)	6MWD (m)	Borg fatigue degree	ADL
Aerobic exercise combined with drug care group	Before care	96.134±1.4679	339.372±57.6503	4.800±0.9187	85.878±10.2471
	After care	95.164±1.5432	359.709±51.9614	4.254±0.6268	91.206±5.3798
Drug care group	Before care	93.749±1.7549	335.487±32.8532	5.013±0.7262	87.952±9.3567
	After care	95.401±1.6080	328.582±33.3948	4.992±0.6482	85.828±8.4145

Table 3. Therapeutic effect of aerobic exercise combined with drug nursing intervention on chronic obstructive pulmonary disease.

		Peak oxygen uptake (ml/min)	Peak ventilation (L/min)	Anaerobic threshold (ml/min)
Aerobic exercise combined with drug care group	Before care	1,205.422±293.7414	37.857±11.6793	456.100±516.4377
	After care	1,301.845±293.9106	48.815±13.1119	610.634±558.1666
Drug care group	Before care	1,013.629±331.9731	37.546±9.9358	443.088±589.4311
	After care	1,019.086±330.5976	36.009±10.3080	425.498±570.5269

nursing in the aerobic exercise combined with drug nursing group is 17.34 and 14.23; The data of COPD self-evaluation test in drug nursing group was 17.45, and the data of self-evaluation test after nursing was 16.52.

From the experimental data in Figure 1, it can be clearly contrasted that in the experimental results of the COPD self-evaluation test, aerobic exercise combined with drug nursing intervention has a significant effect on the treatment of chronic obstructive pulmonary disease, while the drug physics group has no significant difference before and after the experiment, which proves that aerobic exercise training combined with drug nursing intervention can improve the treatment effect of chronic obstructive pulmonary disease.

Figure 2 is the result of the experimental data of the treatment effect of chronic obstructive pulmonary disease with the dyspnea assessment scale. The test data of the dyspnea assessment scale before nursing in the aerobic exercise combined with drug care group is 2.73, and the test data of the dyspnea assessment scale after nursing is 2.24; The test data of the dyspnea assessment scale before nursing in the drug nursing group was 2.74, and the test data of the dyspnea assessment scale after nursing was 2.54.

By observing the experimental data in Figure 2, it can be clearly compared that in the experimental data of the dyspnea assessment scale, aerobic exercise combined with drug nursing intervention has a significant effect on the treatment of chronic obstructive pulmonary disease, while the drug physics group has an effect before and after the dyspnea assessment scale, but the effect is not particularly obvious, which proves that aerobic exercise training is carried out, Combined with drug nursing for intervention treatment can improve the treatment effect of chronic obstructive pulmonary disease.

Figure 3 is the experimental data result chart of the treatment effect of COPD acute exacerbation recognition tool for chronic obstructive pulmonary disease. From the experimental data results in Figure 3, it can be seen that the experimental data of the COPD acute exacerbation recognition tool before and after nursing in the aerobic exercise combined with drug nursing group is 28.53, and the experimental data of the COPD acute exacerbation recognition tool after nursing is 23.76; The experimental data of the COPD acute exacerbation recognition tool before nursing in the drug nursing group was 28.66, and the experimental data of the COPD acute exacerbation recognition tool after nursing was 25.97.

By observing the experimental data results in Figure 3, it can be clearly compared that in the experimental data results of the acute exacerbation recognition tool for COPD, aerobic exercise combined with drug nursing intervention has a significant effect on the treatment of chronic obstructive pulmonary disease, while the drug physical group has an effect before and after the test of the dyspnea assessment scale, but the effect is not particularly obvious, which proves that aerobic exercise training is carried out, Combined with drug nursing for intervention treatment can improve the treatment effect of chronic obstructive pulmonary disease.



Figure 1. Treatment effect of chronic obstructive pulmonary disease based on COPD self-evaluation test..

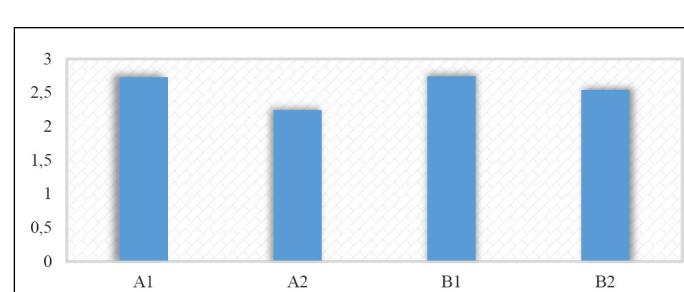


Figure 2. Therapeutic effect of chronic obstructive pulmonary disease based on dyspnea assessment scale.

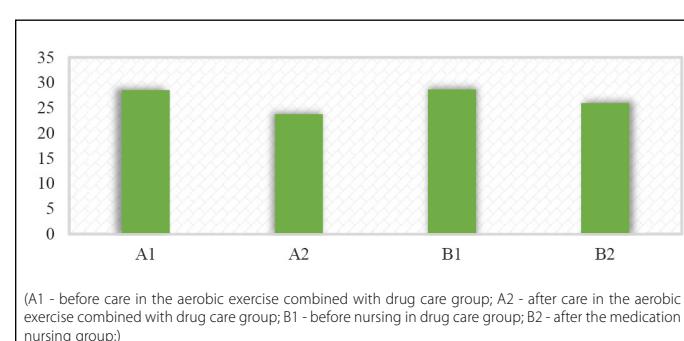


Figure 3. Therapeutic effect of chronic obstructive pulmonary disease based on acute exacerbation recognition tool of COPD.

DISCUSSION

Chronic obstructive pulmonary disease (COPD) has a great impact on the quality of life and working environment of patients because of its common and high incidence of respiratory diseases. Although drug therapy can inhibit the disease to a certain extent, the recovery process is relatively slow due to the long-term impact of the disease, so it is

necessary to cooperate with rehabilitation training to improve its normal respiratory function. Lung rehabilitation is a kind of rehabilitation training for people with lung diseases in recent years. The main purpose is to improve the lung function of patients with respiratory system. Aerobic exercise can improve heart and lung endurance. It can be achieved by jogging, climbing stairs, playing tai chi and other methods. Scientific research shows that aerobic exercise can slow down the continuous atrophy of ventilatory muscles, thus reducing its requirements for oxygenation, greatly improving vital capacity, reducing residual gas, and thus changing the hypoxia status of the body, thus improving the ventilation quality. To sum up, drugs and therapeutic care for patients with chronic obstructive pulmonary disease, combined with aerobic exercise intervention, can promote the respiratory function of the body, thus improving self-care function and quality of life.

Aerobic exercise, also known as endurance exercise, is a kind of physical exercise method aimed at improving human peripheral tissue capacity and endurance quality in an appropriate environment, which has a strong role in improving human heart and lung function. The important factors that cause the decline of muscle endurance are the decline of human exercise, peripheral muscle contraction, and dyspnea. The decline of muscle endurance is related to the mortality of chronic obstructive pulmonary disease. Aerobic exercise can improve the lung compliance and myocardial reactivity of the body, improve the diaphragm movement function, increase the respiratory rate, enhance the respiratory volume and gas exchange capacity, and have a significant effect on promoting cardiopulmonary function. Some researchers have investigated non-small cell lung cancer patients with significantly weakened lung function, and found that treadmill exercise can significantly improve lung function, improve quality of life, and have a good tolerance. Aerobic exercise can not only increase the exercise tolerance of chronic obstructive pulmonary disease, but also increase the patient's blood oxygen saturation and alleviate the disease. Chronic obstructive pulmonary disease (COPD) is mainly caused by abnormal inflation of lung lobes, often accompanied by dyspnea. Under the influence of infection and malnutrition, it can cause respiratory muscle strain and respiratory failure. The whole body respiratory muscle group is divided into intercostal muscle, diaphragm, thoracic support muscle and abdominal muscle group, and the muscle

groups affected by different respiratory tenses are also different. Through reasonable breathing exercise, the tolerance and muscle strength of respiratory muscles can be increased, thus improving lung function and preventing muscle strain. At present, breathing training methods commonly used in medicine are divided into lip contraction, artificial resistance, abdominal exercise, general exercise, diaphragm pacing, etc. The study of low-load deep breathing for patients with chronic obstructive pulmonary disease in stable period showed that after continuous exercise, respiratory muscle strain was significantly improved compared with that before treatment, and the mental health assessment of patients was also significantly improved.

CONCLUSION

Chronic obstructive pulmonary disease (COPD) is a common and multiple disease. In today's society, the prevalence of COPD is high among the elderly. With the intensification of aging, the morbidity and mortality of COPD are also increasing year by year. The repeated attacks of COPD with the patient's condition and the acute illness of the patient will lead to the gradual decline of the ability of lung function in the human body. When performing daily activities, even sometimes at rest, you will feel chest tightness and shortness of breath. Some studies have found that by strengthening physical exercise in daily life, you can improve your physical fitness, thereby improving your immune capacity, which can help improve the physical condition of patients. In order to further study the effect of aerobic exercise training combined with drug nursing intervention can improve the treatment and nursing effect when treating chronic obstructive pulmonary disease. Aerobic exercise includes swimming, jogging and cycling; Among them, jogging can improve the blood supply and oxygen supply of the brain, and can also relieve tension and anxiety, make people feel happy and improve sleep quality. Bicycles can effectively prevent brain aging and improve the heart and lung function of the human body. In this way, when treating chronic obstructive pulmonary disease, drug nursing intervention can be used to improve the treatment effect.

All authors declare no potential conflict of interest related to this article

AUTHORS' CONTRIBUTIONS: The author has completed the writing of the article or the critical review of its knowledge content. This paper can be used as the final draft of the manuscript. Every author has made an important contribution to this manuscript. Chang Na and Li Fei: writing and execution.

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