

Research Article

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Jing Liu*, Guangju Meng, Yi Ma, Xia Zhang, Dongmei Chen, Mengting Chen

Influence of COPD Assessment Test (CAT) evaluation and rehabilitation education guidance on the respiratory and motor functions of COPD patients

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Abstract: The study aimed to evaluate the influence of the COPD Assessment Test (CAT) evaluation and rehabilitation education guidance on the respiratory and motor functions of patients with chronic obstructive pulmonary disease (COPD). Forty-five patients with COPD admitted from Nov. 2012 to Nov. 2013 were treated with combined bronchodilators and inhaled corticosteroids. Thirty-five patients admitted from Nov. 2012 to Nov. 2013 and classified as a study group received rehabilitation education guidance on the basis of the treatment of the control group to compare the quality-of-life-scale score, dyspnea index score, and motor function of the two groups of patients after 48 weeks of treatment. After treatment, the CAT score of both groups of patients was significantly lowered. After 48 weeks of treatment, the respiratory function of both groups was significantly improved, but the Medical Research Council (MRC) scale for the study group after treatment was significantly lower than that for the control group. After 48 weeks of rehabilitation exercises, the 6-minute walk test (6MWT) for patients with COPD was significantly prolonged, but the test results were significantly higher for the study group after treatment than for the control group. After receiving CAT rehabilitation education, COPD patients had significantly improved life quality and significantly enhanced exercise tolerance. The

treatment mode may be gradually introduced in future clinic and nursing work.

Keywords: COPD, rehabilitation education guidance, influence

1 Introduction

Chronic obstructive pulmonary disease [1] (COPD) is common. In the recent years, its morbidity and mortality have significantly increased. It is expected that the disease will become the third leading cause of death and represent the fourth highest economic burden of disease in the world by 2020 [2]. Due to its high prevalence rate, death rate and economic burden, the disease is beginning to endanger public health and safety [3]. Currently, there is no cure for COPD. The resulting problems such as movement restrictions, dyspnea, loss of pulmonary function and damage to life quality place huge burdens on the patients, their families and even society. Pulmonary rehabilitation treatment [4] is a non-drug treatment measure for COPD widely recognized in the industry. By virtue of the scale of the COPD Assessment Test (CAT), in this article we evaluate the influence of CAT evaluation and rehabilitation education guidance on the respiratory and motor functions of COPD patients, discuss the COPD rehabilitation propaganda and education mode, and provide a diagnosis or treatment basis for clinical treatment of COPD.

*Corresponding author: **Jing Liu**, Department of Infection, Tai'an Center Hospital, NO. 29 Longtan road, Shandong 271000, P.R. China, Tel: +86-0538-6298394, Email: liuchang0044@sina.com

Yi Ma, Xia Zhang, Mengting Chen, Department of Internal Medicine, Tai'an Center Hospital, Shandong 271000, P.R. China

Guangju Meng, Department of Infection, Tai'an Center Hospital, Shandong 271000, P.R. China

Dongmei Chen, Department of Internal Medicine, Tai'an Psychiatric Hospital, Shandong 271000, P.R. China

2 Data and methods

2.1 Basic data

The research objects are 80 cases of patients with COPD II or above diagnosed by the Department of Respiration at our hospital from Nov. 2012 to Nov. 2014. The 45 cases admitted from Nov. 2012 to Nov. 2013 were classified as the control group and treated with combined bronchodilators and inhaled corticosteroids. The 35 cases admitted from Nov. 2012 to Nov. 2013 were classified as the study group and received rehabilitation education guidance on the basis of the treatment of the control group. The gender, age, course of disease and other basic information of the two groups had no significant difference, so they were comparable ($P > 0.05$) (Table 1). Furthermore, the research included obtaining the permission of the patients and their family members, who signed informed consent forms.

Ethical approval: The research related to human use has been complied with all the relevant national regulations, institutional policies and in accordance the tenets of the Helsinki Declaration, and has been approved by the authors' institutional review board or equivalent committee.

2.2 Methods

(1) Research methods. The drug treatments for the two groups of patients were in accordance with the literature [5]. The CAT evaluation and rehabilitation education methods are shown [6] as follows. After the patients were included, the international CAT scale was adopted to assess the quality of life. Pulmonary rehabilitation information and education contents were used to convey awareness of related diseases to COPD patients and guide them toward effective and correct rehabilitation training. Reports with respect to the perniciousness of malnutrition

and the importance of nutrient level improvement assisted the patients in selecting reasonable nutrition diets, and education regarding noninvasive ventilation was strengthened for the patients and their family members. For all health education contents, the one-to-one mode of patients and nurses was adopted, and the health education contents were disseminated by such means as thematic instruction, animation, and follow-up visits. Breath training included pursed-lips breathing, abdominal breathing and double-effect pulmonary breath training devices. Pursed-lips breathing mainly trains patients to exhale and inhale by mouth and nose according to rhythm, with a rhythm ratio of inhalation to expiration of 1:2 or 1:3. Preferably, all gas should be exhaled, 10 to 20 times per day. Abdominal breathing requires patients to lie on their backs with their hands resting on their chests and abdomens swollen and to inhale through the nose and exhale through pursed lips to train their respiratory functions (twice per day, 15-20 min. each time). The double-effect pulmonary breath training device mainly trains the patients' inspiratory and expiratory functions. Its application method was in accordance with the literature [7]. Inspiratory and expiratory training requires 15 min., respectively, every day. Nutritionists assessed the patients' nutrition, formulated nutrition schemes combining the patients' conditions and guided the implementation. The patients could return to the Nutrition Department until the end of the follow-up period.

(2) Inclusion criteria. The patients in the study conformed to the diagnostic criteria and staging criteria in the Guidelines for Diagnosis and Treatment of Chronic Obstructive Pulmonary Disease (2007 version). The patients with COPD II or higher and the patients who could accept observation and examination were included in the research.

(3) Exclusion criteria [9]. Patients with Alzheimer's disease, myocardial infarction, unstable angina pectoris, multiple organ failure, combined liver and kidney and blood system diseases, mental disorders, poor compliance or high hearing/visual impairment, patients who were discharged from hospital in advance, and patients who died suddenly during the study were excluded.

(4) Investigation index. The CAT [10] score, MRC [11] score and 6MWT [12] score of the two groups were recorded and compared after 2 weeks, 12 weeks and 48 weeks of follow-up visits.

Table 1: Comparison of basic information

Group	N	Age	Gender (male/female)	Course
Study group	35	57.1±12.1	24/11	17.3±13.3
Control group	45	58.5±13.2	27/18	16.9±12.7
χ ² /t		2.123	2.431	2.455
P		0.057	0.062	0.104

2.3 Statistical treatment

SPSS17.0 statistical analysis software was adopted to conduct statistic analysis on the research data. The Chi square test was used to analyze the contrast between the enumeration data, t test to analyze the contrast between the measurement data, and rank sum test to analyze the contrast between the ranked data. With a difference of $P < 0.05$, the statistical results were of statistical significance.

3 Results

3.1 CAT score comparison (Table 2)

After treatment, the CAT score of both groups was significantly lowered ($P < 0.05$), but the decrease in the study group's scores was significantly more that of the control group ($P < 0.05$).

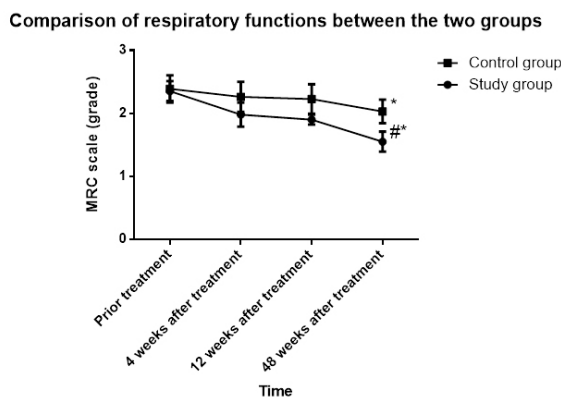
3.2 Comparison of respiratory functions (Fig. 1)

After 48 weeks of treatment, the respiratory functions of both groups were significantly improved ($P < 0.05$), but the MRC scale of the study group after treatment was significantly lower than that of the control group ($P < 0.05$).

3.3 Comparison of exercise tolerance (Fig. 2).

After 48 weeks of rehabilitation exercises, the 6MWT of COPD patients was significantly increased ($P < 0.05$), but the 6MWT of the study group after treatment was significantly higher than that of the control group, with a remarkable difference ($P < 0.01$). The respiratory function grade of the study group after treatment was significantly lower than that of the control group.

Figure 1: MRC scala comparison



Compared with the prior treatment, $*P < 0.05$; compared with the control group, $\# P < 0.05$.

Figure 2: Comparison of exercise tolerance between the two groups

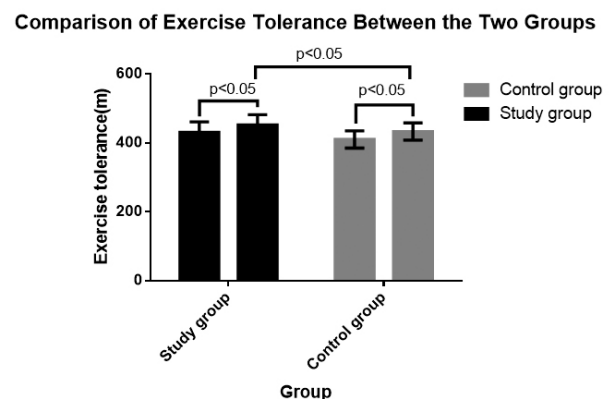


Table 2: COPD Assessment Test (CAT) score comparison

Group	N	Prior treatment	48 weeks after treatment	Difference before and after treatment
Study group	35	20.21±8.21	11.03±5.11*#	9.18±4.61#
Control group	45	22.16±6.98	16.32±6.03*	5.84±3.95

Note: Compared with the prior treatment, $*P < 0.05$; compared with the control group, $\# P < 0.05$.

4 Discussion

The incidence of COPD globally ranks fourth, after cancer, cerebrovascular diseases and cardiovascular diseases [13]. There are nearly 600 million people in the world and 5,000 people in China have COPD. The incidence of people with COPD more than 40 years old is 8.2%. On average, 2.5 people die of this disease per minute [14]. The clinical manifestations of COPD mainly include restricted movement and dyspnea and even loss of pulmonary function, seriously affecting the patients' quality of life [15]. Therefore, research into treatment intervention methods for these patients plays an important role in improving their quality of life.

The update of "Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease (Revised 2013)" [16] further emphasizes the importance of lowering the future risk of patients and indicates that COPD patients should receive an overall assessment to determine comprehensive and objective staging methods and treatment schemes and to achieve the treatment goals of reducing acute exacerbation and lowering future risks. The new guideline indicates [17] that the basic treatment of stage B-D patients with COPD may include rehabilitation treatment. Pulmonary rehabilitation helps to improve the condition of patients with severe COPD whose FEV1% predicted value is lower than 50%. But the patients whose FEV1% predicted value is higher than 50% are restricted by drug treatment, so pulmonary rehabilitation may be used only when the drug treatment is effective. In addition to drug treatment, pulmonary rehabilitation may significantly improve the clinical symptoms of COPD patients, enhance their quality of life and exercise tolerance, and may significantly lower the future risk.

According to evidence-based medicine, pulmonary rehabilitation [18] involves multi-disciplinary comprehensive intervention in COPD patients with obvious symptoms and significantly decreased ability to perform daily activities. The International COPD Education and Prevention Organization pointed out that good and effective self-nursing is conducive to postponing the progressive decrease of pulmonary function of COPD patients, and it is the key to controlling disease progression. Strengthening the health education of COPD patients and their family members in oxygen therapy and respirator-assisted ventilation and guiding the patients to properly use antibiotics, antitussives and expectorants, and bronchodilators may effectively enhance curative effects and the patients' compliance. Successful pulmonary rehabilitation includes three elements [19]: integration of multiple

disciplines, emphasis on individualization and attention to psychological state. On the basis of integrating the three elements, the curative effect of drug treatment can be optimized and the pulmonary function and exercise tolerance can be improved.

In our research we used a COPD assessment test (CAT) scale and analyzed and evaluated the quality of life in COPD patients by such measures as information and education, thematic instruction, and follow-up visits. We found that the CAT score of both groups of patients was significantly lowered ($P < 0.05$) after treatment, but the level of reduction in the study group was significantly more than that of the control group ($P < 0.05$). The respiratory function grade of the study group was significantly lower than that of the control group, but its 6MWT was significantly higher than that of the control group. It shows that CAT score can effectively reflect the state of respiratory function and movement of patients and assess their quality of life. After receiving CAT evaluation and rehabilitation education guidance, COPD patients' respiratory and movement functions significantly improved, with a significant influence. But due to the limited sample size in our research, we need to further expand the sample to determine the effectiveness.

In conclusion, the research summarizes the pulmonary rehabilitation measures of COPD patients and the assessment index for improving quality of life, puts forward a new nursing idea of health education guidance in respect to patients' pulmonary rehabilitation, and forms a guide for pulmonary rehabilitation and health education, which can provide a reference for clinicians. After COPD patients received CAT evaluation and rehabilitation education guidance, their quality of life significantly improved, dyspnea levels lowered and exercise tolerance significantly enhanced. This treatment mode may be gradually introduced in the future clinic and nursing work, but this research has some deficiencies. Combined with the Guideline of GOLD COPD 2013, it needs to be further optimized and perfected.

Conflict of interest statement: Authors state no conflict of interest

References

- [1] Guiyu z., Xiaoping l., Dongmei g., et al., Cognitive behavior intervention in the nursing care for chronic obstructive pulmonary disease, *J. Chinese Journal of Hospital Administration*, 2014, 30(7), 541-544

- [2] Minghua J., Guopeng X., Lihao X., et al., The relationship of the COPD assessment test in patients with COPD to the serum 25-OHD and CRP level, *J. Journal of clinical pulmonary medicine*, 2012, 17(11), 2050-2051
- [3] Bidan H., Zhen D., Clinical analysis of efficacy of budesonide atomizing inhalation in elderly patients with AECOPD, *J. Journal of clinical pulmonary medicine*, 2013, 18(12), 2184-2186
- [4] Hongyan L., Hui A., Youjin L., et al., The role of long-term education management in the treatment of stable chronic obstructive pulmonary disease, *J. Journal of clinical pulmonary medicine*, 2012, 17(12), 2192-2193
- [5] Jiang M., Tianxu G., Li W., et al., Therapeutic effect of salmeterol / fluticasone inhalation in the treatment of COPD patients at moderate stable stage, *J. Journal of clinical pulmonary medicine*, 2014, 19(3), 444-447
- [6] Shuxia Z., Effect observation on noninvasive positive pressure ventilation in the treatment of COPD combined with type II respiratory failure, *J. Practical journal of cardiac cerebral pneumal and vascular disease*, 2012, 20(11), 1856-1857
- [7] Jianjun T., Clinical curative effect of noninvasive ventilators in the treatment of COPD combined with type II respiratory failure, *J. Practical journal of cardiac cerebral pneumal and vascular disease*, 2009, 17(10), 862-863
- [8] Hongbin L., Perioperative nursing of patients with severe COPD, *J. Practical journal of cardiac cerebral pneumal and vascular disease*, 2010, 18(7), 986-987
- [9] Dongqing Z., Liqun D., Changbo L., et al., Influence of noninvasive positive pressure ventilation in the treatment of COPD combined with type II respiratory failure, *J. Chinese journal of misdiagnostics*, 2011, 11(18), 4317-4318
- [10] Hong L., Jing S., Yaping C., et al., Nursing of 48 cases of patients with COPD combined with respiratory failure after weaning from mechanical ventilation, *J. Chinese journal of misdiagnostics*, 2012, 12(12), 3097-3098
- [11] Hailing L., Jin L., Nursing of BIPAP noninvasive ventilators in treating 82 cases of patients with COPD combined with respiratory failure, *J. Chinese journal of misdiagnostics*, 2010, 10(36), 8991-8992
- [12] Tao L., Shengdong L., Yi W., et al., Influence of xuesetong soft capsules on hemorheology and motor function of COPD patients, *J. For all health*, 2014, (9), 14-14
- [13] Sorensen L., Nielsen M., Lo P., et al., Texture-based analysis of COPD: A data-driven approach, *J. IEEE transactions on medical imaging*, 2012, 31(1), 70-78
- [14] Yildiz S., Kaya I., Cece H., et al., Impact of COPD exacerbation on cerebral blood flow, *J. Clinical imaging*, 2012, 36(3), 185-190
- [15] Monteiro A., Carvalho V., Velho S., et al., Assessing and monitoring urban resilience using COPD in Porto, *J. Science of the total environment*, 2012, 414, 113-119
- [16] Ko J., Son J., Lee S., et al., Effects of MgO and MgO/Pd seed-layers on perpendicular magnetic anisotropy of CoPd thin films, *J. Thin Solid Films*, 2011, 519(23), 8252-8255
- [17] Ohno Y., Koyama H., Yoshikawa T., et al., Comparison of capability of dynamic O₂-enhanced MRI and quantitative thin-section MDCT to assess COPD in smokers, *J. European Journal of Radiology*, 2012, 81(5), 1068-1075
- [18] Yabuhara O., Ohtake M., Tobar K., et al., Structural and magnetic properties of FePd and CoPd a₁O_y epitaxial thin films grown on MgO single-crystal substrates with different orientations, *J. Thin Solid Films*, 2011, 519(23), 8359-8362