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ARTICLE

Therapeutic Effect Observation of Tiotropium Bromide in the Treatment of Overlap Syndrome

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ABSTRACT

Objective: To study the M receptor blocker on inhalation in patients with overlap syndrome (chronic obstructive pulmonary disease and Obstructive sleep apnea syndrome) curative effect analysis. **Methods:** 25 patients with overlap syndrome as the experimental group, chronic obstructive pulmonary disease patients (30) as control group, patients with overlap syndrome use inhaled tiotropium powder treat 30 days, to observe the changes of pulmonary function, polysomnography, and other indicators after treatment. **Results:** Overlap syndrome were treated by tiotropium bromide inhalation powder, has improved the pulmonary function, the sleep apnea index and lowest nocturnal oxygen saturation after treatment. **Conclusion:** tiotropium bromide has a preferable effective in treatment of overlap syndrome, COPD and OSAHS are interacting with each other.

1. Introduction

"Overlap syndrome (OS)" refers to patients with chronic obstructive pulmonary disease (referred to as COPD) with obstructive sleep apnea hypopnea syndrome (OSAHS). Patients with OSAHS have recurrent apnea and hypopnea during sleep, leading to hypoxemia. Patients with COPD have persistent airflow limitation and hypoxemia for a long time, which causes more severe hypoxia in OS patients. The coexistence of the two aggravates the patient's condition, and is more likely to cause increased risk of hospitalization and mortality due to risk factors such as respiratory failure, heart failure, and arrhythmia.

Experiment with the pharmacological effects and effects of anticholinergic drugs (tiotropium bromide), and treat patients with OS with tiotropium bromide powder inhaler. The changes of lung function, AHI index and nocturnal minimum oxygen saturation (SaO2) in OS patients before and after treatment were observed. The efficacy of inhaled tiotropium bromide powder inhalation in OS patients was analyzed.

2. Materials and Methods

2.1 Research Objects

30 patients with chronic obstructive pulmonary disease and 25 patients with OS were enrolled from 2016 to 2018. Patients with COPD were in clinical remission.

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There were no significant differences in gender, age and height between the study groups (P>0.05). In the past two months, there was no acute exacerbation. In the past month, no history of taking psychotropic drugs and inhaling corticosteroids and β-agonists was used. There was no history of drinking in the week before the experiment. The included study population excluded tonsil enlargement, thoracic deformity, and other respiratory diseases such as pulmonary infection, bronchial asthma, and pulmonary interstitial fibrosis.

2.2 Research Methods

Night polysomnography and pulmonary function tests were performed in the chronic obstructive pulmonary disease patients included in the study. The results were grouped according to the results of FEV1/FVC in pulmonary function and apnea hypopnea index (AHI) in polysomnography, as follows:

1. COPD group (30 cases): FEV1/FVC <70%, AHI<5 times/h, and chronic obstructive pulmonary disease group as control group.

2. OS group (25 cases): FEV1/FVC <70%, AHI>5 times/h.

For patients with OS, a 30-day treatment with tiotropium sulphate powder inhalation, 1 inhalation, 1 inhalation per morning, 1 day after treatment, 30 days after treatment, return to hospital for nighttime sleep monitoring and pulmonary function tests. The changes of AHI, night minimum SaO2, FEV1%, FEV1/FVC and other related indicators were observed before and after treatment.

2.3 Statistical Methods

Statistical methods Statistical analysis was performed using the SPSS 19.0 statistical software package. The t test was used between the two sample means. The difference was statistically significant when the test standard P < 0.05.

Table 1. Comparison of pre-treatment data between OS group and chronic obstructive pulmonary disease group (* P<0.05)

Group	n	Minimum night SaO2 (%)	FEV1% (%)	FEV1/FVC (%)
COPD group	30	90.82±4.23	60.34±7.52	62.53±4.24
OS group	25	64.74±4.72*	56.34±5.86*	60.54±3.36

Table 2. Comparison of sleep monitoring and lung function data after OS treatment in OS group

OS group	AHI (times/h)	Minimum night SaO2 (%)	FEV1% (%)	FEV1/FVC (%)
Before treatment	27.30±7.32	64.74±4.72	56.34±5.86	60.54±3.36
After treatment	25.53±7.58	68.26±5.85	59.65±6.41	62.24±4.23
t value	3.68	5.805	6.341	1.672
p value	0.003	0	0	0.105

3. Discussion

Overlap syndrome (OS) is involved in multiple systems and is a generic term for two different diseases in the same discipline. In respiratory medicine, OS refers to patients with both chronic obstructive pulmonary disease and OSAHS. According to foreign research statistics, the overall population prevalence of OS is 0.5%[1], and the prevalence rate in males is 1%[2]. Airway stenosis in patients with chronic obstructive pulmonary disease occurs in the lower respiratory tract, especially in the bronchioles and distal end, and hypoxemia occurs after the airflow limitation is gradually aggravated; the airway stenosis in patients with OSAHS is the upper airway, intermittent apnea and hypopnea during sleep, characterized by intermittent hypoxemia. Although the two diseases have different pathogenesis, there are many similarities between the adverse consequences and the impact on the body, which result in OS patients with concurrent disease with more severe hypoxemia and ventilatory dysfunction, and the two diseases can interact at multiple levels: Patients with chronic obstructive pulmonary disease are susceptible to upper respiratory tract infection, and the upper airway obstruction is aggravated when infected; smoking can aggravate upper airway collapse and promote the increase of OSAHS[3]; during sleep, the diaphragm muscle shifts upward, resulting in a decrease in functional residual capacity and supplemental expiratory volume, and patients with OSAHS often have restrictive ventilation dysfunction due to obesity, further affecting the ventilation function of the lung[4] and so on. The interaction between the two will inevitably aggravate the patient's hypoxia and sleep disorders[5].

4. Conclusion

This study looked at the efficacy of inhaled tiotropium bromide in patients with OS. Tiotropium bromide is a M1 and M3 antagonist in the respiratory tract, and the dissociation rate is significantly lower than that of the M2

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receptor when combined with the M1 and M3 receptors [6]. It has high selectivity for airway receptors, and the effect of expanding airway is continuous and powerful, reducing respiratory secretions. It is recommended for the treatment of chronic obstructive pulmonary disease in the treatment of patients with chronic obstructive pulmonary disease[7]. Tiotropium bromide also inhibits mucin secretion, anti-inflammatory, and reduces airway remodeling[8]. Chronic obstructive pulmonary disease has local and systemic inflammatory responses in the airways, as does OSAHS[9]. Both of them have pathogenic factors such as increased parasympathetic tone and oxidative stress. OS patients have improved sleep monitoring and lung function indicators after treatment, which may be related to the mechanism of action of tiotropium to improve hypoxia[10], reduce airway inflammation[11], and reduce parasympathetic tone[12]. At present, the treatment of OS is mainly oxygen therapy and non-invasive ventilation, and has achieved good results[13]. However, there is still no clinical guidance for the drug treatment of OS. The current research is mainly based on ICS+LABA, which provides a new idea for clinical drug treatment of OS patients. At the same time, clinicians should pay attention to the diagnosis and treatment of OS, and timely treatment and rehabilitation guidance for OS patients.

References

[1] Weitzenblum E, Chaouat A, Kessler R, et al. The Overlap Syndrome: association of COPD and Obstructive Sleep Apnoea. Rev Mal Respir. 2010 Apr; 27(4):329-40.

[2] Pronzato C. Chronic obstructive pulmonary disease and obstructive sleep apnea. Association, constraints and treatment. Am J Respir Crit Care Med. 2009 Oct 15; 180(8):692-700.

[3] Kim KS, Kim JH, Park SY, et al.Smoking induces oropharyngeal narrowing and increases the severity of obstructive sleep apnea syndrome. J Clin Sleep Med. 2012 Aug 15; 8(4):367-74.

[4] Xianmei Liang. Obstructive sleep apnea syndrome and pulmonary function. Chinese Medical Abstracts, Internal Medicine, 2006, 27(1):24-5. (in Chinese)

[5] Coiiop N. Sleep and sleep disorders in chronic obstructive pulmonary disease. Respiration, 2010, 80(1):78-86.

[6] Drager LF, Bortol otto LA, Loren zi MC, et al. Early signs of atheroscleros is in obstructive sleep apnea[J] . Am J Respir Crit Care Med, 2005, 172(5):613-8.

[7] Yohannes AM, Connolly MJ, Hanania NA.Ten years of tiotropium: clinical impact and patient perspectives. Int J Chron Obstruct Pulmon Dis. 2013; 8:117-25.

[8] Qian Jianmei, Guifang Wang. Research progress of long-acting anticholinergic drug tiotropium. International Journal of Respiratory, 2010, 30(23):1467-9. (in Chinese)

[9] Yunchao Huang, Xiao Li, Ao Liu. Advances in the pathogenesis of obstructive sleep apnea hypopnea syndrome. Journal of Clinical Pulmonary Medicine, 2013, 5(18):898-9. (in Chinese)

[10] Liang Ye, Qingyun Li, Min Li. Advances in research on chronic intermittent hypoxia and sympathetic abnormal excitability. Chinese Journal of Respiratory and Critical Care, 2009, 8(6):609-11. (in Chinese)

[11] Curry DT, Eisenstein RD, Walsh JK. Pharmacologic management of insomnia: past, present, and future[J]. Psychiatr Clin N Am, 2006, 29(4):871-93.

[12] Tatiana D Carvalho, Carlos Marcelo Pastre, et al. Fractal correlation property of heart rate variability in chronic obstructive pulmonary disease. International Journal of COPD 2011; 6:23-28.

[13] Nural S, Gunay E, Halici B, et al. Inflammatory processes and effect of continuous positive airway pressure (CPAP) in overlap syndrome. Inflammationg, 2013136(1):66-74.

 DOI: https://doi.org/10.30564/jams.v3i1.1451