

Effect of Alendronate Sodium Combined with Alpha-Calciferol on Chronic Obstructive Pulmonary Disease with Osteoporosis

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We attempt to explore and study the effect of alendronate sodium combined with alpha-calciferol on chronic obstructive pulmonary disease patients with osteoporosis treatment and the changes of serum receptor activator for nuclear factor kappa B ligand and osteoprotegerin levels. We randomly selected 56 patients in the hospital from December 2021 to December 2022 as the study subjects. According to the time of admission, we divided them into two parts. 28 patients were given routine treatment as the control group and the other 28 patients were given alendronate sodium combined with alpha-calciferol as the observation group. Evaluate and compare both groups on the clinical efficacy rate and measure the serum receptor activator for nuclear factor kappa B ligand level and osteoprotegerin level after taking the fasting venous blood of the patients. The adverse reactions occurred during the treatment were counted and adverse reactions rate was calculated. The results showed that observation group had higher clinical control ratio and effective ratio than control group. In addition, observation group possessed higher clinical efficacy efficiency value of the patients than control group and the improvement was more obvious ($p < 0.05$). In terms of serum level results, observation group had better data values of patients than control group. The serum receptor activator for nuclear factor kappa B ligand level, osteoprotegerin level, forced vital capacity 1 level and forced vital capacity 1/forced vital capacity values of patients in observation group were significantly improved than those in control group ($p < 0.05$). In terms of adverse reaction evaluation, observation group during treatment had lower adverse reactions rate than control group ($p < 0.05$). Alendronate sodium combined with alpha-calciferol can improve the clinical efficacy of chronic obstructive pulmonary disease and osteoporosis patients to a certain extent, and have a better effect on serum receptor activator for nuclear factor kappa B ligand, osteoprotegerin level and lung function.

Key words: Alendronate sodium, alphacalciferol, chronic obstructive pulmonary disease, osteoporosis, curative effect

Chronic Obstructive Pulmonary Disease (COPD) is a common type of respiratory disease and it is a chronic disease, so the course of the disease is long and the cure is very difficult. In addition, patients will have symptoms of incomplete reversible airflow limitation and persistent respiratory tract when they become ill and according to clinical studies, COPD is closely related to the enhancement of inflammatory response. Harmful particles and gases from environmental factors can stimulate the occurrence of inflammatory reactions, under the influence of the above factors, COPD will present progressive and developmental characteristics and the repeated action of the disease will increase the risk of patients with other extra-pulmonary complications^[1,2]. Osteoporosis is one of

the common serious complications of COPD, clinical studies have indicated that the cause of osteoporosis in COPD patients may be related to the mechanism of bone loss in patients, but the specific mechanism of action has not been found in clinical studies^[3]. COPD patients are prone to discomfort, anxiety, panic and other adverse emotions during treatment due to the long course of their chronic disease, pain and other factors in the treatment, thus affecting the clinical treatment effect. This study investigated the therapeutic effect of alendronate sodium combined with alfacalcidol in COPD combined with osteoporosis patients. We randomly selected 56 patients in the hospital from December 2021 to December 2022 as the study subjects. According to

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the time of admission, we divided them into two parts. 28 patients were given routine treatment as the control group and the other 28 patients were given alendronate sodium combined with alpha-calciferol as the observation group. The patients in this study were COPD combined with osteoporosis, which met the relevant criteria for COPD and osteoporosis^[4]. All patients were 20 y old and above. Patients and their families understood the content and situation of the study and agreed to participate in the study. There are 28 cases in control group, 16 cases male, 12 cases female, the average age were 53.28 ± 4.83 y old, average course of disease were 10.32 ± 1.10 y. There are 28 cases in observation group, 17 cases male, 11 cases female, the average age were 52.11 ± 4.29 y old, average course of disease were 10.43 ± 1.16 y. The difference of clinical data between the two groups was small and comparable. The control group adopted conventional management methods. Patients are treated by clinicians according to the hospital's diagnostic criteria and treatment guidelines for COPD and osteoporosis, in treatment, paid attention to the incompatibility or contraindications of combined drug use for the two diseases and the medical staff should observe the patient's health status, if the patient has serious adverse drug reactions, the treatment should be stopped in time and the clinical attending physician should conduct the corresponding treatment for the adverse drug reactions and change to other drug treatment programs after intervention. The observation group adopted alendronate sodium combined with alfacalcidol. Clinicians made treatment plans according to the severity of the patient's disease and the evaluation results, and gave alendronate sodium and alfacalcidol drug treatment respectively. Alendronate sodium tablets should be taken orally. Patients should take alendronate tablets on an empty stomach at least 30 min before breakfast every day, and take them with warm boiling water. In addition, the nurse told the patient to take one tablet each time, once a day, for a total of 3 mo. Alfacalcidol soft capsules were taken orally 2 capsules per time, once a day, according to the dosage in the drug instructions, for a total of 3 mo. When taking the above drugs, patients should pay attention to whether they have adverse reactions. In case of adverse reactions or discomfort, patients should go to the hospital for treatment in time and stop taking the drugs. They can continue to take the drugs after evaluation by attending clinical physician. Observation indicators

and judgment criteria includes the medical staff; used the diagnostic criteria for common diseases and the criteria for chronic diseases to evaluate the efficacy. The diagnostic grades of the efficacy were divided into three different grades; clinical control, effective and ineffective. Clinical control indicates the patient's pain and other clinical symptoms basically disappear, and the joint function is normal and can move freely, effective indicates the patient has improved clinical symptoms such as pain, recovered clinical limb joint function and can move with assistance, ineffective indicates that the patient's clinical symptoms have not improved or even worsened and the limb joint function has not recovered^[5]. After collecting the fasting vein blood of the patients, the medical staff examined the serum Receptor Activator for Nuclear Factor Kappa B Ligand (RANKL) index and bone protectin index and evaluated lung function, including forced expiratory volume in the first second Forced Vital Capacity (FEV1), ratio of Forced Expiratory Volume in the first second (FEV1/FVC)^[6]. Nurses diagnosed and evaluated patient's adverse reactions, including constipation, gastrointestinal symptoms, abnormal liver function and so on, and calculated the incidence of adverse reactions according to the rules for the diagnosis and evaluation of adverse drug reactions^[7]. Adopted software to process and calculate the data collected by researchers in this study, measurement data and counting data were calculated and compared with corresponding test methods, $p < 0.05$ was considered different. The results showed that observation group had higher clinical effective rate than control group and the improvement was more obvious ($p < 0.05$) as shown in Table 1. The results showed that observation group had higher levels of serum RANKL, osteoprotectin, FEV1 and FEV1/FVC than control group ($p < 0.05$) as shown in Table 2. The results showed that observation group had higher adverse reactions rate than control group ($p < 0.05$) as shown in Table 3. COPD is essentially a systemic inflammatory response disease, which may cause not only lung lesions but also extra-pulmonary complications, including muscular dystrophy, metabolic syndrome, cardiovascular disease and osteoporosis, which can have a huge impact on the quality of life of patients. Clinical scholars have found that inflammatory factors including interleukin-6 and tumor necrosis factor are important inflammatory factors in the pathogenesis of COPD, after the onset of the disease, the bone density of

patients was measured and it was found that the bone mass loss of patients was relatively obvious. Therefore, the incidence of osteoporosis in patients with COPD was relatively high. Under the influence of the dual diseases, the condition of patients would be aggravated and the prognosis of patients would be affected^[8]. Serum RANKL and osteoprotectin are important substances for bone metabolism and bone remodeling regulation in the human system, when the condition of COPD combined with osteoporosis patients change, the serum RANKL and osteophosphorin levels in the body will change greatly. Therefore, it is of certain significance to study the above indexes for improving the therapeutic effect of COPD combined with osteoporosis patients. The results showed that the clinical control ratio and effective ratio of patients in observation group were improved compared with control group, observation group possessed higher clinical effective rate than control group and the improvement was more obvious. Osteoporosis is a common bone disease in the elderly population. After the onset, the function of bone cells will decline and further affect the patient's function, osteoporosis can even lead to bone fractures in severe cases, which can seriously affect the quality of life of patients and cause a huge financial burden to patients^[9]. Observation group possessed better serum level results than control group and it had higher levels of serum RANKL, osteoprotectin, FEV1 and FEV1/FVC than control group, the improvement of data value is obvious. Current clinical research on patients with COPD combined with osteoporosis focuses on how to improve patients' dysfunction and relieve pain symptoms; COPD and osteoporosis are both chronic diseases, which will lead to chronic pain in the process of treatment, long-term pain distress will greatly affect the clinical efficacy of patients. On the other hand, if the COPD patients with osteoporosis cannot be timely controlled and pain symptoms can be alleviated, the implementation of normal clinical treatment measures will be greatly affected and the

clinical treatment effect of patients will be reduced. Alendronate sodium and alfacalcidol are effective drugs for osteoporosis treatment, which can promote the absorption of phosphate and calcium salt in the gastrointestinal tract of elderly patients with osteoporosis to a greater extent, has a good regulating effect on blood phosphorus metabolism and blood calcium metabolism in the body, so it has a good application effect in COPD combined with osteoporosis patients. Clinical scholars have found that alendronate can effectively promote the formation of bone and bone mineralization in COPD combined with osteoporosis patients. However, one study found that the treatment course of alendronate is longer and there is room for improvement in long-term efficacy^[10]. In terms of adverse reaction evaluation, adverse reactions rate during treatment in observation group was compared with control group and it was found that there was a certain degree of reduction. Alendronate sodium combined with alfacalcidol has a good effect on improving bone strength and bone density in patients and can effectively maintain the bone structure of patients, after taking a course of treatment, the osteolysis process in the body of the patient is better inhibited, which has a good effect on relieving the patient's chronic joint pain, redness and other clinical symptoms. In this study, there were few adverse reactions in patients who took long-term medication, indicating that the application of this program can improve the clinical therapeutic effect of patients with high safety, therefore, medical staff should take corresponding nursing measures according to the actual condition of patients, improve the overall nursing intervention measures. In summary, alendronate sodium combined with alfacalcidol can improve the clinical efficacy of COPD combined with osteoporosis patients to a certain extent, and has better effects on serum RANKL, osteophosphorin levels and lung function, with fewer adverse reactions, high safety, and good clinical application value.

TABLE 1: COMPARISON OF EVALUATION RESULTS OF CLINICAL TREATMENT EFFECT BETWEEN BOTH GROUPS (n %)

Group	Cases	Clinical control	Effective	Ineffective	Clinical effective rate
Control group	28	15 (53.57)	8 (28.57)	5 (17.86)	23 (82.14)
Observation group	28	17 (60.71)	10 (35.71)	1 (3.57)	27 (96.43)
χ^2					23.145
P					<0.05

TABLE 2: COMPARISON OF SERUM RANKL, OSTEOPROTECTIN AND LUNG FUNCTION LEVELS BETWEEN BOTH GROUPS

Group	Cases	Serum RANKL (pg/ml)	Osteoprotectin (pg/ml)	FEV1 (%)	FEV1/FVC (%)
Control group	28	405.32±12.17	243.19±9.48	52.47±4.35	47.69±3.24
Observation group	28	345.23±10.39	203.21±8.79	81.32±7.95	79.90±5.46
t		2.239	4.352	3.228	3.82
p		<0.05	<0.05	<0.05	<0.05

TABLE 3: COMPARISON OF ADVERSE REACTIONS BETWEEN BOTH GROUPS (n %)

Group	Cases	Constipation	Digestive tract symptom	Abnormal liver function	Adverse reaction rate
Control group	28	2 (7.14)	1 (3.57)	1 (3.57)	4 (14.29)
Observation group	28	0 (0.00)	1 (3.57)	0 (0.00)	1 (3.57)
χ^2					24.125
p					<0.05

Conflict of interests:

The authors declared no conflict of interests.

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