Original Article

Application of High Quality Nursing Combined with Budesonide in Elderly Patients with Chronic Bronchial Pneumonia and Emphysema

Yanyun Zhou[1]*, Xuan Wang[2], Lijie Zhang[3], Haifeng Liu[1], Shanshan Lan[4]

Abstract

Background: Bronchial pneumonia is a type of pneumonia resulting from inflammation in the alveoli. Someone with bronchopneumonia may have experienced moderate to severe breathing trouble, sometimes leading to death as their lungs may not function properly due to inflammation. It is a disease that is fairly common in the elderly, with high morbidity and mortality rates.

Objective: This experiment explores a scientific and efficient diagnosis and treatment method for treating pneumonia in elderly patients.

Methods: The study was conducted among 110 patients with fifty-five patients in the conventional group, treated with conventional medication and care. The intervention group added budesonide and salbutamol to the conventional group and conducted nursing according to the PDCA – (plan–do–check–act or plan–do–check–adjust) cycle method. Detailed records and comparisons were carried out for hyperthermia, asphyxiation, cough, lung dry and wet rales, arterial blood oxygen partial pressure (PaO_2), arterial blood oxygen saturation (SaO_2) indexes, and serums from the subjects in the routine and research groups

Results and Discussions: IL-6 and TNF-α showed that the cure rate of the patients in the research group was 23.63% higher than that of the conventional group, and the inefficiency was 5.46% lower in the research group. Analysis of the difference in treatment effect was significant. The results indicate that budesonide and salbutamol treat inflammation and the use of high-quality care has a positive effect on patients with bronchitis, which promotes alveolar ventilation, improves oxygen deficiency, and relieves symptoms of asphyxiation.

Conclusion: It is visible from the experiment above that two drugs, namely budesonide, and salbutamol effectively address bronchial inflammation and therefore, it can relieve the symptoms of pneumonia, thereby improving the overall health and well being of the patients. [*Ethiop. J. Health Dev.* 2021: 35(4) :349-354]

Keywords: Quality care; Budesonide; Elderly chronic bronchopneumonia; Emphysema; salbutamol.

Introduction

Before we delve into the study's depth, we need to elaborate the most common causes of pneumonia, namely community-acquired pneumonia and nursing home acquired pneumonia. Community-acquired pneumonia (CAP), is the most common type of highly contagious pneumonia. Instead of any specific pathogen, multiple pathogens have been found to be responsible for CAP. Bacterial pathogens responsible for the CAP are Streptococcus pneumonia, Haemophilus influenza, and Moraxella catarrhalis. Viral pathogens are commonly human rhinovirus and influenza. Nursing home-acquired pneumonia (NHAP), is most commonly referred to as healthcare-associated pneumonia and is a highly infectious disease. The mortality and morbidity rates for NHAP sheds light on the cause of concern for elderly patients who receive treatment in hospital facilities and therefore are at greater risk of developing this disease. Typical bacterial pathogens that cause NHAP include Staphylococcus aureus, Streptococcus pneumonia, and Pseudomonas aeruginosa.

Despite the remarkable medical advancements and pharmacological diversity, higher mortality and different etiology have made NHAP significantly more contagious than the CAP. For bronchial pneumonia (BP), the location of the disease, is generally in the bronchioles of the lungs, which then spreads to other tissues. As the body's immune system declines, the respiratory tract is infected by pathogens, causing inflammation of the lungs bronchial tubes. Pneumonia is a disease that is easily acquired by the elderly, mainly because the body's resistance has been compromised due to aging , and it cannot fully resist the bacteria and viruses in the air. This makes it is easy to be infected and cause lung lesions. The incidence of pneumonia in the elderly is extremely high, and it is currently the most common disease which affects the elderly. Compared with the younger group, the morbidity and mortality of the elderly group is higher [1, 20, and 21]. This results in a significant amount of medical facilities and resources being utilized and occupied, which results in a huge medical loss. The increasing number of senior citizens in China has increased to about 140 million, accounting for about 12% of the country's population. The number of people and the consumption of medical resources are increasing, research into the prevention of pneumonia in the elderly and a possible cure for pneumonia is imperative. The symptoms of pneumonia in the elderly population are not obvious or atypical and usually coexist with other diseases. It is not easy to distinguish them during clinical treatment, thereby increasing the difficulty of treatment. At present, there have been many studies on the prevention, morbidity factors, and treatment methods of pneumonia

[1]College of Nursing, YongZhou Vocational Technical College, Yongzhou, 425100, China; *Correspondence to: Yanyun Zhou, Email: 382665095@qq.com. 289 Yongzhou Avenue, Lingling District, Yongzhou City, Hunan Province, China
[2]Vasculocardiology Deparment, Shuangpai People's Hospital, Yongzhou, 425202, China;
[3]The First People's Hospital of Yongzhou City, Yongzhou, 425199, China;
[4]Cardiac Rehabilitation Centre, Hunan Academy of Traditional Chinese Medicine Affiliated Hospital, Changsha, 410006, China

in older people, mainly through vaccine prevention, drug intervention, and daily care to improve the recovery rate of pneumonia and reduce mortality.

The elderly suffer from poor physical health, weak resistance; reduced recovery rates, they are vulnerable to pneumonia caused by pathogen infection, and even repeated attacks (2). Due to multiple attacks and long-term treatment, the elderly patients are both physically and psychologically drained. Having experienced a certain amount of stress, and having a certain amount of mental pressure, as well as the cost of treatment, which has also increased the financial burden of the family; these aspects have caused a certain negative impact on the quality of life of the elderly people and their family environment. Therefore, it is very important to explore scientific and efficient diagnosis and treatment methods to prevent and treat pneumonia in the elderly. Primac Lingshu is a glucocorticoid, which can play a significant role in reducing inflamation, oxymetazoline is a selective β2 receptor agonist, which can inhibit the release of allergic substances, through the use of the above two drugs to treat inflammation, there is a noticeable reduction in the contraction of bronchial smooth muscles, thereby preventing bronchospasms and enhancing the stability of bronchial cells. In this experiment, 110 patients were divided into two groups, namely the conventional and the research group. The conventional group used conventional methods for treatment and care, and the research group used a combination of two drugs, in order for the conventional group to observe and analyze the symptoms and serum characteristics of the experimental subjects during treatment (IL-6), tumor necrosis factor (TNF-α) index, and to explore more scientific and efficient treatment methods (3).

Materials and methods

Research object

The participants included 110 pneumonia patients who were diagnosed with pneumonia in the past two years, participants were randomly divided into two groups consisting of 55 subjects in each group. The conventional group consisted of: 23 female subjects and 32 male subjects. The age range was 57-85 years old. The average age was 72.9±8.9 years old. The course of the disease was 2-5 days. The average course of the disease was 3.6±0.8 days. The degree was graded, including six severely ill patients, 30 moderately ill patients, and 19 lowly ill patients. The research group consisted of: 22 female subjects, 33 male subjects, the age range was 55-82 years old, with an average age of 73.4± 9.7 years of age, the course of the disease was recorded from 2 to 5 days, with an average course of 3.8 ± 0.8 days. The disease was graded according to the severity of the disease, including ten severe patients, 28 moderate patients, and 17 low-grade patients (4). There were no significant differences between the two groups regarding gender, age, disease history, and disease severity.

Inclusion criteria were: 1) Whether the test subject has bronchial inflammation as diagnosed according to the regulations of relevant organizations and relevant documents, and the subject's degree of illness was graded according to CURB to assess the patient's condition; 2) The subject's disease response was high in temperature, Cough, asphyxiation, etc., CT and radioactive detection was used to confirm the diagnosis; 3) consent was taken from patients and their families before conducting experimental research, and approval was sought from the relevant organizations.

Exclusion criteria were: 1) Subjects had other diseases besides bronchial inflammation, such as cardiovascular disease, etc.; 2) Blood pressure and blood glucose being too high without treatment control; 3) Lungs having a tumor; 4)Experiment Patients who have used glucocorticoid drugs within the first two months; 5) Patients who were allergic to the two drugs in this experiment (5).

Research methods

Medication

Conventional (control) group: All conventional group subjects were treated with anti-inflammatory treatment to ensure oxygen inhalation. Oral erythromycin tablets were taken twice a day orally (Guo Yao Zhunzi H20023871, Jiangxi Huiren Pharmaceutical Co., Ltd.) (6), each dose is 0.25g;

Research (interventional) group: Inaddition to the conventional group treatment, all experimental subjects added two drugs, budesonide and salbutamol for joint diagnosis and treatment. Budesonide (National Pharmaceutical Standard H20030987, Lunanbeite Pharmaceutical Co., Ltd.), inhaled three times a day; each dose was 100μg; nebulized solution of oxymetazoline (National Pharmaceutical Standard H20060409, Lunanbeite Pharmaceutical Co., Ltd.) (7), inhaled twice a day, each time 0.25 ~ 0.5mL dissolved in 3mL 0.9% NaCl injection In the liquid. Both groups were treated for two months, one course/month.

Nursing methods

Conventional group: Treatment and care was carried out following current routine practices, such as regular propaganda and education of bronchitis knowledge, encouragement, and support for timely treatment, and active cooperation of patients and their families.

Research group: According to the Deming Ring (PDCA cycle) method, the circular nursing intervention was carried out with a focus on improving the quality of nursing services to ensure that patients enjoy high-quality diagnosis and treatment. The nursing plan included four links: the first link, the plan (P). Understand and investigate the health status of experimental subjects in detail, evaluate the condition, record and develop a personal plan for each experimental subject (8). The second link is the implementation plan (D). According to the nursing plan of the previous link, nursing intervention is carried out on patients, and attention is paid to treating psychological issues, diet, and prevention of other diseases. Among them, psychological issues are mainly reflected in the psychological counseling of the test subjects to keep the patients in a comfortable mood; dietary intervention is mainly used to monitor whether the patient's diet meets the patient's dietary standards,

to be healthy, to avoid excessive greasy and spicy food, etc. The occurrence of the disease is mainly reflected in helping patients clear respiratory secretions on time, cleaning the ward, and keeping the treatment and care environment tidy. In the third link, check the feedback (C). It is necessary to observe the development and health status of the experimental subjects, by carefully recording the situation of the experimental subjects, conducting in-depth research and scientific judgment on the adverse reactions and other problems of the patients; the fourth part, adjust the treatment (A). After analyzing the difficulties and problems that occur in treating patients' illnesses, readjust the treatment and nursing methods, optimize the nursing plan, and repeat the four links to improve the quality of nursing and to optimize the nursing plan (9).

Measurement indicators

Record and compare in detail the indexes of hyperthermia, asphyxiation, cough, and lung dry and wet rales of the subjects in the conventional group and the research group; measure and compare the PaO_2 of the subjects in the conventional group and the research group before the experiment and after five days of treatment SaO_2 index; measure and compare the levels of IL-6 and TNF-α (19) in the experimental group and the experimental group before and after five days of treatment.

At the end of the experiment, all the subjects were divided into cured, improved, and invalid. Cure: after the experiment, the symptoms of the subject before the experiment disappeared, and all the indicators were normal following thorough inspection and measurement; Better: after the experiment, the symptoms of the subject were lighter, and the physical indicators had a tendency to become better as compared to before the experiment (10). But some indicators were not normal; making them invalid: after the experimental treatment, the subject's illness has not improved, or the condition has become worse, and various physical indicators and lung test results have not improved or have even worsened.

Statistical analysis

The experimental data were statistically analyzed and processed using SAS10.0 software. For the disappearance of the cough, hyperthermia, asphyxiation, lung dry and wet rales and the treatment time and IL-6, TNF-α, PaO_2, SaO_2 indicators, according to "$\bar{x} \pm S$" is used for statistical description, compared by t-test, grade count data, which was described using percentages, and non-parametric test of two independent samples is used for comparison; $P<0.05$ indicates that the difference is statistically significant (11).

Results

The clinical symptom relief of the two groups of patients: According to the test results of the test subjects shown in Table 1, the conventional group was higher than the research group, with a significant difference ($P<0.05$).

Table 1. Detection of clinical symptoms of patients in the conventional group and the research group ($\bar{x} \pm S$, d)

Group	Number of cases	Cough	Fever	Shortness of breath	Wet and dry lung rales	Length of hospitalization
Conventional group	55	5.5±1.8	3.0±1.1	5.7±2.0	5.4±1.9	8.3±2.2
Research group	55	4.5±1.1	2.3±0.9	4.8±1.8	4.1±1.7	7.1±2.0

Comparison of changes in serum IL-6 and TNF-α levels between the two groups: According to the data in Table 2, there was no significant difference between the two indicators of the conventional group and the research group before treatment; after five days of the experiment, the two indicators of the patients in the research group decreased as compared with the indicators of the conventional group.

Table 2. Comparison of changes in serum IL-6 and TNF-α levels between patients in the conventional group and research group ($\bar{x} \pm S$)

Group	Number of cases	Time	IL-6 (μ/L)	TNF-α (μ/L)
Conventional group	55	Before treatment	256.0±42.6	75.0±15.2
		After treatment	133.2±29.5	42.7±12.8
Research group	55	Before treatment	248.4±39.0	78.9±19.6
		After treatment	92.1±22.5	31.8±11.0

Comparison of blood gas index changes between 2 groups of patients: According to the data in Table 3, there was no significant difference between the two indicators of the conventional group and the research group before treatment; after five days of the experiment, the two indicators of the patients in the research group had increased as compared to the indicators of the conventional group.

Table 3. Comparison of changes in PaO_2 and SaO_2 levels between patients in the conventional group and research group ($\bar{x} \pm S$)

Group	Number of cases	Time	PaO_2 (mmHg)	SaO_2 (%)
Conventional group	55	Before treatment	77.5±4.8	93.1±1.7
		After treatment	84.2±5.3	95.2±1.4
Research group	55	Before treatment	76.2±4.5	93.2±1.9
		After treatment	87.3±5.9	91.3±1.5

Comparison of clinical efficacy of 2 groups of patients: According to the data in Table 4, after five days of treatment, the recovery rate in the research group was 76.36%, the improvement rate was 25.45%, and the inefficiency was 1.82%. The recovery rate in the conventional group was 52.73%, the improvement rate was 41.82%, and the inefficiency was 7.28%. The difference in treatment effect was significant (P<0.05).

Table 4. **Comparison of clinical efficacy of patients in routine group and research group (n (%))**

Group	Number of cases	Cure	To become better	Invalid
Research group	55	42 (76.36)	14 (25.45)	1 (1.82)
Conventional group	55	29 (52.73)	23 (41.82)	4 (7.28)
Z			-2.224	
P			0.026	

Discussion

Analysis of experimental results:

Comparison of the clinical symptom relief of the two groups of patients: After treatment, the symptoms of the patients in the research group had improved. Through recording and analyzing the disappearance time of each symptom and the length of hospitalization, it can be seen that the indicators of the patients in the research group were lower as compared to the conventional group, with significant differences [12]. It has been found that the combined treatment of bronchitis, with the two drugs under study, can significantly relieve the symptoms of fever and cough in patients, enhance the stability of bronchial smooth muscles and other cells, and relieve spasms, with the effect being more obvious.

Comparison of the changes of serum IL-6, TNF-α levels, and blood gas indexes of the two groups of patients: Interleukin-6 and tumor necrosis factor in serum are two substances produced during lung inflammation. Their indicators can reflect the onset of inflammation and are closely related to the treatment results of symptoms. According to the research, there is no significant difference between the indicators of the experimental subjects prior to the experiment. After the treatment, the two indicators of the patients in the research group were significantly lower as compared to the conventional group, and the difference was significant. It can be seen that the combined use of budesonide and medroxyprogesterone can effectively relieve the development of inflammation and improve the physical condition of the patients (13).

PaO_2 and SaO_2 can reflect the blood gas levels of the body. The acid-base balance of the ecological environment of the body and the content of carbon dioxide and oxygen in the plasma can be assessed according to these two indicators to judge the degree of oxygen dissolution of the patient's alveoli. According to the data analysis, there was no significant difference between the two indexes of the experimental subjects prior to the experiment. The two indexes of the experimental subjects in the research group after the experiment were higher than that of the conventional group, which was significant. This indicates that using the two drugs under study had a positive effect on patients with bronchitis, which can promote the alveolar ventilation function, improve oxygen deficiency, and relieve the symptoms of breathlessness.

Comparison of clinical efficacy of the patients in the two groups: According to other reports, budesonide and salbutamol have a synergistic effect, inhibiting bronchitis infections and enhancing lung respiratory function. When comparing the clinical treatment effects of the two groups, five days after the experiment, the recovery rate of the 55 subjects in the research group reached 76.36%, the improvement rate was 25.45%, and the inefficiency was 1.82%. In contrast, the recovery rate of the conventional group was only 52.73%; the improvement rate was 41.82% (14). The inefficiency was 7.28%. The results of the treatment effects were compared and analyzed, and the difference was significant. Therefore, the combined use of drugs has a significantly positive effect on bronchitis. However, the lack of analysis and comparison of the dosage of the two drugs requires further experimental analysis.

Research status of chronic bronchopneumonia in the elderly

Pathophysiological basis of the elderly susceptible to pneumonia: The main reasons for the elderly to be susceptible to bronchial pneumonia are: firstly, the aging of the body leads to a decline in resistance, and the respiratory tract cannot fully exert the heated, humidified air which leads to further damage of the respiratory tract; secondly, the lungs bronchial cells and glands have been degraded The barrier function decline, makes it easier to be infected. Thirdly, older people usually suffer from various chronic diseases, and their physical conditions are already in an unhealthy state, which makes it easy to be infected by pathogenic bacteria which cause respiratory diseases (15). Based on the special physiological basis of the elderly, the elderly become infected with bronchial inflammation, resulting in a decline in the body's

physiological function, which in turn leads to other complications, making treatment more difficult. At the same time, because the elderly group is susceptible, there will be multiple relapses after treatment and rehabilitation. After many drug treatments, the drug resistance of the body increases, which is not conducive to the control of the disease.

Clinical features of elderly pneumonia: Since the elderly often suffer from various diseases, the symptoms are complicated and diverse, and the clinical manifestations of bronchial inflammation are not always obvious. Typical manifestations include hyperthermia, asphyxiation, coughing, and expectoration, etc. In addition to the above reactions, the symptoms of elderly are also reflected in terms of a decreased mental state, unclear consciousness, decreased flexibility, decreased food intake, vomiting, and diarrhea (16). It is also reported that other clinical manifestations of elderly patients with pneumonia include sudden shock.

Antibiotic treatment of elderly pneumonia: At present, the most common treatment for patients with bronchitis in the elderly population is to use antibiotics to fight infection. In the process of treatment diagnosis, the dose and frequency of antibiotics should be controlled to avoid drug resistance. Accordingresearch, the liver and kidneys of elderly patients are deteriorating , chemical drugs are metabolized at a much slower rate, and they may not be absorbed and accumulated in large quantities. Therefore, it is necessary to control the dosage of drugs and use them with caution. In addition, lung infections are often caused by the presence of multiple pathogens at the same time. Different antibiotics should be used to treat different pathogens (17). A combination of drugs can be used to improve the anti-infection effect. Suitable antibiotics are chosen for the treatment of pneumonia and the elimination of pathogens following the microbiological assay. Mainly these antibiotics are intravenous, but they can be switched to oral antibiotic therapy after notable clinical improvement.

Due to the variety of conditions in elderly patients, other basic diseases may quickly develop due to inflammation, leading to complications. Therefore, attention must be given to the symptoms and reactions of elderly patients, especially the health of the nervous system and cardiovascular system, which must be treated symptomatically.

Prevention of senile pneumonia: The elderly population is susceptible to bronchial pneumonia. Due to special physiological conditions, it is expensive, not easy to treat, and has a high mortality rate, so preventative measures are necessary [18]. Relevant departments should strengthen the publicity and education of health knowledge to prevent pneumonia, and emphasise the development of good living habits: Firstly, by keeping the environment clean, and reducing the number of activities in densely populated, dirty, and in environments with poor air quality; Secondly, be active exercise, improve the immunity and resistance of the elderly, and reduce the probability of illness from the self; thirdly, recognizing of the key symptoms of infection and seeking medical treatment on time in order to avoid the aggravation of the condition, thereby increasing the difficulty of treatment.

Conclusion

During treatment, the signs, symptoms, and other breathing complications are greatly improved by the applied treatment method. Nursing interventions with regular monitoring have contributed to the success of the study. Complete eradication of bacterial load by boosting the immunity of elderly patients has become a significant aspect of this study. Regular monitoring of the IL-6 and TNF-α along with the SaO2 index and PaO2 level checking has a pivotal role in relieving other bronchopneumonia symptoms. Therefore, this study may strongly establish a new window of treating bronchial pneumonia in elderly patients. Through experiments, it can be seen that for patients with bronchial inflammation, using conventional treatments, by adding two drugs, budesonide and salbutamol, and implementing nursing interventions can effectively relieve the symptoms of pneumonia, improve patients' symptoms such as coughing and shortness of breath, and further improve the recovery rate.

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