The therapeutic efficacy of high-dose ambroxol and the nursing effects in the treatment of severe pneumonia

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Abstract: To observe and analyze the therapeutic efficacy of high-dose ambroxol in the treatment of severe pneumonia, as well as summarize the nursing methods. A total of 180 patients diagnosed with severe pneumonia and treated at our hospital who were enrolled. The patients were divided into a control group and are search group, with 90 patients in each group. Of those, patients in the research group were treated with high-doses ambroxol, while small-dose ambroxol was administered to patients in the control group. The therapeutic efficacy was compared between both groups. Meanwhile, predictive nursing regimens were applied on patients in the research group, while routine nursing care was given to patients in the control group. The nursing satisfaction was compared between both groups. By comparing the pulmonary function indicators, Comparison of procalcitonin **(**PCT**)** and C-reactive protein **(**CRP**)** results showed that all indicators of the research group were obviously better than those of the control group ($p<0.05$). The time of infection control, ICU stay and hospital stay of the research group were significantly less than those of the control group ($p<0.05$). Moreover, the overall nursing satisfaction of the research group was significantly higher than that of the control group ($p<0.05$).Application of high-dose ambroxol and scientific nursing methods could significantly improve the therapeutic efficacy in the treatment of severe pneumonia and gain favorable nursing satisfaction.

Keywords: High doses, ambroxol, severe pneumonia, nursing effects.

INTRODUCTION

Nowadays, changes occur in people's lifestyles and eating habits as our living standards are constantly improving, which together with changes in the surrounding environment have led to great impact on public health (Li, 2016; Luo, 2017). As for clinical diseases, the incidence of severe pneumonia is on the rise, causing varying degrees of impacts on patients' life qualities and work. Pneumonia may be caused by many reasons, such as bacteria (*Pneumococcus, alpha hemolytic streptococcus, Staphylococcus aureus, klebsiella pneumoniae white bacterium, haemophilus influenzae, pseudomonas aeruginosa, escherichia coli, pseudomonas aeruginosa,* etc.), virus (coronary virus, adenovirus, influenza virus, cytomegalovirus, herpes simplex virus, etc.) and fungi (white candida, aspergillus, radiation, etc.), and atypical pathogens (such as Legionella bacteria, Mycoplasma, chlamydia, rickettsia, toxoplasma, protozoon, etc.), physical and chemical factors (radioactive, gastric acid inhalation, drugs, etc.)In terms of anatomical location, it can be divided into lobar pneumonia, lobular pneumonia and interstitial pneumonia (Randrianarison and Ashraf, 2018). In terms of course of the disease, it is divided into acute pneumonia, protracted pneumonia, chronic pneumonia. Studies have shown that acquired pneumonia usually predominates in severe pneumonia (as shown in fig. 1). However, its pathogenesis is not yet fully understood. As patients' prognosis is affected by numerous factors; the treatment of severe pneumonia is relatively difficult, which has attained great attention (Yun *et al.,* 2019).

Severe pneumonia (as shown in fig. 2), a severe infectious disease originating from the lungs, would cause infection in numerous tissues or organs after onset (Mehvish and Barkat, 2018). Based on the clinical studies, severe pneumonia is the most common severe infectious disease with rather high mortality rate, especially in elderly patients and preschool children (Hanafiah *et al*., 2018). Apart from active and effective drug administration, it is also necessary to take scientific nursing actions to help enhance the therapeutic effects (Alvi *et al*., 2018). One of the important drugs for the treatment of severe pneumonia is ambroxol, which can achieve favorable results. However, different dosages would lead to different effects (Khan *et al*., 2016). This study was aimed to observe and analyze the therapeutic efficacy of high doses of ambroxol and the nursing effects in the treatment of severe pneumonia, providing valuable evidence for clinical treatment, which is reported as follows (Fahim and Sathi, 2018).

MATERIALS AND METHODS

General data

A total of 180 severe pneumonia patients treated at our hospital from May 2015 to June 2018 were enrolled. This paper has a rigorous structure, and the conclusion has been approved by relevant ethics and relevant departments. The inclusion and exclusion criteria were as follows: the patient met the clinical diagnostic criteria for

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severe pneumonia, with a course of 5 days; no drug contra indications, informed consents obtained, no complications of other severe primary fatal diseases, no complications of severe liver or kidney disease or malignant tumors. Patients were randomized into the research group and the control group, with 90 patients in each group. Of those, there were 48 male patients and 42 female patients in the research group, with an average age of (49.18 ± 7.03) years, ranging from 20 to 75. There were 50 male patients and 40 female patients in the control group, with an average age of (50.16 ± 6.15) years, ranging from 22 to 76. Data obtained from both groups were comparable ($p>0.05$).

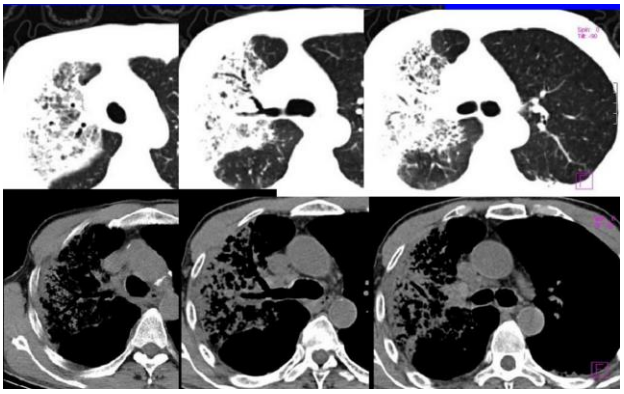

Fig.1:Community acquired pneumonia (Source: Affiliated Hospital of Changchun University of Traditional Chinese Medicine)

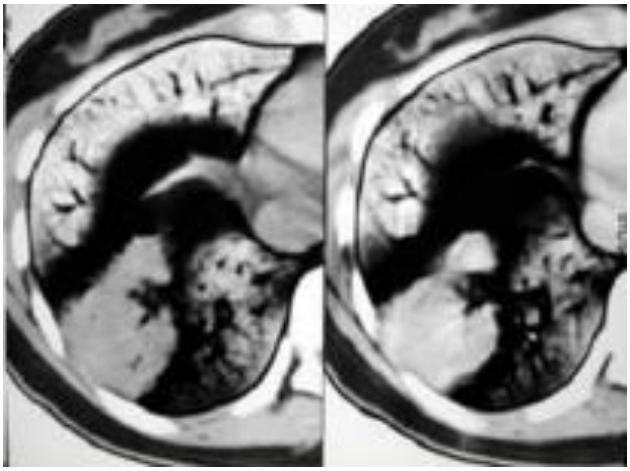

Fig.2: Image of severe pneumonia(Source: Affiliated Hospital of Changchun University of Traditional Chinese Medicine)

Methods

Therapeutic methods for patients in both groups. After admission, regular treatments were given to patients in both groups, including nutritional support therapy, immunotherapy, etiological treatment, anti-infective treatment and the like. Meanwhile, antiviral therapy was performed to specifically target patients' complications. Moreover, vasoactive drugs, sedation drugs, and therapies for improving microcirculation and cardiac support were applied.

On the bases of the above treatment, ambroxol hydrochloride was intravenously administered to patients in the control group at small doses (15 mg each time, twice a day), while high doses of ambroxol hydrochloride (90 mg each time) were intravenously injected to patients in the research group, three times a day. Two consecutive weeks of treatment was view as a complete course (Rafid *et al*., 2017; Vinz *et al*., 2016).

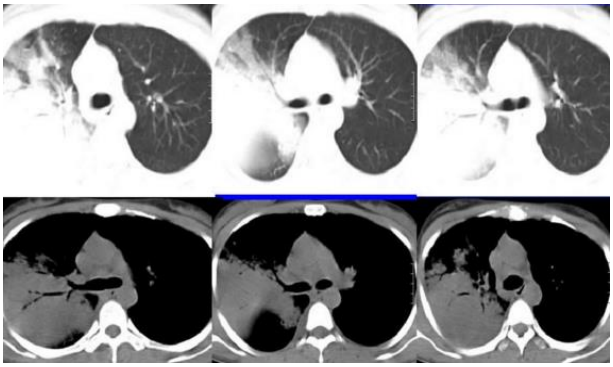

Fig.3:The images of lungs before treatment(Source: Affiliated Hospital of Changchun University of Traditional Chinese Medicine)

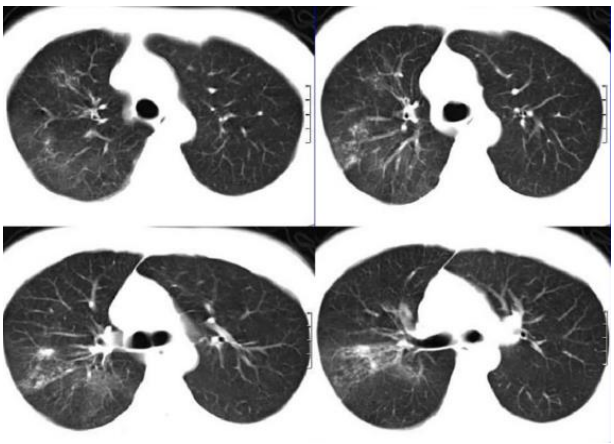

Fig.4: The images of lungs after treatment (lesions were basically absorbed)(Source: Affiliated Hospital of Changchun University of Traditional Chinese Medicine).

Nursing methods for patients in both groups. General routine nursing regimens were applied on the patients in the control group, including psychological nursing, medication nursing, environmental nursing, life instruction and so on. On the bases of routing nursing, predictive nursing plan was implemented on patients in the research group, which is listed as follows:

First, strengthen the basic nursing intervention. Comfortable and quiet hospitalization environment should be provided, the temperature and humidity in wards

should be controlled, and the disinfection work in the hospital should be enhanced (Chbani *et al*., 2015). Patient's vital signs such as blood pressure, respiration and pulse should be recorded every day; secondly, perform psychological nursing intervention. Patients with severe pneumonia can be easily struck by various negative emotions, such as anxiety, depression, tension, insecurity, reduced treatment compliance because of the long course of disease. Their mental states should be monitored after admission to the hospital. Nursing staff should specifically ease the patients' negative emotions, and slowly eliminate the sense of strangeness and fear, as well as perform health education in easy languages when they are stable, aiming to inform the relevant knowledge of severe pneumonia, introduce the pathogenesis and treatment methods, considerations and so on. We should tell them more about the successful cases to improve their self-confidence. Next, implement oral and respiratory care. Clean patients' oral cavity with compound chlorhexidine gargle, four times a day. The patient's oral endocrine material should be cleared in time to keep oral and respiratory tract unobstructed. Effective coughing and deep breathing should be guided, so that the respiratory tract is always in unobstructed state. Meanwhile, regularly roll over should be maintained to keep the skin dry and clean. The time of mechanical ventilation time should be controlled strictly and kept minimized as far as possible. Disinfection of ventilator internal pipeline should be carried out strictly. In addition, strengthen oxygen inhalation. The oxygen flow should be controlled as 1-5 L per minute. Observe the patient hypoxia symptom, oxygen uptake should be terminated when cyanosis disappears. Finally, strengthen diet intervention. Scientific diet should be made for patients, which should be mild and easy to digest, mainly includes foods with rich calcium and protein. Spicy or excitant food should be avoided. Moreover, patients should eat more fresh fruits and vegetables as well as drink more water to ensure the bowel patency (Zhang *et al*., 2018; Xin, 2015).

Outcome measures

The pulmonary function indicators, procalcitonin (PCT), C-reactive protein (CRP), the time of infection control, ICU stay and hospital stay of both groups were observed and recorded. Moreover, our own nursing satisfaction questionnaire was applied to investigate patients' nursing satisfaction.

STATISTICAL ANALYSIS

Statistical analyses were performed using SPSS21.0. All quantitative data are expressed as mean ± standard variance ($x \pm s$), and comparisons were made with t-test. Enumeration data are expressed as natural number (n) and percentage (%) and comparisons were made with chi-square test. $p<0.05$ was considered statistically significant.

RESLUTS

The pulmonary function indicators, PCT and CRP of both groups before and after treatment

As shown in table 1, no significant difference was observed in the PaO2, SpO2,PaO2/FiO2,PCT and CRP levels before treatment between both groups($p>0.05$). After treatment, all indicators of the research group were obviously better than those of the control group($p<0.05$).fig. 3 and fig. 4 show the pulmonary image of a patient in the research group before and after treatment, respectively.

Comparison of nursing satisfaction between both groups

As shown in table 2, the nursing satisfaction of the research group was significantly higher than that of the control group ($p<0.05$).

Comparison of the time of infection control, ICU stay and hospital stay between both groups

As shown in table 3, thetime of infection control, ICU stay, hospital stay of the research group were significantly less than those of the control group($p<0.05$).

DISCUSSION

Pneumonia is a common respiratory disease caused by numerous factors. If prompt and effective treatments are not performed, the condition will gradually deteriorate and turn into severe pneumonia. At the onset of severe pneumonia, patients usually present with obvious symptoms such as fever, nasal congestion and poor breathing, which may be accompanied by irritability and loss of appetite, seriously affecting their normal life and even threatening their lives. Clinically, severe pneumonia is mainly treated with ambroxol hydrochloride for cluster therapy, which aims to reduce the complications and mortality rates. Ambroxol hydrochloride is a bismuth drug that promotes the dissolution of the viscous sputum while lubricating the respiratory tract, increasing the secretion of pulmonary surfactant and respiratory fluid, and promoting the ciliary movement of the lung surface. Clinical studies have shown that the therapeutic effect varies with different amount of ambroxol hydrochloride. Therefore, the dosage should be reasonably selected according to the actual situation during treatment. High doses of ambroxol hydrochloride can effectively reduce the patient's body temperature, promote the patient's appetite, improve the patient's mental state, and keep the patient's respiratory tract unobstructed, thus exerting better therapeutic effects. In addition, with a scientific nursing intervention regimen, the treatment efficiency can be significantly enhanced.

Results from this study showed that all pulmonary function indicators, PCT, CRP value of the research group were obviously better than those of the control group

Table 1: The pulmonary function indicators, PCT and CRP of both groups before and after treatment ($\bar{x}$ ± s)

Groups	Time	PaO2 (mmHg)	SpO2 (%)	PaO2/FiO2 (mmHg)	PCT (ng/ml)	CRP (mg/L)
Research group (n=90)	Before treatment	51.29 ± 4.28	77.80 ± 3.12	118.90 ± 2.52	1.73±0.49	80.15±10.28
	After treatment	95.36 ± 6.80	96.23 ± 5.39	369.03 ± 8.94	0.65±0.21	42.13±7.33
Control group (n=90)	Before treatment	51.29 ± 3.21	78.04 ± 3.20	118.99 ± 2.15	1.57±0.44	80.39±10.25
	After treatment	81.25 ± 5.32	82.66 ± 7.05	278.94 ± 9.52	0.96±0.35	56.47±5.70

Table 2:Comparison of overall nursing satisfaction between both groups [n (%)]

Groups	Very satisfactory	Satisfactory	Unsatisfactory	Overall nursing satisfaction
Research group(n=90)	55	33	2	88 (97.78)
Control group(n=90)	30	42	18	72 (80.00)
X^2				10.69
p				<0.05

Table 3: Comparison of the time of infection control, ICU stay and hospital stay between both groups ($\bar{x}$ ± s)

Groups	Cases	Infection control (d)	ICU stay (d)	Hospital stay (d)
Research group	90	6.03 ± 2.17	10.55 ± 3.12	14.70 ± 3.22
Control group	90	9.16 ± 2.09	15.29 ± 4.06	22.19 ± 3.05
t		10.29	8.73	9.36
p		<0.05	<0.05	<0.05

(p<0.05). The time of infection control, ICU stay, hospital stay of the research group were significantly less than those of the control group (p<0.05). Moreover, the overall nursing satisfaction of the research group was significantly higher than that of the control group (p<0.05).

CONCLUSION

In conclusion, for patients with severe pneumonia, the combined therapy of high-dose ambroxol therapy and scientific nursing mode can significantly improve the treatment effect and obtain good nursing satisfaction. Pneumonia is a common respiratory disease in clinical practice, which seriously affects the normal life of patients and even threatens their life safety. Therefore, taking effective drugs as soon as possible to control the development of the disease is particularly critical. As an effective expectorant drug, ambroxol hydrochloride can promote the dissolution of mucus, and at the same time, lubricate the respiratory tract, secrete the pulmonary surface-active substances and respiratory fluid, and promote the ciliary movement on the pulmonary surface. In order to improve the therapeutic effect, the dosage of this drug should be controlled reasonably. Studies have shown that taking large doses of ambroxol hydrochloride can effectively reduce patients' body temperature, promote patients' appetite, improve patients' mental state, and keep patients' airway unobstructed, so as to achieve better treatment effect. The results of this study are consistent with those of many domestic studies. In the future, studies on doses will be more in-depth, so as to provide valuable guidance for clinical treatment.

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