Oxygen-driving and atomized mucosolvan inhalation combined with holistic nursing in the treatment of children severe bronchial pneumonia

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Abstract: This paper aimed to discuss the method, effect and safety of oxygen-driving and atomized Mucosolvan inhalation combined with holistic nursing in the treatment of children severe bronchial pneumonia. Totally 90 children with severe bronchial pneumonia who were treated in our hospital from March 2013 to November 2013 were selected as the research objects. Based on randomized controlled principle, those children were divided into control group, test group I and test group II according to the time to enter the hospital, 30 in each group. Patients in control group was given conventional therapy; test group I was given holistic nursing combined with conventional therapy; test group II was given oxygen-driving and atomized Mucosolvan inhalation combined with holistic nursing on the basis of conventional therapy. After test, the difference of main symptoms in control group, test group I and II was of no statistical significance ($P>0.05$). Test group II was found with the best curative effect, secondary was test group I and control group was the last. It can be concluded that, oxygen-driving and atomized Mucosolvan inhalation combined with holistic nursing has certain effect in the treatment of children severe bronchial pneumonia and is better than holistic nursing only.

Keywords: Children severe bronchial pneumonia; Oxygen-driving and atomized Mucosolvan inhalation; Holistic nursing.

INTRODUCTION

Infantile pneumonia has been ranked as one of three most important infantile pneumonia by WHO and China has also classified into four critical diseases in child health (Yan, 2008). A amount of 4,000,000 children below five years old worldwide are die of pneumonia every year, most of which are from developing countries (2/3 infant), and in China, there are about 300,000. Pneumonia ranks first among the death causes of infant, and the mortality of infant is 23%, which severely threatens the health of children (Juan *et al.*, 2011). Respiratory system of children is featured by narrow lumen, few mucus secretion, lung incomplete elastic tissue with incomplete growth, poor cilia activity, active pulmonary mesenchyme growth, small amount of pulmonary alveoli, low gas content, rich blood vessel and easy to be congestive. Infection in respiratory system is more likely to result in increased respiratory secretions, congestion and edema of bronchial mucosa, thereby blocking respiratory system, making breath difficult, aggravating lung infection and inducing symptoms such as hyperpyrexia, shortness of breath. Low birth weight infant and children who have malnutrition, vitamin D deficiency rickets and congenital heart disease tend to be have severer condition, performing as unhealed condition all the year round and high fatality rate (Caiying *et al.*, 2013; Chinese Pediatric Society *et al.*, 2007).

To date, the hot solution is oxygen-driving and atomized inhalation (Lina and Lihua, 2007; Chang, 2013). Oxygen-driving and atomized inhalation is to use high flow oxygen pump to atomize drugs with oxygen flow of 8L/min. Drugs are decomposed into particles less than 25μm and they are absorbed directly into pulmonary alveoli or small airway to spread over the whole respiratory tract in a rapider way. Meanwhile, oxygen concentration achieves more than 50%, which can effective for improving oxygen partial pressure of artery and ease respiratory failure. This study took oxygen-driving and atomized Mucosolvan inhalation combined with holistic nursing as intervention measure and discussed its effect to children bronchopneumonia, which fully displays the advantage of external treatment and widens the way for clinical treatment of children with bronchopneumonia. It is of great importance to further promote the clinical effect of children bronchopneumonia, shorten the treatment process and reduce the pain of patients and save expense.

MATERIALS AND METHODS

General materials

Totally 90 children with bronchopneumonia who were treated in department of pediatrics of the First Affiliated Hospital of Zhengzhou University, Zhengzhou, China from March 2013 to November 2013 and who were conformed to the inclusion standard were selected as research objects, in which, 44 were boys and 46 were girls.

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Diagnostic criteria for children bronchopneumonia refers to Zhu Futang Textbook of Pediatrics (Shouchuan *et al.*, 2008), as shown in table 1.

The participants all conformed to the diagnosis standard for viral and bacterial children bronchial pneumonia, have a disease course less than seven days, and be aged no less than one year and meanwhile no more than fourteen years. Their guardians signed the inform consent.

All the 90 patients including 48 boys and 42 girls were divided into control group, test group I and test group II according to the time to enter the hospital, 30 in each group. The control group was given conventional therapy, test group B for holistic nursing combined with conventional therapy and test group II for oxygen-driving atomized Mucosolvan inhalation combined with holistic nursing on the basis of conventional therapy.

Observation index

The disappearance or improvement time for fever, cough, breath, phlegm, lung auscultation, etc. was observed and recorded (Shuqing *et al.*, 2013). Blood and urine routine and hepatorenal function were examined before and after treatment and then X ray examination was performed on chest. Untoward effect appeared during treatment was recorded.

Research protocol

All the cases were given conventional therapy, i.e., anti-infection, cough relieve, oxygen uptake, sedation, spasmolysis and antiasthma, supportive treatment and water electrolyte balance maintenance. Based on the comprehensive treatment above, test group II was given Mucosolvan injection (Ambroxol HCl) (7.5mg each time) and 5ml normal saline by oxygen-driving and atomized inhalation with the help of high flow oxygen pump, 2 or 3 times each day. Test group I and II are given holistic nursing. Care points are as follows. Indoor environment should be kept in a temperature of 22~24°C and in a relative humidity of 55~65% and the room is ventilated for two time every day. Children should keep proper position (semi-Fowler's position). Children are encouraged to take deep breath for better inhalation of drug. Oxygen-driving atomized Mucosolvan inhalation should be correctly operated in a temperature of about 35°C, in order to avoid inducing untoward effect. Patients should be closely observed during atomization process. If patients feel uncomfortable, nurses should make proper adjustment according to the tolerance of patients. Family members of the patient are forbidden to randomly adjust oxygen flow. If dyspnea and cyanosis of lips occur, inhalation should be immediately stopped and replaced by sputum suction and oxygen inhalation. Respiratory droplets should be removed on time. During inhalation, nurses are suggested to slap the back of children and rap. Once inhalation is finished, nurses should turn the patient over and slap on his back to promote phlegm excretion and improve lung circulation. Sputum suction can be performed if necessary.

STATISTICAL ANALYSIS

All the data collected in the research process were first quantified. Two people check and input the data into the computer. SPSS17.0 software was used to make statistical analysis. The data was tested by two-sided test (test level α=0.05). The general data of children in three groups were compared using x2 test and single factor variance analysis. Symptoms and signs of children in different groups after treatment were compared using t test on two samples.

RESULTS

Comparison of signs before test

From table 2 and 3, it could seen that, the difference of 90 patients with bronchopneumonia in age, disease course, symptom and sign was not statistically significant (P>0.05), therefore, the data was comparable.

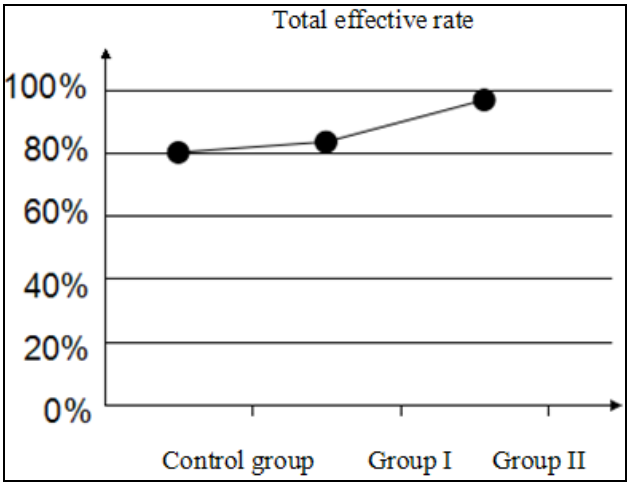

Fig. 1: Comparison of clinical effect of patients in three groups

Comparison of clinical effects after test

From table 4 and fig. 1, it could be known that, total effective rate of test groups were higher than control group (P<0.05) and test group II higher than control group (P<0.05); though no statistical significance was found between between control group and test group I (P>0.05), the total effective rate of test group II tended to be higher than test group I. Total effective rate= cure rate+ marked effect rate effective rate.

It could be seen in table 3 and fig. 1 that, after children were given intervention nursing in different scheme, the cure rate, marked effect rate, effective rate, ineffective rate and total effective rate in control group, test group I

Table 1: Diagnostic criteria of children bronchial pneumonia

Item	Criteria
Disease history	Onset is sudden, and patient has a history of upper respiratory tract infection history before onset.
Symptom	Patients are found to have fever with 38.0-39.0°C and even 40°C at early stage, mostly performing as remittent fever or irregular fever; patients are found to have a cough, expectoration and dyspnea such as nasal ala flap, three concave sign, nodding breathing and groan; patients have accelerated breathing, with a speed of 40-80 times/min.
Sign	Lung is found with medium and fine moist rale during auscultation and voiced sound during percussion.
Laboratory examination	Children with bacterial infection are found with increased white blood cell count, higher proportion of neutrophile granulocyte and nuclear left shift; children with virus infection are found with low or normal while blood cell count and sometimes abnormal lymphocyte
X-ray examination on chest	Doted and plaque-like shadows are observed.

Table 2: Comparison of general data of 90 cases of children bronchial pneumonia (mean±SD)

Item	Control group (n=30)	Test group I (n=30)	Test group II (n=30)	F value	P value
Age (year)	2.95±2.68	3.34±3.31	3.10±2.69	0.11	P>0.05
Disease course (day)	4.32±1.10	3.95±1.39	4.28±1.48	0.64	P>0.05

Table 3: Comparison of symptoms and signs of children in three groups before test (mean±SD)

Item	Control group	Test group I	Test group II	F value	P value
Fever	4.89±1.24	4.96±1.11	5.09±1.13	0.16	P>0.05
Cough	5.11±1.10	4.85±1.22	5.09±1.13	0.30	P>0.05
Breath	7.51±1.68	7.40±1.87	7.23±2.01	0.26	P>0.05
Phlegm	4.86±1.24	4.75±1.40	4.65±1.43	0.12	P>0.05
Lung auscultation	7.47±1.83	7.62±1.91	7.38±2.01	0.14	P>0.05

Table 4: Comparison of clinical effect of children in three groups after test (n,%)

Group	Effect				Z	P
	Cure rate (%n)	Marked effect rate (%n)	Effective rate (%n)	Ineffective rate (%n)		
Control group	33.33 (10)	26.67 (8)	20.00 (6)	20.00 (6)	-0.56	P>0.05
Test group I	36.67 (11)	33.33 (10)	13.33 (4)	16.67 (5)		
Control group	33.33% (10)	26.67 (8)	20.00 (6)	20.00 (6)	-2.50	P>0.05
Test group II	60.00 (18)	26.67 (8)	10.00 (3)	3.33 (1)		
Test group I	36.67 (11)	33.33 (10)	13.33 (4)	16.67 (5)	-2.02	P>0.05
Test group II	60.00 (18)	26.67 (8)	10.00% (3)	3.33% (1)		

and group II were 33.33% (10), 26.67% (8), 20.00% (6), 20.00% (6), 80%; 36.67% (11), 33.33% (10), 13.33% (4), 16.67% (6), 83.33%; 60.00% (18), 26.67% (8), 10.00% (3) and 3.33% (1), 96.67%.

DISCUSSION

Severe bronchial pneumonia, the most common lung disease in childhood, is the first reason for death of children. Clinically, antibiotic and anti-viral drugs are mostly used in treating children bronchial pneumonia (Kuihua *et al.*, 2013) and conventional pediatric nursing is the main nursing method. However, these treatments ignore the influence of long-term use of drugs on the growth of children and pain and fear of children to drugs. Recently, external treatment such as enema, massage, ultra short wave physiotherapy, cupping therapy, computer mid-frequency drug import, pasting, application, atomization widely applied clinically are generally accepted by parents and children since they are found with significant effects and no toxic and side effects. It is urgent to fully make use of the advantages of external treatment, improving the nursing quality, eliminate the pain for injection and drug taking, reduce toxic and side effects and prevent or reduce complications.

Oxygen-driving and atomized Mucosolvan inhalation is invasive. As young children are resistant to injection and drug taking, external application of Chinese medicine and

ultrasonic atomization are generally recognized by children and their parents. Performing external treatment when children is sleeping can effectively control lung inflammation, relieve cough, reduce mucosal edema, promote sputum excretion, with marked effect and no toxic and side effects, and meanwhile, eliminate the pain and fear brought by injection and drug taking. The reason why we chose Mucosolvan is that, featured by broad biological activity and high affinity (Keming and Xiaoming, 2010), it could effectively regulate the secretion of serous fluid and mucus, promote the synthesis of active substance on the surface of lung, strengthen cilia movement, enhance scavenging activity of mucociliary transport system (Jianxin, 2009), regulate alveolar macrophages, inhibit the release of inflammatory medium, reduce inflammation reaction within lung, weaken the damage of free radical to lung tissue and lower the degree of pulmonary edema (Jun, 2009).

Based on the analysis on the research results, it was found that, of 90 Children with bronchopneumonia, 58 aged from one to three years, 27 aged from three to seven years, 5 aged from seven to fourteen years (mean 3.19±3.01 years). That indicated that, infant are most likely to have bronchopneumonia, which is closely related to incomplete growth of central nervous system, weak body immunity and special anatomical physiology of respiratory system. The cure rate, marked effect rate, effective rate, ineffective rate and total effective rate in control group, test group I and test group II were 33.33% (10), 26.67% (8), 20.00% (6), 20.00% (6), 80%; 36.67% (11), 33.33% (10), 13.33% (4), 16.67% (6), 83.33%; 60.00% (18), 26.67% (8), 10.00% (3) and 3.33% (1), 96.67%, respectively. That demonstrated that, the total effective rate of two test groups was higher compared to control group, indicating oxygen-driving and atomized Mucosolvan inhalation combined with holistic nursing was more effective than conventional treatment and nursing; and the total effective rate of test group II was higher than test group II, indicating oxygen-driving and atomized Mucosolvan inhalation combined with holistic nursing was better than single nursing treatment.

CONCLUSION

On the premise of conventional treatment, the effectiveness of holistic nursing only and oxygen-driving and atomized Mucosolvan inhalation combined with holistic nursing in the treatment of children severe bronchial pneumonia are verified. Conventional treatment and holistic treatment are of no statistically significant difference, and oxygen-driving and atomized Mucosolvan inhalation combined with holistic nursing is proved to have significant effect in the treatment of children severe bronchial pneumonia.

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