Traditional Chinese Medicine for Treatment of Bronchiolitis in Young Children
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Abstract
Objective: To evaluate the rectal infusion of Traditional Chinese Medicine (TCM) in clinical treatment of pediatric bronchopneumonia in a large tertiary-care hospital in China.

Methods and Materials: A hundred cases of discharged patients, who were admitted to the hospital due to pediatric bronchopneumonia from September 2016 to May 2017, were randomly selected as the control group with the conventional Western medicine treatment; another 100 cases were selected as the treatment group combined the conventional Western medicine treatment with the rectal infusion. Clinical efficacy was observed by statistics of the average length of stay of the two groups and the recurrence rate was also recorded by the late follow-up.

Results: The total effective rate in the treatment group for the 98.0% and recovery rate and overall efficiency than the control group, by late follow-up relapse rate in the treatment group than the control group. There was a statistically significant difference (p<0.05).

Results: The recovery rate of the treatment group accounted for 88.00% (88/100) and the overall efficiency reached 98.00% (98/100, which were significantly higher than the control group, respectively 81.00% (81/100), 90.00% (90/100). Therefore, the clinical efficacy of the treatment group was better than that of the control group, with the difference having the statistical significance (P<0.05).

Conclusion: Rectal infusion of TCM treatment can shorten the course of bronchial pneumonia in children thus being proved effective. With the convenient clinical administration, it is easily accepted by children and their families.

Keywords: BC: Bronchiolitis; TCM: Traditional Chinese Medicine; RI: Rectal Infusion

Introduction
Pneumonia and bronchiolitis are listed among the three major pediatric diseases globally by the World Health Organization (WHO). About 4 million children under the age of five worldwide die of pneumonia, the vast majority of who are children in developing countries, which seriously harm their health [1]. Both diagnoses have been classified by Chinese government as targets for prevention and control within the frame of pediatric care [2].

Bronchopneumonia is the most common type of pneumonia in childhood. It attacks all year round, with more frequent in the winter and spring in northern China and frequent in the summer in southern China. According to relevant data [3, 4], children with pneumonia account for approximately 35.3% of the hospitalized children (up to 66.7% in a few studies); among them, children with bronchopneumonia account for about 94% of children with pneumonia.

Modern clinical treatment of pediatric bronchopneumonia mainly includes the antibacterial or antiviral injection and oral administration. Using these drugs for a long time usually damages the nervous system, digestive system, blood system, and also damages the function of liver and kidney, which will further affect the growth and development of children. Meanwhile, medical expenses are raised and so does the medical risk [5]. Shi Ji WU, a famous medical scientist of the Qing dynasty, mentioned in a book based on the theory of TCM that “The principle of the external treatment equals that of the internal treatment, which also applies for medicine. There is no significant difference between principles of medical science and drug properties, yet application methods do vary” He considered that the external treatment could be effective within a short time and had slight toxic and side effects. Due to the tender and thin skin of children, drugs could be highly absorbed by the skin mucous membrane. The younger the age, the higher the drug permeability and the better the effect.

The adjuvant therapy of TCM rectal infusion is adopted by our hospital to treat children with bronchopneumonia. Although the therapy is simple to be carried out, it is proved effective and has slight toxic and side effects. What’s more, it can effectively...
reduce children’s fear and pain of the oral administration and injection, fully demonstrating the characteristics and advantages shared by TCM external treatment for children with bronchial pneumonia. It is easily accepted by children and their parents, and relevant reports are as follows: Hereby we present our experience in TCM rectal infusion treatment of young children diagnosed with bronchopneumonia.

Materials and Methods

The study was conducted in the pediatrics department of our hospital through setting up “excel” data tables, and all the data came from the routine clinical work.

Diagnostic criteria (DIAGNOSTIC CRITERIA SHOULD MOVE ABOVE)

i. TCM diagnostic criteria for pediatric bronchial pneumonia The diagnostic criteria are based on the 2008 Chinese medicine society pediatric branch’s guide to the diagnosis and treatment of children’s pneumonia[6]. Primary symptoms: fever, cough, shortness of breath, thick sputum. Secondary symptoms: sweating but aerophobia, flushing, thirsty, red and swollen pharynx, dry stool, deep-colored urine, middle and fine wet rale in the lungs often accompanied by dry rale. Tongue manifestations: red tongue and yellow coating. Pulse manifestations or fingerprint: slippery and rapid pulse or blue fingerprint.

ii. Diagnostic criteria for pediatric bronchial pneumonia of the Western medicine. The diagnostic criteria are based on the diagnosis of pediatric bronchial pneumonia in the practical pediatrics of Zhu Futang [7].

a. Medical history: it has an acute onset and a history of upper respiratory infection before onset.

b. Symptoms: early fever, (mostly 38.0 °C to 39.0 °C, sometimes as high as 40 °C ), the majority of which is remittent fever or irregular fever; Cough, sputum, dyspnea (such as the nose flap, three depression sign, nodding respiration, moaning and so on); increased respiratory rate, reaching 40–80 times per minute.

c. Signs: Middle and fine wet rale can be heard in lungs when auscultation. Dull sound can be heard when percussion.

d. Laboratory examination: children with bacterial infection show an increased leukocyte count, a lifted proportion of neutrophils, and even the nuclear shift to the left. Children with viral infection indicate low white blood cell count or normal, sometimes abnormal lymphocytes.

e. Chest X-ray examination: adotted and patchy shadow.

Inclusion criteria

Children aged 6 months to 36 months diagnosed with bronchopneumonia or bronchiolitis were eligible. Bronchopneumonia, also known as lobular pneumonia, is caused by bacteria, viruses, mycoplasma, chlamydia and other pathogens that can cause inflammation of the lung tissue, mostly in children and adolescents. Bronchiolitis is a common respiratory disease in clinical practice. It is caused by acute inflammation of bronchial mucosa caused by pathogens such as bacteria, viruses and mycoplasma. Often secondary to the upper respiratory tract infection, also often pneumonia early performance. Admitted with fever (temperature >37. 8°C) of less than 48 hours duration is eligible. Fine wet rale, gurgling with sputum and wheezing sound could be heard in lungs when auscultation. A total of 200 children with the above-mentioned criteria were enrolled. Informed consent was requested by the parents or guardians of the enrolled children. The study was approved by the Ethics Committee of the hospital.

Exclusion criteria

Children were excluded if they had one of the following: another respiratory diseases (e.g. herpangina, supportive tonsillitis, bronchitis); perianal or intestinal ulcers; allergy to Chinese herbs; administration of other medications in the past 48 hours.

Method of TCM rectal infusion (THIS SECTION SHOULD MOVE ABOVE, TO THE EXCLUSION CRITERIA)

i. Contraindications

a. Following the anal, rectal and colonic operations, patients respond as severe diarrhoea, anal diseases, acute abdomen, and the suspected intestinal necrosis and perforation.

b. Hemorrhage of upper digestive tract, women’s menstrual period, pregnancy and puerperium.

ii. Treatment

Control group: Conventional western medicine treatment, including anti-infection, antivirus, bronchial diastolic agents, expectorant and etc. was given. If the body temperature was 38.5 °C or higher, oral ibuprofen suspension or acetaminophen suppository would be administered; when febrile convulsion occurred, symptomatic treatment of oxygen inhalation and sedation should be applied. When the treatment effect met the standard of clinical recovery, we recorded the curative effect after 48-hour observation.

Treatment group: Based on the control group, rectal infusion of TCM decoction was added twice a day for seven days.

a. Drug Composition: radix isatidis 10 grams, honeysuckle 10 grams, forsythia 10 grams, burdock 10 grams, radix scrophulariae 10 grams, platycodon grandiflorum 10 grams and raw licorice 6 grams were all decocted. Usage :<1 year old 10 ml/time;1–3 years old 20ml/time;3–5 years old 50 ml/time;5 years old 100 ml/time, rectal infusion should be given.

b. Specific operations: The decocted medicine is bottled and heated to 38 to 40 °C, because too high or too low
temperature will stimulate the intestinal mucosa, excite vagus nerve and lead to defecation, which will cause insufficient absorption of drugs. Informed of defecating in advance, children lie down or take the prone position to make the anus exposed. The appropriate dose of Chinese medicine is extracted with a disposable 100 ml syringe, and then we remove the needle head and connect the syringe with a disposable rectal injection catheter with the front end (5-10cm) coated with paraffin oil. The rectal length is 12 -18cm. Because there are more receptors in the lower part of the rectum than the upper part, shallow administration should be avoided considering the increased risk of leakage. It is appropriate that the depth is commonly at the rectum 12 cm below. Infusion rate is controlled at 20 - 40 drops/min, with children’s comfortable degree as the limit. After the infusion, the left hand is used to squeeze the catheter and remove it. Then the child takes the right lateral position with a pillow under his hips and rests for 10 to 15 minutes. During the treatment period, both groups were asked to have a light diet, drink more water and take more rest.

iii. Standard reference for efficacy

Refer to the grading criteria of the guidelines for the clinical study of Chinese medicine new drugs [8].

a. Recovery: no cough, expectoration and pulmonary symptoms or occasional cough and expectoration, normal body temperature, and other subsided clinical symptoms.

b. Highly effective: significantly improved symptoms of cough, expectoration and pulmonary symptoms, normal body temperature, and other receded or improved clinical symptoms.

c. Effective: improved symptoms of cough, expectoration, lung symptoms, and other clinical symptoms.

d. Invalid: no significant change or even worsened symptoms of cough, sputum expectoration and lung symptoms and so do the other clinical symptoms.

iv. Statistical methods

The processing of the relevant data is carried out with SPSS 22.0 software. If it is count data, X2 test will be preferred, and if it is measurement data, t test preferred. P<0.05 means the difference is statistically significant.

Methodology

Participating children were randomly allocated on a 1:1 ratio to either of the following groups: Group A (treatment group) and Group B (control group). Group B consisted of children treated with conventional western medicine. According to the individual situation, the control group generally was applied antibiotics, such as cephalosporin and penicillin, as appropriate, with ambroxol, acetylcysteine and other cough suppressive drugs. Group A consisted of children treated with TCM rectal infusion.

Results

The former included 53 males and 47 females, among whom the youngest was nine months ten days, and the oldest one was eight years five months. The latter included 50 males and 50 females, among whom the youngest was nine months one day, and the oldest one was ten years. Among them, the lowest clinical temperature is 36.5 °C, and the highest is 40 °C. The age distribution of children in the control group and treatment group are shown in table 1

Comparison of average days of symptoms

The table showed that the used group was more efficient than the unused group, and the difference was statistically significant.

Comparison of clinical efficacy between the two groups after treatment

After treatment, the recovery rate of the treatment group was 88.00% (88/100), and the overall efficiency reached 98.00% (98/100), which were significantly higher than the control group, respectively 81.00% (81/100), 90.00% (90/100). The difference was statistically significant (P < 0.05). See table 3, 4

The above results showed that the used group was more efficient than the unused one, and the difference was statistically significant (P = 0.017 < 0.05).

<table>
<thead>
<tr>
<th>Group</th>
<th>&lt; 1 year old</th>
<th>1 -3 years old</th>
<th>3 - 6 years old</th>
<th>More than 6 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td>The control group</td>
<td>13</td>
<td>37</td>
<td>36</td>
<td>14</td>
</tr>
<tr>
<td>The treatment group</td>
<td>2</td>
<td>35</td>
<td>45</td>
<td>18</td>
</tr>
</tbody>
</table>

There is no statistically significant difference between the two groups, such as age, sex, course of disease, and body temperature (P> 0.05), so these sets of data are comparable.

Table 1: Age distribution of control group and treatment group (unit: people).

<table>
<thead>
<tr>
<th>Group</th>
<th>The average value of the number of fever days</th>
<th>The average value of the number of fever days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>2.17</td>
<td>4.87</td>
</tr>
<tr>
<td>Treatment group</td>
<td>2.06</td>
<td>4.79</td>
</tr>
</tbody>
</table>

The table showed that the used group was more efficient than the unused group, and the difference was statistically significant.

Table 2: Average days of symptoms.
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<table>
<thead>
<tr>
<th>Group</th>
<th>The number of cases</th>
<th>Recovery</th>
<th>Excellent</th>
<th>Effectivity</th>
<th>Void</th>
<th>Recurrence</th>
<th>The recurrence rate</th>
<th>Total effective rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>100</td>
<td>81</td>
<td>6</td>
<td>3</td>
<td>10</td>
<td>17</td>
<td>17%</td>
<td>90%</td>
</tr>
<tr>
<td>The treatment group</td>
<td>100</td>
<td>88</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>11</td>
<td>11%</td>
<td>98%</td>
</tr>
</tbody>
</table>

Total effective number = healing number + significant number + efficient number

Table 3: Comparison of the treatment effect between the treatment group and control group (case, %)

<table>
<thead>
<tr>
<th>The curative effect</th>
<th>The control group</th>
<th>The treatment group</th>
<th>Chi-square</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>The total effective number</td>
<td>90</td>
<td>98</td>
<td>5.674</td>
<td>0.017</td>
</tr>
<tr>
<td>Invalid number</td>
<td>10</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The above results showed that the used group was more efficient than the unused one, and the difference was statistically significant (P = 0.017 < 0.05).

Table 4: Comparison of the clinical efficacy between the treatment group and control group (example)

Discussion

(I WILL TAKE CARE OF THE DISCUSSION AFTER THE OTHER SECTIONS ARE FINALIZED)

Rectal infusion is one of methods of TCM external treatment. Honey suppository and pig bile enema recorded on Treatise on Febrile Diseases, were the source of the rectal administration. According to TCM, the large intestine is not only a channel to transport the feces, but also a way to absorb subtle substances, such as drugs. And because “the rectus is connected with the lungs along veins”, unlike the absorption of oral drugs, drugs given through the rectus are directly carried along veins to lungs, during which drugs are spread all over the body to fully play functions. According to Modern medicine, the blood circulation of the rectal mucosa is strong due to the abundant arteries, veins and lymphatic plexus, making the drug absorption ability high. Meanwhile through the rectal administration, drugs can be directly transported into to the blood circulation along the inferior vena cava, making then work faster and fundamentally alleviate the damage caused by pathogens to the body [9]. In addition, it can avoid the liver’s first-pass detoxification effect and the influence exerted by the upper gastrointestinal value and enzyme on drugs, thus improving the concentration of drugs. The rectal absorption is faster than the oral, and its total absorption amount and bioavailability are also higher than the oral. Similar to the absorption rate and utilization rate of the intravenous administration, the rectal administration also shares advantages of injection-free and no stimulation to the gastric mucosa [10].

Here is the analysis of the compositions from the perspective of Chinese medicine efficacy and performance. Cold-natured radix isatidis tastes bitter and is targeted at liver and stomach, having the effects of heat clearing and detoxification, blood cooling and spots clearing. It has been confirmed by the modern pharmacology studies that radix isatidis is effective in antibacterial; antiviruses, anti leptospira; detoxification and improving the immune function etc. Cold-natured Honeysuckle tastes sweet and is targeted at lung, heart and stomach, having the effects of heat clearing and detoxification, dispelling wind and heat from the body. Modern pharmacological studies show that honeysuckle has antibacterial, antiviral, anti-inflammatory efficacy and the opsonization to the immune system; Cold-natured burdock tastes bitter and spicy, and is targeted at lung and stomach, having the effects of dispelling wind and heat, diffusing the lungs and promoting eruption, relieving sore throat and dispersing mass, as well as detoxification and DE tumescence. Modern pharmacological studies show that burdock has functions of anti-cancer, anti-inflammation and antiviruses, etc.

Cold-natured radix scrophulariae tastes sweet-bitter and salty, having the effects of clearing heat and cooling blood, nourishing the blood and detoxification. It has been proved by modern studies that radix scrophulariae is anti-inflammatory, anti-bacterial and antioxidant. Moderate-natured platycodon grandiflorum tastes bitter and spicy, and is targeted at lungs, having the effects of diffusing lungs and eliminating phlegm. Modern pharmacological studies indicate that it shares the advantages of sedation, analgesia, antipyretic and anti-ulcer. Therefore, the combination of these six Chinese herbs will play stronger functions of heat clearing and detoxification. To sum up, the treatment of TCM rectal infusion for pediatric bronchopneumonia shows an obvious therapeutic effect, and yet no adverse reaction has been reported. The overall efficiency is 98.0%, higher than the control group and the difference is statistically significant (P < 0.05); this method is easy to be carried out, and therefore it is worth to be widely popularized in the pediatric department of the hospital.

References


