Effect of adjuvant therapy of transfer factor oral solution on the infection process of children with Mycoplasma pneumonia

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ABSTRACT

Objective: To explore the effect of adjuvant transfer factor oral solution therapy on the infection process of children with mycoplasma pneumonia. Methods: A total of 164 children with mycoplasma pneumonia who were treated in our hospital between January 2017 and January 2018 were selected as the research subjects and divided into control group (n=82) and transfer factor oral solution group (n=82) by random number table method. Control group received clinical routine therapy for children with mycoplasma pneumonia, transfer factor oral solution group received both routine therapy and transfer factor oral solution therapy, and both groups were treated for consecutive 1 week. The differences in infection-related index levels were compared between the two groups before and after treatment. Results: Before treatment, the differences in serum levels of inflammatory factors, coagulation indexes and immunoglobulins were not statistically significant between the two groups. After 1 week of treatment, serum inflammatory factors IL-2, IL-13 and IL-18 contents of transfer factor oral solution group were lower than those of control group; serum coagulation index FIB level was lower than that of control group whereas PT and APTT levels were higher than those of control group; serum immunoglobulins IgG, IgA and IgM contents were lower than those of control group. Conclusion: Adjuvant transfer factor oral solution therapy can effectively relieve the systemic inflammatory response and reduce the coagulation system and humoral immune system function damage in children with mycoplasma pneumonia.

1. Introduction

Mycoplasma pneumonia is the most common pneumonias among the children. Mycoplasma pneumonia infection in children customed in the lungs and caused a series of lesions. Systemic infection caused by inflammatory mediators in the lungs after blood[1,2]. Most of mycoplasma pneumonia children improved after active treatment antibiotics but some sick children with weak constitution became serious and even caused major organ complications. To increase the intensity of treatment to improve the final outcome. The transfer factor oral solution has the main effective ingredients of transfer factor which immunization labeled infected cells and subjected to T cell killing can enhance the attack directivity and effectiveness of the body’s system so to rapidly control the disease[3] and confirm the feasibility of the treatment scheme.

2. Materials and methods

2.1. Case data

A total of 164 mycoplasma pneumonia children received the treatment in our hospital from January 2017 to January 2018. They were divided by reference random number table method into control group and transfer factor oral solution group with 82 patients in each group. The selected standard: (1) X-ray film of the chest showed the combination of clinical symptoms and signs and sputum culture and etc were diagnosed as mycoplasma pneumonia; (2) No history pneumonia, 6 m before entering in the hospital; (3) history of past transfer factor oral solution; (4) Age 15years old; (5) The family members signed the informed consent. Exclusion Criteria: (1) combination of other respiratory infection diseases; (2) treatment
of severe allergies. Transfer factor oral solution was added to the holistic treatment for the mycoplasma pneumonia children in this study; (3) severe autoimmune disease, abnormal coagulation function.

Control group had 40 cases with 20 females, aged 1 to 13 years old; Transfer factor oral solution group had 41 males and 41 females, aged 1 to 15 years old. The information above in the two groups was similar. The research plan was approved by the hospital ethics committee after discussion.

2.2 Treatment method

Children in the control group received the conventional treatment of mycoplasma pneumonia such as defervesce, antiasthmatic and phlegm, nutritional support, etc, besides azithromycin 10 mg/kg + 5% glucose 250 mL, intravenous drip, for one week. Children in the transfer factor oral solution group received the conventional treatment and the transfer factor oral solution treatment was added, with the detail: transfer factor oral solution, single oral administration 10 mL, once in a day for 1 week.

2.3 Observed indicator

Before and after the treatment, the peripheral blood specimen 2.0 mL was taken from the children patients. Separated the serum and frozen in aseptic EP tube for backup. Used ELISA kit to check the content of interleukins-2 (IL-2), interleukin-13 (IL-13), interleukin-18 (IL-18) in the serum inflammatory factor. Used the coagulometer system to check the level and index of coagulation function, contractinogen (FIB), prothrombi time (PT), activated partial thromboplastin time (APTT) in the serum. Used radioimmunoassay kit to check the content of the immunoglobulin IgG, IgA, IgM in serum.

2.4 Statistical treatment

All the data mentioned in this document had been entered in the software SPSS 24.0 to calculate the statistic P so that to decide the difference between the groups had the statistical significance or not (P<0.05 was the difference in this document and had statistical significance).

3. Results

3.1. Inflammatory factor

The comparison of the inflammatory factor content IL-2, IL-13, IL-18 between the groups: Before the treatment, the IL-2, IL-13, IL-18 in the serum did not have big difference between the groups (P>0.05); One week after treatment, the content of IL-2, IL-13, IL-18 in the serum in the groups were lower than before the treatment (P<0.05). One week after treatment, the content of IL-2, IL-13, IL-18 in the serum of the transfer factor oral solution group were lower than the control group (P<0.05). Refers to the following table 1.

3.2 Index of coagulation function

The comparison of the index of coagulation function level FIB (g/L), PT (s), APTT(s) between the groups: before the treatment, the serum FIB, PT, APTT level between the groups did not show a big difference (P>0.05). One week after treatment, the level of serum FIB lower than before the treatment in this two groups. The level of PT, APTT higher than before the treatment. One week after, the

### Table 1.

**Inflammatory Factor Comparison (ng/mL).**

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>IL-2</th>
<th>IL-13</th>
<th>IL-18</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Before treatment</td>
<td>One week after treatment</td>
<td>Before treatment</td>
</tr>
<tr>
<td>Control group</td>
<td>82</td>
<td>10.39±1.75</td>
<td>9.18±0.54</td>
<td>25.48±3.61</td>
</tr>
<tr>
<td>Transfer factor oral solution group</td>
<td>82</td>
<td>10.41±1.68</td>
<td>2.77±0.32</td>
<td>25.39±3.47</td>
</tr>
<tr>
<td>t value</td>
<td></td>
<td>&gt;0.05</td>
<td>&lt;0.05</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>P value</td>
<td></td>
<td>&gt;0.05</td>
<td>&lt;0.05</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

Remark: vs before the treatment, *P<0.05; vs control group, one week after treatment #P<0.05.

### Table 2.

**Comparison of the coagulation function index level.**

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>FIB</th>
<th>PT</th>
<th>APTT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Before treatment</td>
<td>One week after treatment</td>
<td>Before treatment</td>
</tr>
<tr>
<td>Control group</td>
<td>82</td>
<td>3.11±0.35</td>
<td>2.09±0.24</td>
<td>9.84±1.04</td>
</tr>
<tr>
<td>Transfer factor oral solution group</td>
<td>82</td>
<td>3.16±0.37</td>
<td>1.45±0.17</td>
<td>9.81±1.02</td>
</tr>
<tr>
<td>t value</td>
<td></td>
<td>&gt;0.05</td>
<td>&lt;0.05</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>P value</td>
<td></td>
<td>&gt;0.05</td>
<td>&lt;0.05</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

Remark: vs before the treatment in the group, *P<0.05; vs Control group, one week after the treatment, #P<0.05.
Remark: vs before the treatment in the group, solution group were lower than the control group (the content of IgG, IgA, IgM in the serum of the transfer factor oral and etc. This reach is to discuss the impact of the combined usage immunity of the body and improving the status of immune disorder be attacked by T cells had positive functions [5,6].

Lymphocytes. It was marked as infected cell and caused them to be used for the mycoplasma pneumonia treatment. Transfer factor is from the immune faction to be used for the mycoplasma pneumonia treatment. Transfer factor oral solution is the oral solution which has the main component of transfer factor and presently recommended for combined treatment is the new idea proposed presently by the scholars. Transfer factor oral solution is the oral solution which has the main component of transfer factor and presently recommended to be used for the mycoplasma pneumonia treatment. Transfer factor which is also called transmission factor is from the immune faction lymphocytes. It was marked as infected cell and caused them to be attacked by T cells had positive functions [5,6] in enhancing the immunity of the body and improving the status of immune disorder and etc. This reach is to discuss the impact of the combined usage of transfer factor oral solution and azithromycin on the infection process of the sick children [5,6]. For detail explanation is in the following.

Systemic inflammatorome is the main clinical features of the mycoplasma pneumonia children. After Mycoplasma invading, it stimulated the body to produce various proinflammatory factors which was aggregated and infiltrated in the infected tissue mucous membrane and caused local tissue damage. Sick children started to have the clinical manifestation [7,8] such as cough, expectoration, fever etc. IL-2 produced by Th0 cells, can improve the differentiation of Th0 into Th1 and enhance the inflammatory response [9,10] in the body. IL-13 produced by Th2 cells, was to cause the mass synthesis of IL-13 when under the stimulation of mycoplasma and promoted the release of a variety of chemokines [11]. IL-8 was secreted by mononuclear macrophage and can inducible T Lymphocyte secreting interferon. This had been proved to participate in the development of various respiratory infectious diseases [12,13]. The result in this article is to present: Children in the transfer factor oral solution group after the treatment, the content of IL-2, IL-13, IL-18 in serum is low. This means the adjunctive therapy of transfer factor oral solution is helpful to further control the systemic inflammatory response in children with Mycoplasma. Persistent infection of mycoplasma can affect the coagulation function of children. This is the main reason to cause mycoplasma pneumonia children to the complication such as cerebral infarction and venous thrombosis. The inflammatory system was interchanged with the coagulation system under the action of inflammatory factor and caused microvascular dysfunction and the body was in a relatively high state of coagulation [14,15]. FIB can increase abnormally in acute infection diseases and this was used to evaluate the influence of pathogenic bacteria on coagulation system. The lower level of PT and APTT indicates that the body is in hypercoagulable state [16,17]. The result in the article showed: FIB level in serum after treatment in both groups was lower than before the treatment. PT and APTT level were higher than before the treatment. Compared with the control group, FBI level in serum of the transfer factor oral solution group was lower, and PT, APTT level were higher. This means that transfer factor oral solution adjuvant therapy can help to avoid excessive activation of coagulation

### Table 3

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Before the treatment</th>
<th>One week after treatment</th>
<th>Before the treatment</th>
<th>One week after treatment</th>
<th>Before the treatment</th>
<th>One week after treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Group</td>
<td>82</td>
<td>1.94±0.25</td>
<td>1.75±0.18*</td>
<td>9.48±1.02</td>
<td>6.33±0.68*</td>
<td>1.54±0.17</td>
<td>1.31±0.15*</td>
</tr>
<tr>
<td>Transfer factor oral solution group</td>
<td>82</td>
<td>1.92±0.23</td>
<td>1.36±0.15*</td>
<td>9.37±1.29</td>
<td>4.19±0.55*</td>
<td>1.58±0.16</td>
<td>1.12±0.13*</td>
</tr>
</tbody>
</table>

### 3.3 Immunoglobulin

Content Comparison of IgG, IgA, IgM of immunoglobulin between the groups: before the treatment, the content of IgG, IgA, IgM in the serum did not show big difference (P>0.05); One week after treatment, the IgG, IgA, IgM in the serum of the two groups were lower than before the treatment (P<0.05). One week after treatment, the content of IgG, IgA, IgM in the serum of the transfer factor oral solution group were lower than the control group (P<0.05). For detail in the following Table 3.

### 4. Discussion

Mycoplasma pneumonia cause is quite long and the difference of clinical symptoms among different individuals is larger. If the treatment is improper, the disease continues to be deferred and cause the major organ complications such as myocarditis, encephalitis, etc. and threaten the health and life of the sick children. Azithromycin is a reliable antibiotic for the treatment of mycoplasma pneumonia children. After Mycoplasma invading, it stimulated the body to produce various proinflammatory factors and threatened the health and life of the sick children. Azithromycin can affect the coagulation function of children. This is the main reason to cause mycoplasma pneumonia children to the complication such as cerebral infarction and venous thrombosis. The inflammatory process of the sick children had positive functions [5,6] in enhancing the immunity of the body and improving the status of immune disorder and etc. This reach is to discuss the impact of the combined usage of transfer factor oral solution and azithromycin on the infection process of the sick children [5,6]. For detail explanation is in the following.

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function in children with mycoplasma pneumonia. This is also the direct evidence that it prevents children from developing the infection process.

Humoral immune system is one of the important immune systems that affect the mycoplasma pneumonia. The research discovered that the content of the various immunoglobulin in serum and complement of the mycoplasma pneumonia children were higher than the same age healthy children [18,19]. Accumulation of immune complex activated complement and accelerated the production of neutrophil chemotactic factor. Chemokines further attracted leukocytes to accumulate in lesions and aggravated lesions [20,21]. The result in the article showed: the content of IgG, IgA, IgM in serum after treatment, the transfer factor oral solution group were lower than the control group. This indicated that the transfer factor oral solution adjuvant therapy can reduce humoral immune dysfunction in children with mycoplasma pneumonia. This is another powerful evidence for its suppression of the infection process.

Hence, the conclusion was: Children with mycoplasma pneumonia received adjunctive therapy of transfer factor oral solution can effectively reduce the systemic inflammatory response in the body and lighten the damage of pathogenic bacteria to blood coagulation system and humoral immune system. It is worth promoting and applying in the future clinical practice.

Reference


Pharm Sci 2017; 30(3(Special)): 1099-1102.


