Effect of Yanhuning on the serum inflammatory cytokines and immunological function of children with mycoplasma pneumonia

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Objective: To probe the effect of Yanhuning on the Serum inflammatory cytokines and immunological function of children with mycoplasma pneumonia. Method: 110 children with MP were randomly divined into observed group (treated with azithromycin and Yanhuning) and control group (only treated with azithromycin) with 55 cases respectively. Results: Compared with those before treatment, serum levels of inflammatory cytokines (TNF-α, IL-6, IFN-γ, IL-2, IL-13) and immune function indicators (CD4+, IgG) of the two groups all have significant difference. When compared with those of control group, serum levels of inflammatory cytokines including TNF-α, IL-6, IFN-γ, IL-2, IL-13 and immune function indicators of CD4+ all have significant difference, while IgG level has no significant difference. Conclusions: Yanhuning has significant curative effect on the treatment of children with mycoplasma pneumonia and can effectively improve patients' serum inflammatory factors and immunological function indexes.

1. Introduction

Mycoplasma pneumonia is an acute respiratory tract infection disease caused by Mycoplasma pneumoniae (MP) with the main symptoms of lung inflammation accompany by intractable cough[1]. It’s one of the most common pneumonia diseases in children and has become a main disease to threat children’s health due to the increasing incidence rate year by year. Studies have suggested that abnormal expression of inflammatory cytokines and disorder of the immune function are closely related to the pathogenesis of MP and Yanhuning can effectively improve the clinical symptoms of children with MP[4,5]. Based on this, our study aims to probe the effect of Yanhuning on the Serum inflammatory cytokines and immunological function of children with mycoplasma pneumonia, explore the MP occurrence and development mechanism to provide a theoretical basis for the diagnosis and treatment of MP.

2. Materials and methods

2.1. Clinical information

Study was undertaken of 110 cases of children with mycoplasma pneumonia in our hospital from Jan. 2013 to Dec. 2013. Mycoplasma pneumoniae pneumonia diagnoses code with the diagnostic standard of practical pediatrics. Patients were randomly divided into the control group (treated with only azithromycin) and the observation group (treated with azithromycin and Yanhuning), each 55 cases. In the observation group, male 35 cases and female 20 cases, age ranged from 2.4-14.2 yr, with a mean age of (5.4±1.2); the course of 1-13 d, with the average day of (5.8±2.1). In the control group, male 28 cases and female 27 cases, age ranged from 1.6-11.4 yr, with a mean age of (4.9±2.6); the course of 3-14 d, with the average day of (5.2±1.7). Two groups of children had no significant difference in gender, age, course of disease and
comparable.

2.2. Treatment method

The control group was given azithromycin treatment, 10 mg/(kg•d) azithromycin injection (Hunan Hengsheng Pharmaceutical Co. Ltd) accession to the 5% GS in the intravenous drip. The observation group was given azithromycin combined Yanhuning treatment, 10 mg/(kg•d) azithromycin injection and 10 mg/(kg•d) Yanhuning freeze-dried powder (Jilin Aodong Taonan pharmaceutical Co. Ltd) accession to the 5% GS in the intravenous drip. Both two groups of children were treated for 12 d.

2.3. Detection method

Serum inflammatory factors (TNF-α, IL-6, IFN-γ, IL-2, IL-13) were detected by enzyme linked immunosorbent assay (ELISA), kit was provided by Shanghai AnYan biological company. Immune function detection target CD4+ was measured by BD FACSVersa flow cytometry (Beijing dongxun Tiandi Medical Instrument Co., Ltd). Serum immunoglobulin IgG was detected by Immune rate nephelometry, kit was provided by Beijing Dongge Boye biological Co Ltd.

2.4. Statistical treatment

Dates were analyzed by statistical software SPSS 17.00, measurement data showed by (mean±SD), the groups were compared using $t$ test, $P<0.05$ considered for the difference had significant difference.

3. Results

3.1. Comparison two groups’ children serum pro-inflammatory factor levels before and after treatment

Before treatment, the serum TNF-α, IL-6 and IFN-γ level showed no significant difference between two groups ($P>0.05$). After the treatment, the above indexes levels were significantly lower than the same group before treatment ($P<0.05$), and those in the observation group were significantly decreased than in the control group after treatment ($P<0.05$).

Table 1

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>TNF-α (pg/mL)</th>
<th>IL-6 (pg/mL)</th>
<th>IFN-γ (pg/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation</td>
<td>Before T</td>
<td>28.47±6.32</td>
<td>19.34±5.24</td>
<td>97.54±6.32</td>
</tr>
<tr>
<td></td>
<td>After T</td>
<td>13.75±5.78</td>
<td>10.32±5.51</td>
<td>80.31±4.65</td>
</tr>
<tr>
<td>Control</td>
<td>Before T</td>
<td>27.58±5.89</td>
<td>20.45±5.44</td>
<td>95.67±5.42</td>
</tr>
<tr>
<td></td>
<td>After T</td>
<td>19.25±5.64</td>
<td>12.54±3.65</td>
<td>85.34±3.67</td>
</tr>
</tbody>
</table>

3.2. Comparison two groups children serum anti-inflammatory factor levels before and after treatment

Before treatment, the serum IL-2 and IL-13 level showed no significant difference between two groups ($P>0.05$). After the treatment, IL-2 level increased while IL-13 level decreased significantly compared with the same group before treatment ($P<0.05$). After treatment, the observation group IL-2 was significantly higher while IL-13 was significantly lower than that of the control group ($P<0.05$). Table 2.

Table 2

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>IL-2 (pg/mL)</th>
<th>IL-13 (pg/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation</td>
<td>Before T</td>
<td>4.15±5.36</td>
<td>125.12±3.32</td>
</tr>
<tr>
<td></td>
<td>After T</td>
<td>9.42±5.32</td>
<td>68.65±4.53</td>
</tr>
<tr>
<td>Control</td>
<td>Before T</td>
<td>4.53±6.58</td>
<td>124.56±5.25</td>
</tr>
<tr>
<td></td>
<td>After T</td>
<td>6.93±3.03</td>
<td>72.54±3.65</td>
</tr>
</tbody>
</table>

3.3. Comparison two groups’ children immune factor levels before and after treatment

Before treatment, the serum CD4+ and IgG level showed no significant difference between two groups ($P>0.05$). After the treatment, the above indexes levels were significantly increased than the same group before treatment ($P<0.05$). After the treatment, the observation group CD4+ were significantly higher while IgG level had no significant differences compared with the control group ($P<0.05$). Table 3.

Table 3

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>CD4+ (%)</th>
<th>IgG (g/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation</td>
<td>Before T</td>
<td>28.53±4.65</td>
<td>27.53±4.65</td>
</tr>
<tr>
<td></td>
<td>After T</td>
<td>37.42±5.86</td>
<td>34.74±4.13</td>
</tr>
<tr>
<td>Control</td>
<td>Before T</td>
<td>9.08±5.32</td>
<td>11.35±2.89</td>
</tr>
<tr>
<td></td>
<td>After T</td>
<td>9.23±4.75</td>
<td>10.98±4.27</td>
</tr>
</tbody>
</table>

4. Discussion

At present, the pathogenesis of mycoplasma pneumonia is not clear and it has the following two popular views. Shenoy[6] thinks MP directly invades lung tissue cause the abnormal expression of serum inflammatory factors, specifically for the anti-inflammatory and enhanced proinflammatory cytokine expression[7]. Other scholars[8,9] think that MP stimulates the B or T lymphocyte activation to produce the body’s immune response with specific IgM, IgG and IgA generation, cause multiple system and organization immune damage.

Yanhuning is made of the extract of Andrographis paniculata and has high biological activity. The main effective component of Yanhuning is potassium sodium Dehydroandrographolide
Succinate which has the advantages of good security, high solubility, and low toxicity and can directly enter the blood circulation. Because of the multiple effects of clearing heat, detoxification, anti-inflammatory, bactericidal, anti-virus and immunity enhancement[10,11], It’s usually used in the clinical treatment of pediatric diseases[12]. Clinical studies have confirmed[13,14] that Yanhuning can significantly restrain early increased capillary permeability and inflammatory exudation and edema, enhance the phagocytic function of neutrophil and the humoral immunity ability. It can obviously improve the inflammatory stress and immune state for children with acute viral gastroenteritis or MP.

In our study, both two groups children (treated with only azithromycin and treated with azithromycin combined Yanhuning) serum TNF-α, IL-6 and IFN-γ level decreased significantly (P<0.05); the observation group children serum TNF-α, IL-6 and IFN-γ levels were significantly lower than that of the control group treated with only azithromycin, which indicated that Yanhuning have the advantage of decreasing the above indexes levels. After treatment, both two groups children serum IL-13 level decreased while IL-2 level increased significantly (P<0.05); the observation group children serum IL-13 level was significantly lower while IL-2 level higher than that of the control group, which indicated that Yanhuning can decrease the serum IL-13 level and improve the IL-2 level in children with MP. Anti-inflammatory factor IL-13 level decreased in the course of treatment, reasons may be MP stimulates the inflammatory reaction, proinflammatory cytokines produced in great quantities, activate the expression and release of IL-13 to against excessive inflammation[15]. After treatment, proinflammatory cytokines significantly reduced, inflammatory reaction was controlled and IL-13 expression decreased. And IL-13 decreased obviously after the combination treatment.

In immune response, two groups children serum CD4+, IgG level in convalescent period was significantly lower than that in the disease stage (P<0.05); In convalescent period, the observation group children serum CD4+ level decreased and IgG level showed no significant difference compared with that of the control group, which indicated that Yanhuning can effectively inhibit CD4+, IgG level in children with MP. The level of IgG showed no significant difference before and after treatment, reasons may be that IgG generally began to increase after 2 weeks of the incidence of MP[16].

References


