Study on the influence of puerarin injection for the pulmonary surfactant protein and inflammatory mediators of children with severe pneumonia

Lv-Wei Zhang
Maternal and Child Care Service Center, Xinglong County, Chengde City, Hebei Province, 067300, China

ARTICLE INFO

Article history:
Received
Received in revised form
Accepted
Available online

Keywords:
Puerarin injection
Children with severe pneumonia
Pulmonary surfactant protein
Inflammatory mediators

ABSTRACT

Objective: To study and observe the influence situation of puerarin injection for the pulmonary surfactant protein and inflammatory mediators of children with severe pneumonia. Methods: 60 children with severe pneumonia in our hospital from February 2013 to January 2015 were selected as study object, and they were randomly divided into control group (routine treatment group) 30 cases and observation group (routine treatment and puerarin injection group) 30 cases, then the serum pulmonary surfactant protein and inflammatory mediators of two groups before the treatment and at different time after the treatment were respectively detected and compared. Results: The serum pulmonary surfactant protein and inflammatory mediators of observation group at third, fifth and tenth day after the treatment were all obviously lower than those of control group, all \( P<0.05 \), the comparison indexes after the treatment all had significant differences. Conclusions: The influence of puerarin injection for the pulmonary surfactant protein and inflammatory mediators of children with severe pneumonia are great, and it can effectively improve the disease state of children with severe pneumonia.

1. Introduction

Pneumonia has a high incidence in children, with harmful effect on respiratory system as well as growth and development of children. Severe pneumonia can even be life-threatening for children, so extremely high attention is paid to pneumonia of this kind in treatment. In addition, many studies show that the relevant lung indexes appear abnormal due to the inflammation and pathology in lung so that these indexes can be important factors to know the disease progress\(^{[1-3]}\). In this study, effect of puerarin injection on the pulmonary surfactant protein and inflammatory mediators in children with severe pneumonia is undergone and the findings are as below.

2. Materials and methods

2.1 Clinical materials

A total of 60 cases of children with severe pneumonia in the hospital from February 2013 to January 2015 were randomly divided into control group (conventional treatment group) and experimental group (conventional treatment combined with puerarin injection group). In the 30 cases of control group, there were 16 male cases and 14 female cases, aged 0.3-7.8 years, with average age of \((4.2\pm0.7)\) years, disease duration of 1.0-5.5 d and average disease duration of \((3.1\pm0.6)\) d. In the 30 cases of experimental group, there were 17 male cases and 13 female cases, aged 0.3-8.0 years, with average age of \((4.1\pm0.8)\) years, disease duration of 1.5-5.5 d and average disease duration of \((3.2\pm0.5)\) d. No significant difference was observed in gender distribution, age and disease duration in both groups with \( P>0.05 \), so the two groups were comparable.

2.2 Methods

2.2.1 Treatments

Conventional treatment for severe pneumonia was conducted for the control group, including anti-infection, oxygen inhalation therapy, fever-reducing, expectorants and antistressives and so forth. For the experimental group, puerarin treatment was added on the basis of conventional treatment. Intravenous drip of 8.0 mg/kg of puerarin and 5% of GS was performed once a day for a continuous
10 d. The serum pulmonary surfactant protein and inflammatory mediators in two groups at different time before and after treatment were tested and compared.

2.2.2 Test indexes and methods

Peripheral venous blood of patients 3 d, 5 d, 10 d before and after treatment was tested and centrifuged, after which the upper serum was tested. Pulmonary surfactant protein indexes like SP-A, SP-B, SP-C and SP-D, proinflammatory mediators like IL-1β, IL-6, IL-8 and TNF-α and anti-inflammatory mediators like IL-4, IL-10, IL-13 and TGF-β were tested by corresponding ELISA. The testing results of two groups were then collected and compared, respectively [4,5].

2.3 Statistical processing

All of the enumeration data and measurement data were processed by SPSS 15.0 by the means of t and \( \chi^2 \) respectively. If \( P<0.05 \), significant difference was observed.

3. Results

3.1 Comparison of serum pulmonary surfactant protein before and after treatment

Before treatment, when the levels of serum pulmonary surfactant protein in both groups were compared, \( P>0.05 \). However, 3 d, 5 d, 10 d after treatment, the level of serum pulmonary surfactant protein in experimental group was apparently lower than that in control group, with \( P<0.05 \). More details were given in Table 1.

3.2 Comparison of serum proinflammatory mediators before and after treatment

In the case of the comparison of the levels of serum proinflammatory mediators in both groups before treatment, \( P>0.05 \). However, the level of serum proinflammatory mediators in experimental group 3 d, 5 d, 10 d after treatment was obviously lower than that in control group and \( P<0.05 \). More details were presented in Table 2.

3.3 Comparison of serum anti-inflammatory mediators before and after treatment

In the case of the comparison of the levels of serum anti-inflammatory mediators in both groups before treatment, \( P>0.05 \). However, the level of serum anti-inflammatory mediators in experimental group 3 d, 5 d, 10 d after treatment was obviously lower than that in control group and \( P<0.05 \). More details were provided in Table 3.

4. Discussion

Pneumonia is a sort of respiratory disease, with a high incidence among people of all age. It carries obvious hazard for children and severe pneumonia is in particular more hazardous for children clinically. There are many studies on the treatment of children with severe pneumonia clinically, but the study on the related indexes of severe pneumonia remains a gap. Therefore, it is necessary to perform a deeper research, so that the diagnosis and monitoring of the disease can be given accordingly. Pulmonary surfactant protein...
Table 3
Comparison of serum anti-inflammatory mediators of two groups before and after treatment.

<table>
<thead>
<tr>
<th>Groups</th>
<th>IL-4 (ng/L)</th>
<th>IL-10 (pg/mL)</th>
<th>IL-13 (ng/L)</th>
<th>TGF-β (ng/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Group (n=30)</td>
<td>Before treatment</td>
<td>336.96±35.24</td>
<td>31.15±3.96</td>
<td>11.31±1.45</td>
</tr>
<tr>
<td></td>
<td>3 d after treatment</td>
<td>302.79±32.59</td>
<td>26.73±3.42</td>
<td>10.56±1.13</td>
</tr>
<tr>
<td></td>
<td>5 d after treatment</td>
<td>264.84±29.78</td>
<td>20.15±2.48</td>
<td>8.45±0.78</td>
</tr>
<tr>
<td></td>
<td>10 d after treatment</td>
<td>234.91±28.52</td>
<td>14.95±1.82</td>
<td>7.05±0.62</td>
</tr>
<tr>
<td>Experimental Group (n=30)</td>
<td>Before treatment</td>
<td>336.89±35.19</td>
<td>31.19±3.93</td>
<td>11.34±1.42</td>
</tr>
<tr>
<td></td>
<td>3 d after treatment</td>
<td>245.87±29.64*</td>
<td>17.85±2.20*</td>
<td>8.20±0.74*</td>
</tr>
<tr>
<td></td>
<td>5 d after treatment</td>
<td>210.18±26.76*</td>
<td>11.46±1.42*</td>
<td>6.18±0.59*</td>
</tr>
<tr>
<td></td>
<td>10 d after treatment</td>
<td>192.12±20.74*</td>
<td>7.10±1.07*</td>
<td>4.20±0.45*</td>
</tr>
</tbody>
</table>

Compared with control group, *P<0.05.

is an index related to the bad condition of lung, especially the lung injury. It carries a prominent function in pulmonary inflammation and immune regulation. The relative lack of study on the change of pulmonary surfactant protein in children with severe pneumonia poses a high value to conduct a deeper research. In addition, inflammatory mediators is an index appearing abnormal condition in all inflammatory diseases, among which proinflammatory and anti-inflammatory mediators play a significant role in the regulation of inflammatory balance[6,7]. As a great inflammatory response usually appears in severe pneumonia, the change of inflammatory mediators is relatively obvious. Nevertheless, the study on the change of proinflammatory and anti-inflammatory mediators in patients with severe pneumonia is insufficient, so the study on this perspective in the case of children of severe pneumonia still has a lot to fulfill[8].

In this study, the effect of puerarin injection on pulmonary surfactant protein and inflammatory mediators in the children with severe pneumonia was observed and studied. The results were compared with those of children without puerarin injection and it showed that puerarin plays a positive role clinically in improving the bad condition of lung and inflammatory response[9,10]. The clinical manifestations were that the serum SP-A, SP-B, SP-C and SP-D in patients was relatively well controlled, the level of proinflammatory and anti-inflammatory mediators dropped greatly, and etc. which served as an approval of the application value of puerarin in children with severe pneumonia. In the case of the reasons, it is believed that it is connected to the function of puerarin in immune regulation and microcirculation improvement so that the pulmonary blood supply can be improved and therefore the bad condition of lung can be improved. In conclusion, it is believed that the puerarin injection poses a significant effect on pulmonary surfactant protein and inflammatory mediators in children with severe pneumonia and plays an effective role in improving the bad condition.

References
