Effect of ursodeoxycholic acid combined with bifidobacterium quaduple preparations on myocardial enzyme, immune function and inflammatory response of hyperbilirubinemia neonatal

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Objective: To investigate the effects of myocardial enzyme, immune function and inflammatory response by ursodeoxycholic acid combined with bifidobacterium quaduple preparations on hyperbilirubinemia neonatal.

Methods: A total of 100 cases of neonatal hyperbilirubinemia in our hospital from June 2016 to May 2017 were selected and divided into control group and observation group by random number table, 50 cases in each group. Two groups of neonatal were given routine symptomatic treatment. The control group was treated with ursodeoxycholic acid and the observation group was treated with Bifidobacterium tetralogy of live bacteria on the basis of the control group. The two groups of neonatal were both treated for 7 d. The serum levels of CK-MB, CK, LDH, AST, CD3+, CD4+, CD4+/CD8+, CD8+, CRP and TNF-α were measured before and after the treatment of the two groups.

Results: Before treatment, there was no significant difference in serum CK-MB, CK, LDH, AST, CD3+, CD4+, CD4+/CD8+, CD8+, CRP and TNF-α levels between the 2 groups. After treatment: 2 groups of serum CK-MB, CK, LDH, AST, CD8+, CRP, TNF-α levels significantly decreased compared with the group before treatment, CD3+, CD4+ and CD4+/CD8+ levels were significantly increased after treatment, and the observation group with serum CK-MB, CK, LDH, AST, CD8+, CRP, TNF-α levels were significantly lower than the control group, CD3+, CD4+ and CD4+/CD8+ levels were significantly higher than the control group, the differences were statistically significant.

Conclusion: Ursodeoxycholic acid combined with Bifidobacterium quaduple viable tablets can reduce the activity of myocardial enzyme, improve the state of spectrum index of neonatal hyperbilirubinemia.

1. Introduction

Hyperbilirubinemia is due to the high level of bilirubin in the serum, causing the skin, yellow dye of the sclera and the injury of the myocardium[1-3]. Ursodeoxycholic acid is a hydrophilic bile acid with hepatocyte protection and cytotoxicity. It can promote the secretion and immune regulation of liver cells, and has the function of protecting liver and choling[4]. Bifidobacterium has the effect of immune enhancement, improving gastrointestinal function and so on[5,6]. It can promote the reduction of bilirubin into urinary biliruogen and fecal biliruogen and expel in vitro and can also decompose the cholic acid into free cholic acid and reduce the combination of cholic acid reabsorption[7]. This study analyzed the influence of ursodeoxycholic acid combined with Bifidobacterium quaduple viable tablets on myocardial enzymes, immune function and inflammatory factors in neonates with hyperbilirubinemia. The present report is as follows.

2. Information and methods

2.1 Clinical data

A total of 100 cases of hyperbilirubinemia in our hospital from June 2016 to May 2017 were selected. All the children were in accordance with the diagnostic criteria of hyperbilirubinemia in the
fourth edition of "practical neonatal study"[8]. The random number table was used to divide into the control group and the observation group. There were 50 cases in the observation group, 28 men, 22 women, 34 to 42 weeks of fetal age, and the birth weight of 2.3 to 4.1 kg. In the control group, there were 50 cases of male 26, female 24, fetal age from 34 to 42 weeks, and the birth weight was 2.2 to 4.2 kg. The difference of general data between the two groups was not statistically significant and comparable. Inclusion criteria: (1) those diagnosed as hyperbilirubinemia; (2) those approved by the hospital ethics committee; (3) excluding other diseases, such as cardiovascular and cerebrovascular diseases, liver and kidney dysfunction, etc. Exclusion criteria: (1) patients with functional impairment of heart, brain and liver; (2) those who cannot cooperate with the treatment; (3) patients with severe congenital malformation or chromosomal abnormalities. The family members of the selected children were informed and signed the informed consent.

2.2. Therapeutic method

The two groups of children were given conventional blue light and other symptomatic treatment. The control group was treated with ursodeoxycholic acid (German Fogg pharmaceutical factory), 5 mg/kg/times, 2 times a day, and dissolved in warm water or milk under 50 degrees centigrade. On the basis of the control group, the observation group was given Bifidobacterium quadruple viable tablets (Hangzhou Yuanda bio Pharmaceutical Co., Ltd.), 1 tablets/time, 2 times a day, dissolved in 50 temperatures below the warm water or milk. All of the two groups were treated with 7 d.

2.3 Test method

2.3.1 Detection of activity level of myocardial enzyme spectrum index

After treatment and treatment of 7 d, serum of 2 groups of children were taken respectively. Using PUZS-300X automatic biochemical analyzer (Beijing perlong New Technology Co. Ltd.) by enzyme rate method for detecting serum creatine kinase isoenzyme (CK-MB), creatine kinase (CK), lactate dehydrogenase (LDH) and aspartate aminotransferase (AST) activity level.

2.3.2 Detection of immune function

2 groups of peripheral blood were taken before and after the treatment of 7 d. The use of Attune Nxt flow cytometry (Thermo Fisher Scientific Co. Ltd.) detection of peripheral blood T lymphocytes in CD3+, CD4+, CD8+ level, and the ratio of CD4+/CD8+.

Table 1.

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Time</th>
<th>CK-MB</th>
<th>CK</th>
<th>LDH</th>
<th>AST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>50</td>
<td>Before treatment</td>
<td>40.6±9.4</td>
<td>210.1±34.8</td>
<td>240.5±54.6</td>
<td>63.2±14.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After treatment</td>
<td>19.7±5.8*</td>
<td>52.3±11.7*</td>
<td>124.8±17.9*</td>
<td>29.2±7.8*</td>
</tr>
<tr>
<td>Observation group</td>
<td>50</td>
<td>Before treatment</td>
<td>41.3±8.6</td>
<td>212.5±32.4</td>
<td>239.9±56.1</td>
<td>62.6±13.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After treatment</td>
<td>13.2±3.9*</td>
<td>41.9±10.3*</td>
<td>110.4±12.5*</td>
<td>21.4±6.2*</td>
</tr>
</tbody>
</table>

Compared with before treatment, *P<0.05; compared with the control group, ##P<0.05.

2.3.3 Detection of inflammatory factors

After treatment and treatment of 7 d, serum of 2 groups of children were taken respectively. The serum level of TNF-α in children was detected by double antibody sandwich enzyme-linked immunosorbent assay (ELISA). Using PUZS-300X automatic biochemical analyzer (Beijing perlong New Technology Co. Ltd.) detection of serum C reactive protein (CRP) level.

3. Result

3.1 Analysis of the activity level of myocardial enzyme spectrum index

Before treatment, there was no statistical difference between the serum levels of CK-MB, CK, LDH and AST in the 2 groups (P>0.05). After treatment, the activity levels of CK-MB, CK, LDH and AST in the 2 groups were significantly lower than those in the group before treatment (P<0.05), and the levels of CK-MB, CK, LDH and AST in the serum of the observation group were significantly lower than those in the control group after treatment (P<0.05). See Table 1.

3.2 Analysis of the level of immune function

Before treatment: the levels of serum CD3+, CD4+, CD8+ and CD4+/CD8+ in the 2 groups were equal, and P>0.05. After treatment: the levels of serum CD3+, CD4+ and CD4+/CD8+ in the 2 groups were significantly higher than those in this group, and the
Comparison of the levels of immune functional factors in the 2 groups of children before and after treatment.

Table 2.

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Time</th>
<th>CD3+ (%)</th>
<th>CD4+ (%)</th>
<th>CD8+ (%)</th>
<th>CD4+/CD8+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>50</td>
<td>Before treatment</td>
<td>56.17±7.12</td>
<td>30.45±4.28</td>
<td>31.22±4.13</td>
<td>1.18±0.12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After treatment</td>
<td>66.01±8.02*</td>
<td>41.53±5.97*</td>
<td>24.62±3.02*</td>
<td>1.84±0.39*</td>
</tr>
<tr>
<td>Observation</td>
<td>50</td>
<td>Before treatment</td>
<td>56.04±7.25</td>
<td>30.87±4.56</td>
<td>31.09±4.07</td>
<td>1.19±0.11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After treatment</td>
<td>76.14±11.27*</td>
<td>52.15±6.88*</td>
<td>19.03±2.87*</td>
<td>2.51±0.67*</td>
</tr>
</tbody>
</table>

Compared with before treatment, *P<0.05; compared with the control group, #P<0.05.

Comparison of the levels of inflammatory factors in the 2 groups of children before and after treatment.

Table 3.

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Time</th>
<th>TNF-α (pg/mL)</th>
<th>CRP (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>50</td>
<td>Before treatment</td>
<td>131.25±15.6</td>
<td>13.09±1.89</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After treatment</td>
<td>69.84±7.66*</td>
<td>7.02±0.65*</td>
</tr>
<tr>
<td>Observation</td>
<td>50</td>
<td>Before treatment</td>
<td>132.17±14.9</td>
<td>13.12±1.82</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After treatment</td>
<td>43.65±4.98*</td>
<td>3.98±0.33*</td>
</tr>
</tbody>
</table>

Compared with before treatment, *P<0.05; compared with the control group, #P < 0.05.

3.3 Analysis of the level of inflammatory factors

Before treatment, the levels of TNF-α and CRP in the serum of the 2 groups were equal (P>0.05). After treatment, the serum TNF-α and CRP levels in the 2 groups were significantly lower than those in the control group (P<0.05), and the levels of TNF-α and CRP in the serum of the observation group were significantly lower than those in the control group after treatment (P<0.05). See Table 3.

4. Discussion

Hyperbilirubinemia is a common disease of the newborn. The clinical incidence is up to 30% to 50%, mainly due to the high level of bilirubin in the body of the newborn. Bilirubin is the heme metabolite of red blood cells in the blood, and the spleen produces bilirubin when it destroys old red blood cells. Bilirubin is discharged through the liver and is discharged from the bile duct to the duodenum. Bilirubin is an important basis for clinical diagnosis of jaundice, and also an important indicator of liver function[9,10]. Because of the short life of the erythrocytes in the newborn and the excessive destruction of red blood cells, it is very easy to lead to the increase of bilirubin level[11–15]. The promotion of bilirubin excretion and the reduction of reabsorption are the principle of early treatment of hyperbilirubinemia[16,17]. The most commonly used, safe and effective method of treatment for hyperbilirubinemia, which is not combined with bilirubin elevation, is phototherapy. Ursodeoxycholic acid has the effect of protecting liver, gallbladder and yellowing[18]. Bifidobacterium is an important enteric beneficial microorganism. It has a certain clinical effect on intestinal flora disorder, diarrhea, abdominal pain and constipation[19]. It can also promote the reduction of bilirubin into urinary bilirubinogen and fecal bilirubin and expel in vitro, and has the role of auxiliary yellowing.

It has been found that when the level of bilirubin is too high, it can be deposited in the myocardium and damage the heart of the patient. The degree of myocardial damage can be indicated by the elevation of various levels of myocardial enzyme spectrum[20]. The immune function of the newborn was not fully developed. The results show that the high level of bilirubin also leads to the imbalance of T lymphocyte subsets and the abnormality of humoral immunity[21].

The results showed that after treatment, the levels of CD3+, CD4+ and CD4+/CD8+ in the 2 groups were significantly higher than those in the group before treatment, and the activities of CK-MB, CK, LDH, AST and CD8+ decreased significantly, P<0.05. After treatment, the levels of all the above factors in the observation group were significantly higher than those in the control group (P<0.05). The results showed that the two groups of treatments could reduce the level of myocardial enzyme spectrum index and improve the immune ability of the children. And the combined use of drugs has a stronger regulation on the above function. The mechanism may be that Bifidobacterium can reduce the heavy absorption of conjugated cholic acid by decomposing cholic acid into free state. At the same time, it can also establish normal intestinal flora, further promote intestinal peristalsis, promote excessive excretion of bilirubin in the body, increase the activity of liver enzymes, improve the damaged state of myocardial cells, and enhance the immunity of the machine. TNF-α is a key pro-inflammatory factor and immunomodulatory factor in the organism[22]. CRP is an acute phase reaction protein of liver cells synthesized by inflammatory stimuli such as microorganism invasion or tissue injury. It was found that the concentration of serum CRP in children with hyperbilirubinemia...
was significantly higher than that of healthy newborns[17]. The results of this study found that after treatment: the serum TNF-α and CRP levels in the 2 groups were significantly lower than those in the control group, and the levels of serum TNF-α and CRP in the observation group were significantly lower than those in the control group (P<0.05). The results showed that the two groups of treatments could reduce the level of TNF-α and CRP in children and relieve the inflammatory state of the body. And combined use of drugs on the regulation of the level of inflammatory factors is stronger, the specific mechanism of action needs to be further explored.

In conclusion, ursodeoxycholic acid combined with Bifidobacterium quadruple viable tablets can reduce the activity of myocardial enzymes in neonatal hyperbilirubinemia, improve the inflammatory state, enhance the immune function of children, and improve the clinical efficacy.

Reference


