Effect of nifedipine in combined with magnesium sulfate on the hemorheology and coagulation indicators in patients with gestational hypertension

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ABSTRACT

Objective: To explore the effect of nifedipine in combined with magnesium sulfate on the hemorheology and coagulation indicators in patients with gestational hypertension. Methods: A total of 90 patients with gestational hypertension were included in the study and randomized into the observation group and the control group with 45 cases in each group. The patients in the observation group were given magnesium sulfate in combined with nifedipine, while the patients in the control group were only given magnesium sulfate. The patients in the two groups were continuously treated for 2 weeks. The blood pressure, hemorheology indicators, and coagulation indicators before and after treatment in the two groups were detected and compared. Results: SBP, DBP, whole blood high, moderate, and low shear viscosity, plasma viscosity, and HCT after treatment in the two groups were significantly reduced when compared with before treatment (P<0.05). The levels of the above indicators after treatment in the observation group were significantly lower than those in the control group (P<0.05). PT, APTT, and TT after treatment in the two groups were significantly elevated when compared with before treatment (P<0.05), while Fib was significantly reduced (P<0.05). PT, APTT, and TT after treatment in the observation group were significantly higher than those in the control group (P<0.05), while Fib was significantly lower than that in the control group (P<0.05). Conclusions: Nifedipine in combined with magnesium sulfate can significantly stabilize the blood pressure level in patients with gestational hypertension, and improve the hemodynamic and coagulation indicators, with a significant efficacy.

1. Introduction

Gestational hypertension is a specific complication in the gestation period, with morbidity accounting for about 5% of total pregnant women, usually occurring 20 weeks after gestation or 2 weeks after delivery, which can severely affect the maternal and fetal health[1]. The systemic arteriolospasm is involved in the pathogenesis of gestational hypertension, with clinical symptoms of abnormal blood pressure, high fluctuation of blood viscosity, and even coagulation, which can severely affect the fetal blood supply and endanger the maternal and infant safety[2,3]. Magnesium sulfate is a common drug in the treatment of gestational hypertension in the clinic, with an accurate efficacy, but in partial pregnant women, its efficacy is poor[4]. The study was aimed to explore the effect of nifedipine in combined with magnesium sulfate on the hemorheology and coagulation indicators in patients with gestational hypertension.

2. Materials and methods

2.1. General materials

A total of 90 patients with gestational pregnancy who were admitted in our hospital from May, 2014 to March, 2016 were...
included in the study, aged from 22 to 35 years old; gestational week from 31 to 39 weeks, with an average of (35±3) weeks. Inclusion criteria: (1) those who were in accordance with the diagnostic criteria of gestational pregnancy in the Combined Traditional Chinese and Western Medicine Diagnostic and Treatment Criteria of Pregnancy-induced Hypertension Syndrome; (2) those whose blood pressure was greater than 140/90 mmHg; (3) those who had clear consciousness and no other severe diseases. Those who had previous hypertension, diabetes, nephritis, and severe insufficiency of vital organs were excluded from the study.

2.2. Methods

The patients were randomized into the observation group and the control group with 45 cases in each group. The comparison of age, gestational weeks, and other general materials between the two groups was not statistically significant (P>0.05), but it was comparable. After admission, the patients in the two groups were given left lateral position, routine oxygen inhalation, and sedatives according to the condition. On the above basis, the patients in the two groups were given intravenous injection of magnesium sulfate (2.5 g, 10 mL), with initial dosage of 4 g, + 25% glucose injection (1 000 mL), ivdrip, 2 g/h. Then the dripping speed was adjusted according to the blood pressure. On the above basis, the patients in the observation group were given nifedipine (10 mg), 10 mg/time, 3 times/d. After 2-week treatment, the indicators were observed.

2.3. Observation indicators

SBP and DBP before and after treatment in the two groups were recorded and compared. The fasting venous blood before and after treatment in the two groups was collected, and centrifuged for the serum. BV, PV, HCT, PT, APTT, Fib, and TT were detected.

2.4. Statistical analysis

SPSS 22.0 software was used for the statistical analysis. The measurement data were expressed as mean±SD. The paired t test was used for the intra-group comparison, while the independent t test was used for the comparison between the two groups. P<0.05 was regarded as statistically significant.

Table 2
Comparison of hemorheology indicators before and after treatment between the two groups (n=45, x±s).

<table>
<thead>
<tr>
<th>Groups</th>
<th>Time</th>
<th>High shear BV</th>
<th>Moderate shear BV</th>
<th>Low shear BV</th>
<th>PV</th>
<th>HCT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before treatment</td>
<td>6.43±0.92</td>
<td>9.12±0.89</td>
<td>22.89±3.12</td>
<td>2.06±0.63</td>
<td>45.96±2.50</td>
</tr>
<tr>
<td></td>
<td>After treatment</td>
<td>4.45±0.61*</td>
<td>6.82±0.40*</td>
<td>16.51±3.10*</td>
<td>1.63±0.40*</td>
<td>35.92±1.89*</td>
</tr>
<tr>
<td>Observation</td>
<td>Before treatment</td>
<td>6.42±0.89</td>
<td>9.01±0.91</td>
<td>23.05±3.13</td>
<td>2.04±0.64</td>
<td>46.38±2.49</td>
</tr>
<tr>
<td>Control</td>
<td>Before treatment</td>
<td>5.84±0.92</td>
<td>8.64±0.59</td>
<td>20.11±3.01*</td>
<td>1.81±0.42</td>
<td>43.21±2.13</td>
</tr>
</tbody>
</table>

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

3. Results

3.1. Comparison of the blood pressure level before and after treatment between the two groups

The comparison of SBP and DBP before treatment between the two groups was not statistically significant (P>0.05). SBP and DBP after treatment in the two groups were significantly reduced when compared with before treatment (P<0.05). SBP and DBP after treatment in the observation group were significantly lower than those in the control group (P<0.05) (Table 1).

Table 1
Comparison of the blood pressure level before and after treatment between the two groups (n=45, x±s).

<table>
<thead>
<tr>
<th>Groups</th>
<th>SBP Before treatment</th>
<th>SBP After treatment</th>
<th>DBP Before treatment</th>
<th>DBP After treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation</td>
<td>156.5±14.73</td>
<td>121.6±12.36</td>
<td>103.8±12.36</td>
<td>74.9±8.46</td>
</tr>
<tr>
<td>Control</td>
<td>156.2±15.02</td>
<td>141.4±9.41</td>
<td>104.2±12.14</td>
<td>85.7±10.16</td>
</tr>
</tbody>
</table>

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

3.2. Comparison of hemorheology indicators before and after treatment between the two groups

The whole blood high, moderate, and low shear viscosity, plasma viscosity, and HCT after treatment in the two groups were significantly reduced when compared with before treatment (P<0.05). BV, PV, and HCT after treatment in the observation group were significantly lower than those in the control group (P<0.05) (Table 2).

3.3. Comparison of coagulation indicators before and after treatment between the two groups

The comparison of PT, APTT, TT, and Fib before treatment between the two groups was not statistically significant (P>0.05). PT, APTT, and TT after treatment in the two groups were significantly elevated when compared with before treatment (P<0.05), while Fib was significantly reduced (P<0.05). PT, APTT, and TT after treatment in the observation group were significantly higher than those in the control group (P<0.05), while Fib was significantly lower than that in the control group (P<0.05) (Table 3).
4. Discussion

In recent years, due to the increasing age and great working and life pressure, the occurrence rate of gestational hypertension is gradually increasing[5,6]. The pathogenesis of gestational hypertension is not yet clarified. Some scholars argue that its pathogenesis is closely associated with the blood viscosity, vasospasm, and slow blood flow rate. The advanced gestational hypertension can cause the placental blood supply obstacle, and even DIC, which can endanger the maternal and infant safety; therefore, early drug control is the first treatment means to guarantee the maternal and infant safety[7-9].

Magnesium sulfate is a spasmyotic widely applied in the clinic, can expand the blood vessels, relieve the arteriospasm, reduce the blood pressure, increase the blood supply of heart, brain, and kidney, and will not produce great adverse reactions[10,11]. Some researches demonstrate that Mg$^{2+}$ can effectively strengthen the binding force of hemoglobin with oxygen in the pregnant women and fetus, increase the placental blood supply, and improve the physiological function[12]. Nifedipine, as a kind of Ca$^{2+}$ channel antagonist, can selectively block Ca$^{2+}$ membrane transport of myocardium and smooth muscle, inhibit the excitation-contraction coupling of myocardial cells, block the excitation-contraction coupling of uterine smooth muscle to facilitate the maximum relaxation of uterine smooth muscle, and maximally expand the blood vessels to improve the microcirculation and reduce the blood pressure[13,14]. The results in the study showed that SBP, DBP, whole blood viscosity, plasma viscosity, and HCT after treatment in the two groups were significantly reduced when compare with before treatment ($P<0.05$), and the reduced degree in the observation group was more significant than that in the control group ($P<0.05$); PT, APTT, and TT after treatment in the two groups were significantly elevated when compared with before treatment ($P<0.05$), while Fib was significantly reduced ($P<0.05$); PT, APTT, and TT after treatment in the observation group were significantly higher than those in the control group ($P<0.05$), indicating that nifedipine in combined with magnesium sulfate can effectively improve the blood viscosity, improve the placental blood supply, and play a positive role in the pregnancy outcome.

In conclusion, nifedipine in combined with magnesium sulfate can significantly stabilize the blood pressure level in patients with gestational hypertension, and improve the hemodynamic and coagulation indicators, with a significant efficacy.

References