Forty-six Cases of Vertebrobasilar Insufficiency Treated by Acupuncture plus Intravenous Infusion of Ligustrazine

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Objective: To observe the therapeutic effect of acupuncture plus Ligustrazine on vertebrobasilar insufficiency (VBI) by transcranial Doppler (TCD) sonography. Methods: 86 VBI patients including 56 cases of low flow rate velocity type (LFVT) and 30 cases of high flow velocity type (HFVT) were randomly divided into Ligustrazine group (26 LFRT and 14 HFVT) and acupuncture plus Ligustrazine group (30 LFVT and 16 HFVT). The blood flow velocity (BFV) of vertebral artery (VA) and basilar artery (BA) in systole before and after treatment was measured with TCD and therapeutic effects were evaluated after 10 days’ treatment in the two groups. Results: In the acupuncture plus Ligustrazine group, the total effective rate was 93.3% and 88.5% in cases of LFVT and HFVT respectively, and BFV of VA and BA increased in LFVT patients while that in HFVT patients decreased significantly ($P<0.05$ or $P<0.01$). Conclusion: Owing to its dual regulation on blood flow of VA and BA, the therapeutic effect of acupuncture plus Ligustrazine was better than that of simple Ligustrazine.

Key words: vertebrobasilar insufficiency; blood flow rate; systolic phase

Vertebrobasilar insufficiency (VBI) is a commonly encountered disease in clinic, manifested as abrupt onset and frequent attacks of vertigo, tinnitus, vomiting, etc. With noninvasive transcranial Doppler (TCD), the valuable information on intracranial arterial blood flow for studying cerebral circulation can be obtained directly. From December 2002 to December 2005, the 86 VBI patients from the Department of TCM Internal Medicine of the People’s Hospital of Beijing University were observed with TCD on the effect of acupuncture plus Ligustrazine. The report is as follows.

CLINICAL DATA
With TCD sonography, of the 86 VBI patients, 56 were low flow rate type (LFVT). Those with an odd number of last figures of Case Number were assigned to Ligustrazine group and those with an even number of last figure of Case Number to acupuncture plus Ligustrazine group. In the Ligustrazine group, there were 26 cases, 10 males and 16 females, ranging in age from 38 to 72 years, with an average of 58.15±10.36 years, and ranging in duration of VBI from 1 to 14 days. In the acupuncture plus Ligustrazine group, there were 30 cases, 12 males and 18 females, ranging in age from 40 to 74 years, with an average of 58.73±8.40 years, and ranging in duration of VBI from 1 to 15 days. The 30 cases of high flow rate type (HFVT) were also grouped in the same way. In the Ligustrazine group, there were 14 cases, 6 males and 8 females, ranging in age from 41 to 70, with an average of 61.00±9.66, and ranging in duration of VBI from 1 to 14 days. In the acupuncture plus Ligustrazine group, there were 16 cases, 7 males and 9 females, ranging in age from 40 to 75, with an average of 61.38±9.59 years, and ranging in duration of VBI from 1 to 16 days. The two groups were comparable for their difference in sex, age and duration of illness was not significant ($P>0.05$).

Criteria for diagnosis
In light of WHO’s diagnostic criteria for “possible” VBI,\textsuperscript{1} with emergent onset and vertigo occurred
within 2 min, the patients had one or more of the following: 1) dyscinesia; 2) sensory disturbance; 3) lateral or bilateral vision loss; 4) dysequilibrium, nystagmus, ambliopia, dysphagia, disarthria, etc., with abnormal findings in TCD sonography. The normal value of cerebral flow in systole edited by the People’s Hospital of Beijing University² was taken as criteria for evaluation of the result of TCD sonography of the observed patients: 1) blood flow velocity of basilar artery being lower than 50 cm/s (low flow velocity type) or higher than 70 cm/s (high flow velocity type); 2) blood flow velocity of left or right vertebral artery being lower than 40 cm/s (low flow velocity type) or higher than 60 cm/s (high flow velocity type).

**Inclusive criteria**
The patients with the clinical manifestations of above-mentioned diagnostic criteria and 2 or 3 out of the 3 arteries being in accordance with the result of TCD sonography.

**Exclusive criteria**
1) severe injuries of the liver and kidney; 2) severe cerebral bleeding or infarction; 3) fracture, dislocation, tuberculosis, tumor, or infection of cervical spine; 4) vertigo caused by diseases of eyes and ears; 5) those without treatment required.

**METHODS**
80 mg of ligustrazine in 250 ml of 5% glucose or 0.9% normal saline was intravenously infused into the patients in Ligustrazine group once daily for 15 successive days. The patients in the treatment group were treated with acupuncture based on the Ligustrazine treatment mentioned above. 1) Acu-points: Baihui (GV 20) and bilateral Fengchi (GB 20). 2) Needling method: The patient was in a lateral recumbent position. The areas of selected points were disinfected 3 times with the disinfectants made by the 2nd Military Medical University. The sterilized Huatuo filiform needles of 0.3 mm in diameter and 40 mm in length produced by Suzhou Medical Appliance Factory were used. Fengchi (GB 20) was inserted 1 cun obliquely with the tip of needle toward the tip of nose. Baihui (GV 20) was inserted 1 cun horizontally, and the needle was manipulated with uniform reinforcing-reducing method in small amplitude of lifting-thrusting and twirling for 1 min after arrival of qi. The manipulation of needles was given once every 10 min. The patient was asked to close his eyes and breathe slowly and deeply so as to lead the needling sensation radiating to the deep place in the cranium. The needles were retained for 20 min. The sterilized dry cotton ball was used to press the punctured points when the needles were withdrawn. The treatment was performed once daily in ward during 2:00–5:00 pm with an indoor temperature of (25±2)ºC. One treatment course was 10 such sessions, and each patient in the two groups received two courses of treatment during hospitalization.

DWL–TCD blood flow analyzer made in Germany was adopted. The patient was in a lying position and sitting position later. The doctor used a low speed pulse probe of 2 MHz to observe the bilateral vertebral and basilar arteries separately through great occipital foramen. The depth of sample: the basilar artery: 74–80 mm; vertebral artery: 60–70 mm. Blood flow velocity was expressed as cm/s. The TCD sonography was given to test the basilar and vertebral arteries after the patient rested for 30 min. The re-examination was done 20 days later for observing the changes after treatment.

The clinical data were collected before treatment and after 2 courses for statistical analysis. The data were expressed as \( \bar{x} \pm s \). Paired \( t \)-test was used for comparing before and after treatment in same group, and independented \( t \)-test for comparing between different groups after treatment. The chi-square test was used to compare the effective rate. The software SPSS-10.0 was used to process the data.
RESULTS

Therapeutic criteria
Therapeutic criteria for the treatment of vertigo from *Guiding Principles to Clinical Research on the New Drugs of TCM* were adopted. Clinically controlled: vertigo and other symptoms disappeared. Markedly relieved: vertigo and other symptoms were significantly relieved, with the presence of mild dizziness or blurring of vision and absence of the sensation of whirling and movement of his own body and scenery, the normal daily life and work could be carried out. Improved: vertigo or blurring of vision was alleviated, with presence of mild whirling and movement of his own body and scenery. Though normal work could be done, the daily life and work were affected. Failed: vertigo and blurring of vision were not improved or worsened.

Comparison of the clinical effect for VBI patients with low- and high-flow types between two groups
Table 1 showed that the total effective rate of simple ligustrazine on VBI of LFVT was 88.5% in 26 VBI patients of LFVT and that of acupuncture plus ligustrazine was 93.3% in 30 VBI patients of LFVT; and the total effective rate of simple ligustrazine on VBI of HFVT there was 71.4% in 14 VBI patients of HFVT and that of acupuncture plus ligustrazine was 87.5% in 16 VBI patients of HFVT. The difference in the total effective rate between the two groups was statistically significant by chi-square test ($P<0.05$).

Comparison of the changes in BFV of VA and BA in VBI patients of LFVT after treatment between two groups
Table 2 showed that there was a significant difference in VBI patients of LFVT after treatment in the same group ($P<0.01$). There was a significant difference between acupuncture plus ligustrazine group and ligustrazine group after treatment ($P<0.05$).

Comparison of the changes in BFV of VA and BA in VBI patients of HFVT after treatment in two groups
Table 3 showed that there was a significant difference in VBI patients of HFVT after treatment in the same group ($P<0.01$). There was a significant difference between acupuncture plus ligustrazine group and ligustrazine group after treatment ($P<0.05$).

<table>
<thead>
<tr>
<th>Groups</th>
<th>Flow type</th>
<th>Cases</th>
<th>Clinically controlled</th>
<th>Markedly relieved</th>
<th>Improved</th>
<th>Failed</th>
<th>Total effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ligustrazine</td>
<td>LFVT</td>
<td>26</td>
<td>12(46.0)</td>
<td>6(23.0)</td>
<td>5(19.5)</td>
<td>3(11.5)</td>
<td>23(88.5)</td>
</tr>
<tr>
<td></td>
<td>HFVT</td>
<td>14</td>
<td>5(36.0)</td>
<td>3(21.0)</td>
<td>2(14.4)</td>
<td>4(28.6)</td>
<td>10(71.4)</td>
</tr>
<tr>
<td>Acupuncture +</td>
<td>LFVT</td>
<td>30</td>
<td>16(53.0)</td>
<td>8(27.0)</td>
<td>4(13.3)</td>
<td>2(6.7)</td>
<td>28(93.3)</td>
</tr>
<tr>
<td>Ligustrazine</td>
<td>HFVT</td>
<td>16</td>
<td>8(50.0)</td>
<td>4(25.0)</td>
<td>2(12.5)</td>
<td>2(12.5)</td>
<td>14(87.5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Arteries</th>
<th>Groups</th>
<th>Cases</th>
<th>Before treatment</th>
<th>After treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basilar artery</td>
<td>Acupuncture + Ligustrazine</td>
<td>30</td>
<td>45.23±2.61</td>
<td>52.67±3.07*</td>
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<td></td>
<td>Ligustrazine</td>
<td>26</td>
<td>44.88±3.23</td>
<td>48.12±3.83*</td>
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<tr>
<td>Left vertebral artery</td>
<td>Acupuncture + Ligustrazine</td>
<td>30</td>
<td>33.27±3.98</td>
<td>43.80±3.25*</td>
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<td></td>
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<td>26</td>
<td>33.06±4.21</td>
<td>38.77±4.28*</td>
</tr>
<tr>
<td>Right vertebral artery</td>
<td>Acupuncture + Ligustrazine</td>
<td>30</td>
<td>34.83±3.68</td>
<td>43.47±2.75*</td>
</tr>
<tr>
<td></td>
<td>Ligustrazine</td>
<td>26</td>
<td>33.52±3.86</td>
<td>38.50±3.88*</td>
</tr>
</tbody>
</table>

Notes: Compared with the self group before treatment, *$P<0.01$; compared with Ligustrazine group after treatment, $P<0.05$
Table 3. Comparison of the changes in FBV of VA and BA in VBI patients of HFVT after treatment between two groups (cm/s, \(\bar{x} \pm s\))

<table>
<thead>
<tr>
<th>Arteries</th>
<th>Groups</th>
<th>Cases</th>
<th>Before treatment</th>
<th>After treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basilar artery</td>
<td>Acupuncture + Ligustrazine</td>
<td>16</td>
<td>92.19±5.28</td>
<td>66.50±4.73*</td>
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<td>90.00±4.94</td>
<td>89.14±5.17*</td>
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<td>84.25±4.19</td>
<td>60.38±4.57*</td>
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<td>14</td>
<td>83.93±4.07</td>
<td>83.36±4.14*</td>
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<tr>
<td>Right vertebral artery</td>
<td>Acupuncture + Ligustrazine</td>
<td>16</td>
<td>82.88±3.81</td>
<td>60.06±3.55*</td>
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<tr>
<td></td>
<td>Ligustrazine</td>
<td>14</td>
<td>82.64±4.33</td>
<td>83.07±4.26*</td>
</tr>
</tbody>
</table>

Notes: Compared with the self group before treatment, *\(P<0.01\); compared with Ligustrazine group after treatment, \(\beta P<0.05\)

**DISCUSSION**

It is very important to treat the causative factors of VBI, such as adjusting and controlling blood pressure and lowering blood-lipid and treating cervical spondylosis. As to the symptomatic treatment, vasodilators are suggested to use. Acupuncture may improve cerebral blood supply, relieve and stop vertigo. The aim of the above treatment is to dilate the peripheral small arteries, relieve spasm of the blood vessels, get rid of spasm of labyrinthine artery and improve microcirculation of the inner ear and function of vestibulum. At the same time, it can dilate the cerebral blood vessels, increase cerebral blood flow, and improve cerebral ischemia to have vertigo relieved or disappeared. The mechanism of acupuncture treating VBI may be stimulating the sensory ending of peripheral nerve in different layers of the tissues, have the needling sensation reflected to the different levels of nerve system through the afferent nerve system of the nerve to adjust and excite the system of the self-adjustment of the human body, so as to adjust the function of vegetative nerve in the wall of cerebral vessels, relieve the abnormal diastole-systole and spasm of cerebral vessels, thus improving blood supply of the brain.

Baihui (GV 20), known as *Sanyangwu hai* (三阳五会), is a meeting point of all the yang meridians of the whole body, located on the top of head, and in charge of yang-qi of the whole body. Puncturing this point may ascend the light and clear yang-qi, guide qi and blood upward to nourish the head, so as to have the blood of extraordinary organ replenished and spirit returned. Fengchi (GB 20) is a point of Gallbladder Meridian of Foot-Shaoyang. There were many records in the books of different dynasties to treat vertigo with this point. Fengchi (GB 20) is located at the nape. It is seen from the lamina-dissection that there are occipital nerve and occipital artery in the superficial layer and the bulb and vertebral artery in the deep layer of Fengchi (GB 20). Acupuncture at this key point to treat VBI can adjust the circulation of qi and blood on the head to relieve vertigo. Modern researches have shown that acupuncture is effective in treating VBI by improving the resistance and elasticity of blood vessels, further improving BFV and affecting the blood supply. As to LFVT, acupuncture can excite cholinergic sympathetic nerve and non-cholinergic, non-adrenergic nerve to release acetylcholine and nitric oxide, so as to dilate the blood vessels and increase the cerebral blood flow. As for HFVT, acupuncture can relieve vasospasm and broaden the diameter of blood vessels to slow down the flow speed. So it is thought that acupuncture improving the blood flow speed relies on the functional condition of cerebral blood vessels, therefore it has the dual regulation, which is confirmed in this research.

The result of this observation showed that the total effective rate in the acupuncture plus Ligustrazine group was higher than that of Ligustrazine group with a significant difference. The change before and after treatment in TCD sonography showed that the BFV was highly improved in LFVT and significantly lowered in HFVT in the acupuncture plus Ligustrazine group, significantly different in comparing with Ligustrazine group.
The very research shows the fact that acupuncture functions to adjust *yin* and *yang*. The key link in acupuncture treatment for this disease is to restore the balance of *yin* and *yang* of human body. This method of treatment is simple, practical, economic and effective, easily accepted by the patients.

**REFERENCES**


(Translated by ZHU Han-ting 朱涵亭)

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