Effect of atorvastatin on blood lipid indexes of patients with transient ischemic attack

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ABSTRACT

Objective: To investigate the effect of atorvastatin therapy on lipid levels of patients with transient ischemic attack (TIA). Methods: A total of 210 cases of TIA were selected as research subjects, and randomly divided into two groups with 105 cases in each group. Patients in the control group were treated with conventional therapy, and the observation group were treated with conventional treatment based on the use of atorvastatin. Incidence of cerebrovascular diseases, high-density lipoprotein (HDL), low density lipoprotein changes (LDL), triglycerides (TG) and total cholesterol (TC) and side effect of two groups were compared. Results: The incidence of cerebrovascular diseases was 10.48%, and significantly lower than the control group (P<0.05). The levels of HDL after treatment was significantly higher than the control group, and the levels of LDL, TG and TC after treatment were significantly lower than the control group (P<0.05). No adverse reaction occurred in both groups. Conclusion: Atorvastatin is safe and effective in prevention of TIA patients from cerebrovascular events, and can improve blood lipid indexes.

1. Introduction

Transient ischemic attack (TIA), a common type of ischemic cerebral vascular disease, is the precursor of cerebral infarction which is shown to be related with lipid metabolism disorder and needs active treatment[1]. In recent years, clinical researches have confirmed that statin drugs have a good effect on improving the metabolism disorder of blood lipid and preventing disease of heart head blood-vessel[2]. Atorvastatin, as a new type of statins, has a remarkable effect on regulating blood lipid level and preventing heart and brain blood vessel disease. Satisfactory results were obtained with atorvastatin in the treatment of TIA in our hospital since 2012.

2. Materials and methods

2.1. General information

Study was undertaken in 210 TIA patients in our hospital from August 2012 to June 2014. According to the random number,
cooperation with the treatment.

Exclusive criteria[3]: (i) Patients had allergic reactions to statins. (ii) Patients with history of gastrointestinal operation or serious gastrointestinal diseases. (iii) Taking statins within 30 d after the incidence. (iv) Patients with severe heart failure or hepatorenal function impairment. (v) Patients with cerebral and myocardial infarction. (vi) The creatine kinase level more than 3 times the upper limit of the normal level. (vii) Poor compliance and no cooperation with the treatment.

2.3. Treatment and observation

The patients in the control group were given conventional treatment, including bed rest, oxygen inhalation, quit smoking, limit alcohol, no fatigue, open bowels, anti-platelet drugs (such as aspirin), pimobendane (Venoruton, Xinxiaokang, etc.), hypotensor (beta 2 receptor blockers, calcium channel blockers, ACEI, ARB, etc.), brain cell nutrition drugs (citicoline), and active treatment of complications. The patients in the observation group were given atorvastatin (Pfizer Inc, batch number 20120309) based on the conventional treatment, with 20 mg/d, 1 times/d, 6 months treatment. The occurrence of cerebrovascular events, changes of HDL, LDL, TG and TC levels before and after treatment, and adverse reaction after taking atorvastatin were observed in two groups.

2.4. Statistical treatment

Data were analyzed by statistical software SPSS 19.0. Measurement data are expressed as Mean±SD. The groups were compared using t test, and count data were compared using χ² test. P<0.05 was considered for the difference with statistical significance.

3. Results

3.1. Comparison on cerebrovascular adverse events

In the observation group, cerebral infarction occurred in two cases, and TIA recurred in nine cases. The total incidence of cerebrovascular events was 10.48% (11/105) in the observation group. In the control group, cerebral infarction occurred in 11 cases and TIA recurred in 23 cases. The total incidence of cerebrovascular events was 32.28% (34/105) in the control group. The difference was statistically significant (χ²=15.22, P<0.05).

3.2. Comparison on blood lipid indexes before and after treatment

Before the treatment, the levels of HDL, LDL, TG and TC showed no significant difference between two groups. After the treatment, the HDL level was significantly higher in the observation group, while the levels of LDL, TG and TC were significantly lower than that before treatment (P<0.05). The levels of HDL, LDL, TG and TC in the control group had no significant difference compared with those before treatment. In the observation group after treatment, the HDL level was significantly higher while the levels of LDL, TG and TC were significantly lower than those of the control group after treatment (P<0.05) (Table 1).

3.3. The adverse reaction of atorvastatin

The patients in both groups did not show special discomfort or adverse reactions during the medication.

4. Discussion

TIA is one of the most common cerebrovascular diseases with clinical features of acute onset, recurrence, focal, early warning and complete remission. Frequent episodes of TIA increase the possibility of cerebral infarction, so the prevention and treatment of TIA are the key to prevent cerebral infarction[4,5]. The main pathogenesis of TIA may be the micro vascular stenosis occurs after cerebral artery atherosclerosis, further causing the local blood supply shortage. The exact mechanism remains obscure yet[6]. Related researchers have found that it may be associated with atherosclerotic thrombosis, blood circulation disorder, dyslipidemia, microemboli theory and the change of blood components. Therefore, reducing blood viscosity, correcting dyslipidemia and stabilizing vascular endothelial function have crucial roles in preventing cardiovascular and cerebrovascular diseases.

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>HDL (mmol/L)</th>
<th>LDL (mmol/L)</th>
<th>TG (mmol/L)</th>
<th>TC (mmol/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation group</td>
<td>Before treatment</td>
<td>1.08±0.37</td>
<td>4.49±0.85</td>
<td>3.00±0.65</td>
<td>6.62±1.18</td>
</tr>
<tr>
<td></td>
<td>After treatment</td>
<td>1.41±0.39</td>
<td>3.48±0.87</td>
<td>2.27±0.56</td>
<td>5.26±1.01</td>
</tr>
<tr>
<td></td>
<td>t, P</td>
<td>6.29, &lt;0.05</td>
<td>8.51, &lt;0.05</td>
<td>8.72, &lt;0.05</td>
<td>8.97, &lt;0.05</td>
</tr>
<tr>
<td>Control group</td>
<td>Before treatment</td>
<td>1.10±0.39</td>
<td>4.51±0.87</td>
<td>2.98±0.72</td>
<td>6.58±1.24</td>
</tr>
<tr>
<td></td>
<td>After treatment</td>
<td>1.12±0.38</td>
<td>4.33±0.92</td>
<td>2.87±0.65</td>
<td>6.42±1.33</td>
</tr>
<tr>
<td></td>
<td>t, P</td>
<td>0.71, &gt;0.05</td>
<td>0.65, &gt;0.05</td>
<td>1.62, &gt;0.05</td>
<td>0.90, &gt;0.05</td>
</tr>
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<td></td>
<td>Compared before treatment t, P</td>
<td>0.70, &gt;0.05</td>
<td>0.17, &gt;0.05</td>
<td>0.21, &gt;0.05</td>
<td>0.24, &gt;0.05</td>
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<tr>
<td></td>
<td>Compared after treatment t, P</td>
<td>5.46, &lt;0.05</td>
<td>7.69, &lt;0.05</td>
<td>7.17, &lt;0.05</td>
<td>7.12, &lt;0.05</td>
</tr>
</tbody>
</table>
Statins are hydroxyl methy glutaryl-coenzyme A (HMC-CoA) reductase inhibitors, while HMC-CoA reductase is the cholesterol synthesis rate limiting enzyme[7]. The researchers showed that statin drugs can significantly decrease the cholesterol level, protect vascular endothelial function, reduce oxidative stress and inhibit the inflammatory reaction[8]. In our study, the incidence of adverse events in TIA patients with atorvastatin therapy was significantly decreased compared with that in patients subjected to conventional therapy. In addition, the serum HDL level increased and the levels of LDL, TG and TC decreased obviously in the patients, which indicated that atorvastatin can prevent cerebrovascular adverse events, improve blood lipid disorder and reduce the risk level of TIA attack. The results are in accordance with other researches. Moreover, by atorvastatin safety observation, we found that the drug did not show special discomfort and adverse reaction, which indicates that the drug is safe and reliable.

Atonvastatin is a synthetic compound with similar pharmacological properties of other statins. Through the inhibition of HMG-CoA reductase synthesis, it can slow down liver cholesterol synthesis rate, increase the liver cells low density lipoprotein receptor (LDL receptor) level and its absorption capacity of LDL. It also induces the secretion of LDL receptor which mediated the catabolism and clearance of serum LDL. The blood cholesterol of LDL and lipoprotein level obviously reduced. In addition, it also has the effect of promoting vascular endothelial cell activation and proliferation, anti-inflammatory, antioxidant, elevating plasma HDL content and delaying arteriosclerosis[9–12]. Moreover, through the observation of the curative effect of high dose atorvastatin treatment in patients with acute cerebral infarction, Zhang found that the drug can speed up the synthesis of NO to promote NO bioavailability, thereby reducing the harm caused by free radicals[13]. So, atorvastatin, by slowing down the process of TIA and promoting plaque stability to reduce artery intima-media thickness (IMT) and the incidence of cerebrovascular diseases.

In summary, atorvastatin, used for the treatment TIA, can effectively prevent cerebrovascular adverse events, regulate blood lipid level and relieve dyslipidemia. It has high security of therapeutic doses, and it is suitable for long time use and worthy for clinical application.

**Conflict of interest statement**

The authors declare that they have no conflict of interest.

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**References**


