Influence of amlodipine combined with valsartan to the vascular elasticity function and myocardial cells apoptosis of elderly patients with hypertension

Xing-Bin Zou¹; He Huang²

¹Cardiovascular Internal Medicine Department, People’s Hospital, Hanchuan City, Hubei, 436100
²Cardiovascular Internal Medicine Department, People’s Hospital of Wuhan University, 430000

ARTICLE INFO

Objective: To discuss the influence of amlodipine combined with valsartan to the vascular elasticity function and myocardial cells apoptosis of elderly patients with hypertension.

Methods: Selected 70 cases of elderly patients with hypertension treated in our hospital as the research object, using the random number table method to divide them into study group and control group (n=35), and control group was given valsartan treatment, while study group was given amlodipine combined with valsartan treatment, course of treatment of both groups was 2 weeks, to compare the vascular elasticity function, plasma sDR4, sDR5 levels and blood pressure changes before and after treatment of both groups.

Results: (1) Vascular elasticity function: C1, C2, ankle brachial index in study group was obviously higher than that in control group [(13.48±3.79) vs (9.18±2.84) mL/mmHg¹, (4.69±1.88 vs 3.71±1.85) mL/mmHg¹, (1.24±0.05 vs 1.14±0.12)] (P<0.05), but PWV was obviously lower than that in control group (10.35±2.5 vs 12.01±2.68) m/s (P<0.05); (2) Myocardial cells: sDR4, sDR5 levels in study group was obviously lower than that in control group (3.63±0.69 vs 5.57±0.15, 39.09±5.18 vs 49.43±6.17) (P<0.05); (3) Blood pressure control: 24 h SBP, 24 h DBP in study group was obviously lower than that in control group (122.23±8.42 vs 140.57±9.65, 80.56±8.78 vs 97.54±8.35) (P<0.05).

Conclusion: Amlodipine combined with valsartan was helpful to improve vascular elasticity function, slow down myocardial cells apoptosis and control blood pressure levels.

1. Introduction

Hypertension was a common disease which was harmful to the health of middle-aged and old friends in our country. Along with the life-style changes, changes of the dietary structure, the incidence of hypertension was increasing year by year. Intracranial vascular sclerosis, poor elasticity and easily bleeding of patients with hypertension for a long time were the main pathological basis of stroke, and sudden death[1-2]. Hypertension cell apoptosis was closely related with the development of the course of hypertension[3]. Amlodipine combined with valsartan was commonly used in the treatment of elderly patients with hypertension, and its influence to blood pressure control has been generally recognized by scholars[4], influential literature reports about vascular elasticity and myocardial cells apoptosis were less. This article adopting randomized controlled trial method to discuss the influence of amlodipine combined with valsartan to vascular elasticity factors (C1, C2) and sTRAIL death receptors(sDR4, sDR5) of elderly patients with hypertension and the influence of antihypertensive efficacy.

2. Data and Methods

2.1. Objects

Selected 70 cases of elderly patients with hypertension treated in department of Cardiolog your in our hospital from October 2013 to August 2014 as the research object; using the random number table method to divide them into study group and control group (n=35). Control group: male 21 cases & female 14 cases; age: 63-78 (67.8±8.35) years old; course of disease: 2-19 (10.1±1.24) years. Study group: male 23 cases & female 12 cases; age: 65-77
2.2. Inclusion and Exclusion Standard

Inclusion Standard: (1) All chosen patients conformed to elderly hypertension diagnostic criteria of ‘Guidelines for prevention and control of hypertension in China 2010’ [5]; (2) Age > 60 years old; (3) Systolic/Diastolic Pressure 140/90 mmHg; (4) Had a medical history of myocardial infarction, cerebral hemorrhage; (3) Severe hypertension and malignant hypertension; (4) Diabetes which could not be controlled by drugs; (5) NYHA cardiac functional grading: III-IV rating; (6) Hypertensive renal artery stenosis; (7) Malignant tumor patient.

2.3. Therapeutic Method

Patients in control group were merely taken valsartan capsule (Trade Name: Beijing Novartis Pharma Ltd., Approval Number: H200404217 approved by the state, Production lot number: 131210) of 80 mg, once/d, took the medicine in the morning, if antihypertensive effect was not ideal after taking it for 4 weeks, could increase the dose to 160 mg/d. Patients in study group were given amlodipine combined with valsartan treatment. Amlodipine Besylate Tablets (Trade Name: amlodipine besylate tablet, produced by Pfizer Pharmaceutical co., Ltd., Approval Number: H10950224 approved by the state, Production lot number: 130815) of 5 mg, once/d, took the medicine orally in the morning, while valsartan taken method was the same as that of control group. Continuous medicine-taken for 12 weeks in both groups.

2.4. Research Index

(1) Vascular elasticity function determination: Artery elasticity index (C1), Small artery elasticity index (C2) using arterial elasticity function tester to determine (Model: CVProfilor TMDO-2020, produced by HDI company, USA); Pulse Wave Velocity (PWV) using Compilor-type pulse wave velocity tester to determine (Produced by Fortis Kangda company in Beijing); Ankle Brachial Index determination choosing M337544-type Doppler ultrasound diagnostic apparatus to determine (Produced by Midwest Technology Co., Ltd.).

3. Results

3.1. Vascular Elasticity Index

Before treatment, comparative difference of C1, C2, PWV and ankle brachial index in both groups had no statistical significance (P>0.05), after treatment, C1, C2, PWV and ankle brachial index in both groups were superior to before treatment. C1, C2 and ankle brachial index in study group were obviously higher than that in control group, while PWV was obviously lower than that in control group, difference comparison had statistical significance (P<0.05), see chart 1.

3.2. Plasma sDR4, sDR5 levels

Before treatment, comparative difference of sDR4, sDR5 levels of both groups had no statistical significance (P>0.05); after treatment, both groups were significantly lower, sDR4, sDR5 levels in study group were lower than that in control group, comparative difference had statistical significance (P<0.05). See chart 2.

3.3. Ambulatory Blood Pressure

Before treatment, comparative difference of 24 h SBP and 24 h DBP in both groups had no statistical significance (P>0.05); after
treatment, both groups were significantly lower, 24 h SBP and 24 h DBP in study group were significantly lower than that in control group \((P<0.05)\). See chart 3.

Chart 2.
Comparisons of plasma sDR4, sDR5 levels before and after treatment in both groups (Mean±SD).

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>sDR4 (ng/mL)</th>
<th>sDR5 (ng/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>Before treatment</td>
<td>7.80±0.06</td>
<td>95.23±9.09</td>
</tr>
<tr>
<td>Control</td>
<td>Before treatment</td>
<td>3.63±0.69*</td>
<td>39.09±5.18*</td>
</tr>
<tr>
<td></td>
<td>After treatment</td>
<td>7.83±1.04</td>
<td>95.16±9.16</td>
</tr>
<tr>
<td></td>
<td>After treatment</td>
<td>5.57±0.15*</td>
<td>49.43±6.17*</td>
</tr>
</tbody>
</table>

Notes: compared with before treatment, \(*P<0.05\); compared with control group after treatment, \(\#P<0.05\).

Chart 3
Comparisons of blood pressure changes before and after treatment in both groups (Mean±SD).

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>SBP (mmHg)</th>
<th>DBP (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>Before treatment</td>
<td>172.12±10.56</td>
<td>106.49±10.35</td>
</tr>
<tr>
<td>Control</td>
<td>Before treatment</td>
<td>167.78±10.48</td>
<td>111.62±10.57</td>
</tr>
<tr>
<td></td>
<td>After treatment</td>
<td>122.23±8.42*#</td>
<td>80.56±8.78*#</td>
</tr>
<tr>
<td></td>
<td>After treatment</td>
<td>140.57±9.65*</td>
<td>97.54±8.35*</td>
</tr>
</tbody>
</table>

Notes: compared with before treatment, \(*P<0.05\); compared with control group after treatment, \(\#P<0.05\).

4. Conclusion

Amlodipine besylate tablet was a new generation of calcium ion antagonist, antihypertensive effect was obvious, its effect was gentle, long blood concentration t-max, effect was long lasting, and could directly relax vascular smooth muscle, high bioavailability. Patients were easy to resist, especially suitable for elderly patients with hypertension[7]. Valsartan was angiotensin II receptor antagonist, which played a role of antihypertensive effect by blocking Ang II combined with its receptors. Valsartan also blocked Ang II combined with the endothelial cells of AT1 receptors, which reduced the formation of endothelial cells E1, maintained the normal blood pressure[8]. Two medicine were confirmed clinically the ideal medicine in the treatment of hypertension[9].

Elderly patients with hypertension had long-time course, chronically elevated blood pressure made vascular load increase, and elasticity of artery blood vessel let-down, which caused cerebral arteriosclerosis, renal artery stenosis and even cerebral hemorrhage, sudden death etc. serious complications[10]. In this study, after amlodipine combined with valsartan treatment, C1, C2, ankle brachial index in study group were obviously higher, PWV was obviously lower, which indicated that amlodipine combined with valsartan treatment could improve effectively the vascular elasticity of elderly patients with hypertension and promote cardiovascular health.

Cell apoptosis played an indispensable role in the process of cardiovascular disease occurrence & development[12], in 1995, Wiley found and cloned TNF (tumor necrosis factor) related apoptosis inducing ligand[tumor necrosis factor-related apoptosis-inducing ligand, TRAIL] for the first time[13]; in 1997, Pan et al. further found the TRAIL of death receptor, that was DR4 (death receptor 4), DR5 (death receptor 5). Many studies proved that TNF, myocardial cell apoptosis DR4, DR5 were all involved in left ventricle remodeling of patients with hypertension[11]. In this study, DR4, DR5 values of both groups before treatment were seriously higher than normal reference value, but were lower after treatment, data showed that study group declining degree was more obvious, which indicated that amlodipine combined with valsartan treatment could reduce cell apoptosis factor, and had a positive effect on delaying ventricular remodeling.

In conclusion, amlodipine combined with valsartan treatment could effectively reduce the blood pressure, meanwhile, improve the vascular elasticity and reduce the cell apoptosis factors, which played an important role in reducing cardiovascular adverse events and delaying the progression of hypertension.

References