ORIGINAL ARTICLE

ANTI HYPERTENSIVE EFFECTS OF AMLODIPINE AND ENALAPRIL IN COMBINATION WITH ATORVASTATIN IN HYPERTENSIVE DYSLIPIDEMIC PATIENTS

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ABSTRACT

OBJECTIVES: To compare the antihypertensive effect of Enalapril and Amlodipine along with Atorvastatin in hypertensive dyslipidemic patients.

STUDY DESIGN: Prospective and descriptive case study.

PLACE AND DURATION: Study was conducted by the Department of Pharmacology & Therapeutics, LUMHS, Jamshoro at Red Crescent hospital, Latifabad, Hyderabad, Pakistan from 2007 to 2009.

METHODS: One hundred (100) essential hypertensive, dyslipidemic patients were enrolled in the study. Protocol was approved by ethical committee. After taking written consent patients were divided into two groups (A & B), each comprising 50 patients. Group A received Enalapril 10mg in the morning along with 20mg Atorvastatin at bed time while group B received 5mg of Amlodipine in morning along with 20mg of Atorvastatin at bed time. Blood pressure and lipid profile were done at the start (Baseline) and after 3 months (end of study) by mercury sphygmomanometer. Results were compared and analyzed statistically by using SPSS-V16 at the end.

RESULTS: At the end of the study when both groups were compared for antihypertensive effects. It was observed that the both the antihypertensive drugs have significantly lowered the blood pressure separately but when the effects were compared for both groups there was no significant change at the end of study. Enalapril reduced mean systolic blood pressure from 155.7 + 16.38mmHg at baseline to 140.1 + 8.36 mmHg and diastolic blood pressure to 93.6 + 5.81mmHg to 82.6 + 10.65 mmHg (P value 0.001). Amlodipine reduced the systolic blood pressure from 157 + 16.72 mmHg to 142.1 + 9.37 mmHg and diastolic blood pressure from 95.6 + 7.11mmHg to 81.4 + 11.06 mmHg (P value 0.001).

Mean systolic blood pressure after treatment in group A was 140.1 + 8.36 mmHg and in group B was 142.1 + 9.37 and mean diastolic blood pressure in group A and B after treatment was 82.6 + 10.65 mmHg and 81.4 + 11.06 mmHg respectively (P value 0.58).

CONCLUSION: Both drugs individually reduced the systolic and diastolic blood pressure significantly but when compared, there was no significant change noted and both were equally effective.

KEYWORDS: Enalapril, Amlodipine, Antihypertensive, Blood pressure

INTRODUCTION

Hypertension has also been identified as one of the leading causes of death and disability in the developing countries 1. National Health Survey of Pakistan (NHSP) has reported that 18% of adults more than 15 years, and 33% of adults more than 45 years of age suffer from hypertension 2,3. If the Renin-Angiotensin-Aldosterone system is too active, blood pressure will be too high. There are many drugs which interrupt steps in this system to lower blood pressure. These drugs are one of the main methods to control high blood pressure (hypertension), heart failure, kidney failure, and harmful effects of diabetes 4. The ACE Inhibitors are most frequently prescribed antihypertensive agents in younger and older patients 5. The Calcium Channel Blockers (CCBs) are widely used drugs and Amlodipine is the most frequently prescribed, and the most commonly used drug in adults in the United States 6. Enalapril maleate is also able to improve both endothelium-dependent and endothelium-independent vascular relaxation. However the endothelial effects of this drug are not only dependent on decrease of Angiotensin II formation and increase of bradykinin bioavailability.
In this regard it has been suggested that the vascular action of ACE-1 could be also related to their ability to reduce production of endothelin I (ET-I), one of the most potent vasoconstrictor, through an increased nitric oxide (NO) production leading to a down-regulation of ET-I gene expression. These studies stress on the need to investigate the comparative efficacy of the existing antihypertensive drugs. Keeping in view these facts and figures, the present study was carried out to compare the antihypertensive effect of Enalapril and Amlodipine along with Atorvastatin in hypertensive dyslipidemic patients.

**MATERIAL & METHODS**

The study was conducted by the Department of Pharmacology & Therapeutics, LUMHS, Jamshoro at Red Crescent hospital, Latifabad, Hyderabad, Pakistan from 2007 to 2009. It was a prospective and descriptive case study of one year duration. Non probability convenience sampling technique was used. One hundred (100) essential hypertensive, dyslipidemic patients were enrolled in the study and divided in two groups. Group A received Enalapril 10mg and Group B received Amlodipine 5mg in the morning. Both groups were receiving Atorvastatin 20 mg at bed time. Patients of either sex, Age between 35 – 65 years, with essential hypertension (systolic BP 140-159 mmHg, Diastolic BP 90-99 mmHg and Dyslipidemia (Total Cholesterol above 200mg/dl and less than 250mg/dl) were included in the study. Patients with primary hypertension and normal lipid profile, Diabetes mellitus, Chronic Renal Failure, Pregnancy, Liver disorders, Hypo & Hyperthyroidism and Familial hyperlipidemic syndromes were excluded. All patients with essential hypertension and dyslipidemia were included in the study after obtaining informed consent. The study protocol was approved by ethical committee. History and examination was carried out of each patient as part of routine care. Blood pressure was recorded at base line and after three months of treatment.

The data were entered in statistical program SPSS version 16.0. The numerical parameters were expressed as Mean ± standard deviation. Student t test (2 tailed) was applied to compare the means among the groups i.e. Enalapril and Amlodipine. Paired sample t test was also used to compare the blood pressure between baseline and after 3 months of treatment. P value ≤ 0.05 was considered as statistically significant level for all the comparisons. Blood pressure was measured by using sphygmomanometer (mercurial type).

**RESULTS**

The comparison of mean blood pressure at base line and after treatment in Enalapril group was done. Mean systolic blood pressure at base line was 155.7 ± 16.38 mmHg and after treatment it was 140.1 ± 8.36 mmHg. There was significant decrease in the mean systolic blood pressure after treatment (p- value < 0.001). Mean diastolic blood pressure at base line was 93.6±5.81 mmHg and after treatment it was 82.6± 10.65 mmHg. There was significant decrease (p- value <0.001) in the mean diastolic blood pressure after treatment (Table – I).

In Group B (Amlodipine) Mean systolic blood pressure at base line was 157±16.72 and after treatment it was 142.1±9.37 Hg. There was significant decrease in the mean systolic blood pressure after treatment (p- value <0.001). Mean diastolic blood pressure at base line was 95.6± 7.11 mmHg and outer treatment it was 81.4±11.06mmHg. There was significant decrease (p- value <0.001) in the mean diastolic blood pressure after treatment (Table – I). After 3 months of treatment when both groups were compared, mean systolic blood pressure in Enalapril groups after treatment was 140.1± 8.36mmHg and in Amlodipine group was 142.1±9.37mmHg. There was no significant difference (p- value 0.26) in the mean systolic blood pressure of two groups after treatment. Mean diastolic blood pressure in Enalapril group after treatment was 82.6±10.65 mmHg and in Amlodipine group was 81.4±11.06 mmHg. There was no significant difference (p- value 0.58) in the mean diastolic blood pressure of two groups.

<table>
<thead>
<tr>
<th>Blood Pressure (mmHg)</th>
<th>Enalapril Baseline Mean ± Standard Deviation</th>
<th>Enalapril After 3 months Mean ± Standard Deviation</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic</td>
<td>155.7 ± 16.38</td>
<td>140.1 ± 8.36</td>
<td>&lt; 0.001†</td>
</tr>
<tr>
<td>Diastolic</td>
<td>93.6 ± 5.81</td>
<td>82.6 ± 10.65</td>
<td>&lt; 0.001†</td>
</tr>
</tbody>
</table>

Results are presented as Mean ± Standard Deviation
† P value is statistically highly significant calculated by paired t test
DISCUSSION

Hypertension and dyslipidemia are two important risk factors for many systemic diseases including ischemic heart disease, and cerebrovascular accidents (stroke). Controlling one of the risk factors will not prevent development of enlisted diseases. Therefore currently multidisciplinary and combination therapy has been emphasized. This therapy includes behavioral modification, lipid lowering drugs and antihypertensive drugs. This descriptive, prospective, comparative study was performed to evaluate the effect of two hypertensive drugs (Amlodipine, Enalapril) in combination with Atorvastatin a lipid lowering agent in hypertensive dyslipidemic patients.

In Enalapril group (Group A) there was significant fall in the blood pressure after 3 months of treatment. In Amlodipine (Group B) there was significant fall in the blood pressure after 3 months of treatment. This is in agreement with other studies. This descriptive, prospective, comparative study was performed to evaluate the effect of two hypertensive drugs (Amlodipine, Enalapril) in combination with Atorvastatin a lipid lowering agent in hypertensive dyslipidemic patients.

In our study we also combined the lipid lowering agent atorvastatin, which also helped in blood pressure lowering effect which may be due to effect observed by Kwang Koh, as it result in prompt blood pressure lowering effect and will be helpful in patients will hypertension and patients with other cardiovascular risk fortuos including diabetes and dyslipidemia.

CONCLUSION

Both drugs individually reduced the systolic and diastolic blood pressure significantly but when compared, there was no significant change noted and both were equally effective.

REFERENCES


