Original Article

Biochemistry

Comparative Efficacy Evaluation of Amlodipne/Ramipril Combination with Essential Hypertension

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ABSTRACT

Introduction: The reduction of blood pressure lower than 130/85 mmHg provides additional benefits regarding both protection of organs and cardiovascular mortality. Amlodipine is a calcium channel-blocking agent with vasodilator activity and Ramipril is ACE inhibitor.

Objective: the objective of this double-blind, comparative study evaluating the efficacy of Amlodpine 5mg and Ramipril 1.25mg in combination and as mono therapy in adult patient with essential hypertension.

Study design. Double-blind, comparative study

Place and Duration of Study: This study was conducted in the department of Biochemistry, University of Karachi from February 2011 to July 2011.

Materials and Methods: This was multicenter randomized, double-blind, comparative study. Patients were selected from different hospitals of Orangi Town Karachi from February 2011 to July 2011 and study was conducted in the department of Biochemistry, University of Karachi. Patients were randomized to receive Amlodopine (5mg) once daily Ramipril (1.25 mg) once daily for 8 weeks. The analysis of antihypertensive efficacy and biochemical effects of a therapeutic regimen in the long term becomes important .In study patents were randomized to receive amlodipine 5mg once daily, Ramipril 1.25 mg once daily, the combination of amlodipine 5mg with Ramipril 1.25 mg once daily.

Results: In the patients treated with combination of Amlodipine 5mg and Ramipril 1.25mg tablets blood pressure reduction was significantly lower, reaching values of 130.4 ± 10.2 / 84.1 ± 7.4 mmHg by the end of eight weeks of treatment**.**

Conclusion: The results of this study demonstrated that the combination of amlodipine 5mg with Ramipril 1.25 mg once daily has a high antihypertensive efficacy and showed synergetic effect.

Key Words: Amlodipine, hypertension, Ramipril, systolic blood pressure.

INTRODUCTION

An adequate blood pressure is a treatment of hypertension and it is the risk of cardiovascular morbidity and mortality so proper therapy is essential. And the reduction of blood pressure lower than 130/85 mmHg provides additional benefits regarding both protection of organs and cardiovascular mortality. Guidelines of World Health Organization for the treatment of hypertension that is, 130/85 mmHg which is lower than the previous limit of 140/90 mmHg.[1-6]

ACE inhibitors, or angiotensin converting enzyme inhibitors (i.e. Enalapril, Ramipril, Captropril) reduce peripheral vascular resistance via blockage of the angiotensin converting enzyme. This action reduces the myocardial oxygen consumption, thereby improving cardiac output and moderating left ventricular and moderating left ventricular and vascular hypertrophy. ACEIs are recommended in current clinical practice guidelines for secondary prevention in patients with cardiovascular disease[7, 8]

Combination therapies reduced B.P to a greater extent than with amlodipine besylate alone as indicated with benazepril hydrochloride with valsartan and with perindopril[9, 10]

Therefore, the objective of this double-blind, comparative study evaluating the efficacy of Amlodpine 5mg and Ramipril 1.25mg in combination and as monotherapy in adult patient with essential hypertension..

MATERIALS AND METHODS

This was multicenter randomized, double-blind, comparative study. Patients were selected from different hospitals of Orangi Town Karachi from February 2011 to July 2011 and study was conducted in the department of Biochemistry, University of Karachi. Patient was randomized to receive Amlodopine (5mg) once daily Ramipril (1.25 mg) once daily for 8 weeks. The analysis of antihypertensive efficacy and biochemical effects of a therapeutic regimen in the long term becomes important .In study patents were randomized to receive amlodipine 5mg once daily, Ramipril 1.25 mg once daily, the combination of amlodipine 5mg with Ramipril 1.25 mg once daily.

RESULTS

In the patients treated with Amlodipine 5mg tablet alone, blood pressure reduction was lower, although significant, reaching values of 140.9 ± 11.2 / 90.2 ± 6.5 mmHg ($p < 0.05$ versus Amlodipine 5mg + Ramipril 1.25mg) by the end of eight weeks of treatment.

In the patients treated with Ramipril 1.25mg tablet alone, blood pressure reduction was lower, although significant, reaching values of 141.2±12.3 / 91.1±7.4 mmHg ($p < 0.05$ versus Amlodipine 5mg + Ramipril 1.25mg) by the end of eight weeks of treatment. In the patients treated with combination of Amlodipine 5mg and Ramipril 1.25mg tablets blood pressure reduction was significantly lower, reaching values of 130.4 ± 10.2/ 84.1 ± 7.4 mmHg by the end of eight weeks of treatment.

Table No.1 - Baseline Characteristics

	Amlodipine (n=67)	Ramipril (n=67)	Amlodipine + Ramipril (n=67)
Age (years)	50.2 ± 9.3	51.5 ± 9.8	53.4 ± 9.5
Male / Female (%)	43.4 / 56.6	35.0 / 65.0	31.6 / 68.4
Body weight (Kg)	68.9 ± 13.5	71.2 ± 12.2	69.7 ± 10.9
BMI (kg/m2)	27.5 ± 3.8	27.8 ± 3.4	27.3 ± 3.5
SBP sitting (mmHg)	149.5 ± 11.5	148.8 ± 10.9	149 ± 9.9
DBP sitting (mmHg)	95.7 ± 7.4	94.9 ± 7.8	95.9 ± 6.9

Table No.2: Ambulatory Blood Pressure Monitoring. Mean Values of Blood Pressure

	Amlodipine (n=67)	Ramipril (n=67)	Amlodipine + Ramipril (n=67)
Systolic BP - 24 hours (mmHg)			
Baseline	149.5 ± 11.5	148.8 ± 10.9	149.9 ± 9.9
Week 8	140.9 ± 11.2	141.2 ± 12.3	130.4 ± 10.2
Diastolic BP - 24 hours (mmHg)			
Baseline	95.7 ± 7.4	94.9 ± 7.8	95.9 ± 6.9
Week 8	90.2 ± 6.5	91.1 ± 7.4	84.1 ± 7.4

DISCUSSION

The baseline characteristics of the population included in the study are shown in Table No.1. We can observe that the groups were not different in relation to age, body mass index and weight, heart rate, and systolic and diastolic pressure values. We can observe that blood pressure in the three groups, which was similar in the baseline, had a significant reduction as from the third week of treatment in the three groups ($p < 0.001$ versus week 0). In the patients treated with Amlodipine 5mg tablet alone, blood pressure reduction was lower, although significant, reaching values of 140.9 ± 11.2 / 90.2 ± 6.5 mmHg ($p < 0.05$ versus Amlodipine 5mg + Ramipril 1.25mg) by the end of eight weeks of treatment. In the patients treated with Ramipril 1.25mg tablet alone, blood pressure reduction was lower, although significant, reaching values of 141.2±12.3 / 91.1±7.4 mmHg ($p < 0.05$ versus Amlodipine 5mg + Ramipril 1.25mg) by the end of eight weeks of treatment. In the patients treated with combination of Amlodipine 5mg and Ramipril 1.25mg tablets blood pressure reduction was significantly lower, reaching values of 130.4 ± 10.2 / 84.1 ± 7.4 mmHg by the end of eight weeks of treatment. It means that patients treated with Amlodipine 5mg tablet alone, and Ramipril 1.25mg tablet alone, achieve previous blood pressure level. i.e 140/ 90 mm Hg. And when the patients treated with combination (Amlodipine 5mg & Ramipril 1.25mg) showed synergetic effect as compare to Amlodipine 5mg & Ramipril 1.25mg alone that was achieve new blood pressure limits i.e. 130/ 85 mmHg Table No.2.The results of this multicenter study showed that the combination of Amlodipine 5mg and Ramipril 1.25mg has a high antihypertensive efficacy that is sustained in the long term with a quite reduced percentage of loss of blood pressure control. Based on our results we can state that the antihypertensive efficacy of the combination of Amlodipine 5mg and Ramipril 1.25mg at low doses was higher than that of the two comparative monotherapy regimens using those drugs alone. We observed that more than 63% of the patients treated with the combination of Amlodipine 5mg and Ramipril 1.25mg remained with diastolic blood pressure levels equal to or lower than 85 mmHg, thus achieving the goals recommended by current guidelines for the treatment of hypertension. And patients treated with the combination of Amlodipine 5mg and Ramipril 1.25mg showed the highest rates, which were statistically different from that observed with Amlodipine 5mg and Ramipril 1.25mg alone. The difficulty to achieve the goal of controlling systolic blood pressure explains why the international guidelines for studies on antihypertensive drugs still use criteria based on diastolic blood pressure to describe the antihypertensive efficacy of a drug, in spite of the fact that guidelines indicate the real need to control systolic blood pressure as well. It is important to point out that blood pressure reduction provided by the treatment with the combination of Amlodipine 5mg and Ramipril 1.25mg did not cause any secondary increase in sympathetic activity, since no significant variations of heart rate occurred.

CONCLUSION

In brief, the results of this multicenter study demonstrated that the combination of Amlodipine 5mg and Ramipril 1.25mg of these two classes of antihypertensive drugs has a high antihypertensive

efficacy, allowing approximately 63% of the patients treated to achieve and maintain for eight weeks the new goal of blood pressure control.

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