

Efficacy of Different Antihypertensive Drugs among newly Diagnosed Hypertensive Patient in Dhulikhel Hospital

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ABSTRACT

Background

Cardiovascular disease represents the largest burden on global health, important modifiable risk factor being hypertension. Difference in response to antihypertensive medication depending on ethnic group is well recognized. There is very few data regarding this difference in the South Asian population especially from Nepal.

Objective

The aim of this study is to find out which antihypertensive medication has better efficacy in our population.

Method

One seventy two newly diagnosed hypertensive patients who presented to cardiology OPD were included. Blood Pressure (BP) was recorded in both arms at least three times. Patients were counseled for lifestyle and dietary modification and were prescribed one of the three drugs Hydrochlorothiazide 25 mg or Amlodipine 5 mg or Enalapril 5 mg. Patients were called back in 4-6 weeks time and Blood Pressure was recorded in similar manner.

Result

Out of 172 patients, 97 were male and 75 female. The mean age was 55.49 ± 1.03 years. Mean Systolic BP before treatment was 156.2 ± 10.6 mm of Hg and Mean Diastolic BP before treatment was 100.5 ± 6.8 with no statistically significant difference among different groups. However Systolic BP reduction was 14.6 ± 5.1 , 21.9 ± 5.9 and 21.8 ± 7.4 by Hydrochlorothiazide, Amlodipine and Enalapril respectively. Diastolic BP reduction was 8.8 ± 2.5 , 14.2 ± 2.8 and 14.3 ± 2.9 by Hydrochlorothiazide, Amlodipine and Enalapril respectively.

Conclusion

Amlodipine and Enalapril are equally effective in controlling BP in our population. Hydrochlorothiazide is less effective than both Amlodipine and Enalapril.

KEY WORDS

Amlodipine, antihypertensive drugs, efficacy, enalapril, hydrochlorothiazide.

INTRODUCTION

Cardiovascular disease represents 10% of the global burden of disease and mortality and morbidity due to cardiovascular disease is expected to rise by more than 33% over the coming two or three decades.^{1,2} Hypertension defined as systolic BP of more than 140 mmHg and diastolic BP of more than 90 mm Hg is one of the most important modifiable risk factor for cardiovascular disease.³ The prevalence of hypertension is in rising trend in Nepal. The prevalence of hypertension has increased by three fold in twenty five years. In study done at the same place it was found that prevalence of hypertension was 6% in 1981 and 18 % in 2006.⁴

Difference in response to antihypertensive agents depending on different ethnic group is well recognized. Joint National Committee (JNC) IV published in 1988 was the first to recommend consideration of race and ethnicity while prescribing antihypertensive drugs.⁵ There are many trials which have shown the difference among the black and the white population. Blacks of African origin have propensity for a higher salt sensitivity, and markedly lower plasma renin levels, compared with whites of Caucasian origin. While south Asians, because of a higher prevalence of central obesity and insulin resistance, are likely to have hypertension mainly driven by a higher sympathetic activity.⁶

There is very few data regarding this difference in the South Asians. From Nepal there is almost no data. So it is important for us to find out which antihypertensive medication is best for the patient to control BP.

METHODS

It is a prospective comparative study carried out at Dhulikhel Hospital, Kathmandu University Hospital. A newly diagnosed hypertensive patient who presented to cardiology OPD from January 1st 2015 to 30th April 2015 were included in the study. BP was recorded according to standard method in both arms at least three times and average was recorded. All the patient were counseled for lifestyle and dietary modification and were prescribed one of the three drugs Hydrochlorothiazide 25 mg or Amlodipine 5 mg or Enalapril 5 mg. Patients were called back for follow up in 4-6 weeks time and BP was recorded in similar manner.

Inclusion criteria

i) Newly diagnosed hypertensive patient of age 40 to 80 who presented to cardiology OPD.

Exclusion criteria

i) Patient having Systolic BP more than 180 mm of Hg and / or Diastolic BP more than 110 mm of Hg.

ii) Patient suspected to have secondary hypertension.

iii) Patient having compelling indication or contra-indication for any of the drug.

iv) Patient who were not willing to be the part of study or did not come for follow up in 4-6 weeks time, or were not compliant to prescribed drug.

Statistical analysis was done using SPSS 20.0 and ANOVA was applied wherever applicable.

RESULTS

Out of 172 patients, 97 were male and 75 female. The mean age was 55.49 ± 1.03 years. Distribution of patient according to gender and antihypertensive medication is shown in Fig. 1 and similarly distribution of patient according to age and antihypertensive medication is shown in Fig. 2.

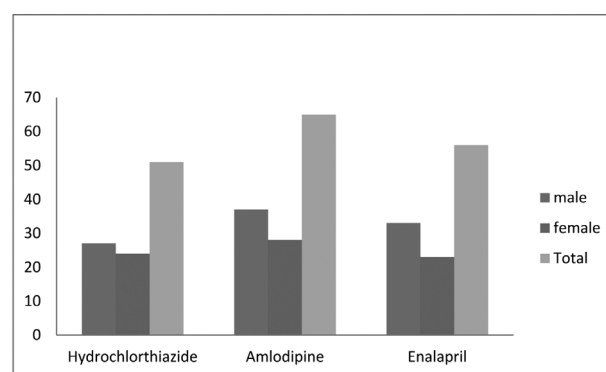


Figure 1. Distribution of Patient according to gender and antihypertensive drug.

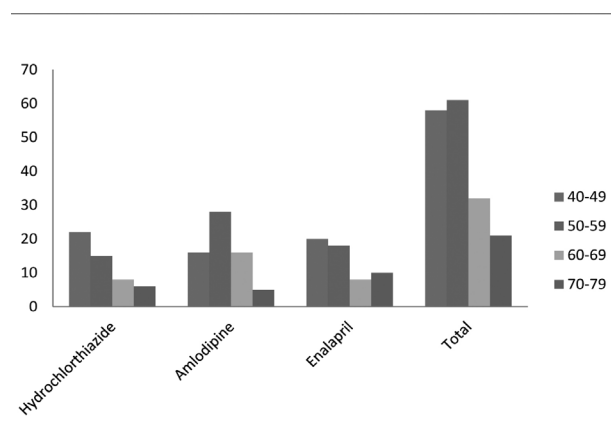


Figure 1. Distribution of patient according to age and antihypertensive drug.

Mean Systolic BP before treatment was 156.2 ± 10.6 mm of Hg with no significant difference all three groups. Mean Diastolic BP before treatment was 100.5 ± 6.8 mm of Hg with no statistically significant difference among different groups. However as shown in table 1, 2 and 3 the average Systolic BP reduction was 14.6 ± 5.1 mm of Hg, 21.9 ± 5.9 mm of Hg and 21.8 ± 7.4 mm of Hg by Hydrochlorothiazide, Amlodipine and Enalapril respectively. Diastolic BP reduction was 8.8 ± 2.5 mm of Hg, 14.2 ± 2.8 mm of Hg and 14.3 ± 2.9 mm of Hg by Hydrochlorothiazide, Amlodipine and Enalapril respectively. The efficacy in reducing both Systolic

Table 1. Comparison between Hydrochlorthiazide 25 mg and Amlodipine 5 mg

	Hydrochlorthiazide 25 mg	Amlodipine 5 mg	P value
Systolic BP before treatment (mean±SD)/mmHG	156.2 ±9.8	155.8 ±10.7	0.870
Systolic BP after treatment (mean±SD)/mmHG	141.6 ±9.6	133.9 ±7.5	0.000
Reduction in Systolic BP (mean±SD)/mmHG	14.6 ±5.1	21.9 ±5.9	0.000
Diastolic BP before treatment (mean±SD)/mmHG	101.5 ±7.5	102 ±5.8	0.700
Diastolic BP after treatment (mean±SD)/mmHG	92.7±7.2	87.8 ±6.1	0.001
Reduction in Diastolic BP (mean±SD)/mmHG	8.8 ±2.5	14.2 ±2.8	0.000

Table 2. Comparison between Hydrochlorthiazide 25 mg and Enalapril 5 mg

	Hydrochlorthiazide 25 mg	Enalapril 5 mg	P value
Systolic BP before treatment (mean±SD)/mmHG	156.2 ±9.8	156.6 ±11.4	0.856
Systolic BP after treatment (mean±SD)/mmHG	141.6 ±9.6	134.8±8.8	0.000
Reduction in Systolic BP (mean±SD)/mmHG	14.6 ±5.1	21.8 ±7.4	0.000
Diastolic BP before treatment (mean±SD)/mmHG	101.5 ±7.5	100.6 ±6.3	0.325
Diastolic BP after treatment (mean±SD)/mmHG	92.7±7.2	86.3 ±6.9	0.008
Reduction in Diastolic BP (mean±SD)/mmHG	8.8 ±2.5	14.3 ±2.9	0.000

Table 3. Comparison between Amlodipine 5 mg and Enalapril 5 mg

	Amlodipine 5 mg	Enalapril 5 mg	P value
Systolic BP before treatment (mean±SD)/mmHG	155.8 ±10.7	156.6 ±11.4	0.730
Systolic BP after treatment (mean±SD)/mmHG	133.9 ±7.5	134.8±8.8	0.587
Reduction in Systolic BP (mean±SD)/mmHG	21.9 ±5.9	21.7 ±7.4	0.920
Diastolic BP before treatment (mean±SD)/mmHG	102 ±5.8	100.6 ±6.3	0.224
Diastolic BP after treatment (mean±SD)/mmHG	87.8 ±6.1	86.3 ±6.9	0.226
Reduction in Diastolic BP (mean±SD)/mmHG	14.2 ±2.8	14.3 ±2.9	0.857

and Diastolic BP is similar with Amlodipine and Enalapril. However Hydrochlorthiazide has less efficacy in comparison to Amlodipine (p 0.000) and Enalapril (p 0.000).

DISCUSSION

Difference in response to antihypertensive agents depending on different ethnic group is well recognized. The clinical recognition of such differences followed the 1982 Veterans Affairs (VA) Cooperative Study Group finding that 62% of whites and 54% of blacks achieved BP goal with propranolol, while such goal was attained with hydrochlorothiazide in 55% of whites and 71% of blacks.⁷ Blacks respond slightly better than whites to diuretics and CCBs, while whites respond slightly better than blacks to ACE inhibitors and β-blockers.⁸ In our study we found that our population responds better to CCB and ACEI than Hydrochlorthiazide.

Trials with black and Hispanic participants (ALLHAT, INVEST, VALUE) found similar primary outcomes, but ALLHAT found a greater magnitude of benefit for blacks on diuretic therapy compared with nonblacks.⁹⁻¹¹ Our study suggests that we respond like nonblacks as BP control was significantly less with HCTZ. PROGRESS trial compared Asians with non-Asians, reporting that angiotensin converting enzyme inhibitors were equally effective for preventing stroke in both groups.¹² In three studies conducted exclusively in Asians (JMIC-B, FEVER, NICS-EH), calcium channel blockers were effective in preventing cardiovascular outcome.¹³⁻¹⁵ Though we did not look at the cardiovascular outcome in our study we looked at controlling BP which is an important risk factor to prevent cardiovascular outcome.

In one of the study conducted in India, when antihypertensive medication in diabetic patient was compared the Systolic and Diastolic BP reduction by enalapril monotherapy was similar to our study.¹⁶ In another study where efficacy of different antihypertensive drugs were compared as a monotherapy or combined therapy, monotherapy drug efficacy is similar to our study.¹⁷ One of the sub group major trial, ASCOT trial which compared South Asians with white and black population, showed better response to angiotensin converting enzyme inhibitor (ACEI) and calcium channel blocker (CCB) then diuretics.¹⁸ So similar to these large studies our study also shows CCB and ACEI to be more effective in controlling BP.

BP recording was not done by the same person which could vary a little. BP recording was not done by the same sphygmomanometer which could also vary a little.

CONCLUSION

From our study we can conclude that both Amlodipine and Enalapril are equally effective in controlling BP in our population. Hydrochlorthiazide is less effective than both Amlodipine and Enalapril. So while choosing first

line antihypertensive medication we should choose either Amlodipine or Enalapril but not Hydrochlorothiazide.

However we cannot comment on combination of drugs from this study.

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