COMPARISON OF EFFICACY OF TELMISARTAN AND ATENOLOL IN MANAGEMENT OF ESSENTIAL HYPERTENSION

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ABSTRACT

Objective: To compare the efficacy of telmisartan and atenolol in management of patients with essential hypertension.

Study Design: Randomized comparative trial.

Place and Duration of Study: Department of Medicine Combined Military Hospital Peshawar, from Feb 2010 to Aug 2010.

Material and Methods: One hundred & eighty patients diagnosed with essential hypertension fulfilling the inclusion criteria were included in study using consecutive non-probability sampling after taking informed consent. Patients were allocated to either telmisartan or atenolol group by using a table of random numbers. Follow up of patients was carried out in 4 visits with recording of sitting systolic and diastolic blood pressures.

Results: Among total of 180 patients, 60% were females and 40% were males. Majority were between age group 56-75 years. Reduction of both systolic and diastolic blood pressures at the end of eight weeks was significantly greater with telmisartan as compared to atenolol (*p*-value=0.000 and 0.016 respectively).

Conclusion: At the end of eight weeks of treatment, telmisartan was more effective than atenolol in lowering systolic and diastolic blood pressure.

Keywords: Atenolol, Diastolic blood pressure (DBP), Essential hypertension, Systolic blood pressure (SBP), Telmisartan.

INTRODUCTION

Hypertension is an important global health challenge because of its high prevalence[1] and resulting cardiovascular disease[2] and chronic kidney disease[3]. In 2010, 31.1% of the world's adults (1.39 billion) had hypertension[4]. Improving hypertension control should be a priority to achieve the UN Millennium Development Goals for noncommunicable diseases in low and middle income countries[5].

Beta-blockers have been used for more than 40 years to treat hypertension. Data from clinical trials has resulted in recommendations of beta-blockers as first or second-line antihypertensive agents in most recent guidelines of European Society of Hypertension/European Society of Cardiology[6] and the Joint National Committee (JNC-8) on the prevention, detection and treatment of high blood pressure[7]. A recent meta-analysis concluded that atenolol is more effective than placebo in reducing cardio-vascular events in patients with hypertension[8]. Moreover various side effects including diabetes[9], gout[10], dyslipidaemia and erectile dysfunction[11] significantly affect the patient's quality of life.

An effective strategy to control BP is blockade of the renin-angiotensin-aldosterone system. A relatively new class of anti hyper-tensives are Angiotensin II type 1 (AT1) receptor blockers that selectively block the actions of angiotensin II. Among AT1 receptor blockers (ARB), telmisartan has very long half-life[12]. It acts as a partial agonists at peroxisome proliferator-activated receptor-γ[13].

Telmisartan is a new introduction in Pakistani pharma industry. Very little work regarding its effectiveness in local population is available. We have selected atenolol for comparison as it is a conventional first-line antihypertensive drug widely used and the

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results will be helpful to guide the treatment strategy of essential hypertension.

MATERIAL AND METHODS

This randomized comparative trial was carried out at Combined Military Hospital (CMH) Peshawar from Feb 2010 to Aug 2010. Permission from hospital ethical review committee was taken. Sample size was calculated using WHO sample size calculator with the following; level of significance 5%, power of test 80%, SD 12.6, test value of population mean 158.4 ± 12.6 mm Hg, anticipated population mean 153.8 ± 12.6 mm Hg[14]. A total number of one hundred and eighty patients, 90 in each group with essential hypertension were selected by non-probability consecutive sampling after taking informed written consent. Patients of essential hypertension between 18-80 years of age with poor control of hypertension on diet alone or have discontinued antihypertensive drug(s) one month before the initial visit, reporting in medical out-patient department of CMH Peshawar were included in the study. Patients with secondary hypertension, lactating or pregnant females or those planning to conceive, patients with co-morbid conditions like renal impairment, ischemic heart disease and chronic liver disease, intravenous drug users, alcoholics and patients who had already experienced side effects of these two drugs were excluded from the study.

A detailed history including onset and duration of essential hypertension, medication history, micro and macrovascular complications was taken from each patient along with clinical examination was carried out to find out above mentioned complications. Initial investigations performed to exclude secondary causes of hypertension were electrocardiography; serum urea and creatinine; ultrasound abdomen; echo-cardiography; and chest radiograph. Patients were randomly allocated into two groups by using random number table. Telmisartan in a dose of 80 mg once-daily was administered to group A, whereas atenolol in a dose of 50 mg once daily to group B.

At visit-1 (time of inclusion in the study), sitting systolic and diastolic BP was taken initially and recorded in the individual patient proforma. At each subsequent visit (2, 4 and 8 weeks), sitting systolic and diastolic BP was taken twice and means were recorded. Data thus obtained were entered into a pre-designed proforma.

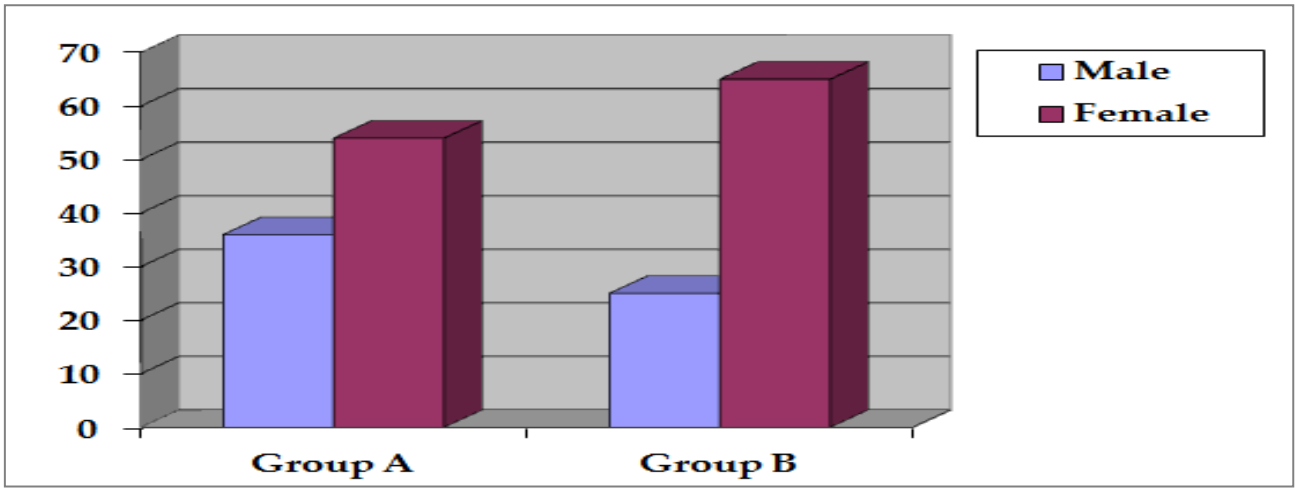

Figure: Gender-wise distribution in both the drug groups (*p*-value=0.08).

Data Analysis

All data were analyzed using SPSS 11.0 statistical software. Mean and standard deviation (mean ± SD) were calculated for age, systolic and diastolic BP at 0, 2, 4 & 8 weeks. Categorical data like gender were given in frequency and percentages. Chi-Square test was applied

between the age group and treatment. Independent sample "t" test was used to compare mean SBP and mean DBP between the study groups at 0, 2, 4 & 8 weeks. Paired "t" test was used to compare base line systolic and diastolic BP with systolic and diastolic BP after 8 weeks. A *p*-value <0.05 was considered significant.

RESULTS

A total of 180 patients fulfilling the inclusion/exclusion criteria were included in study. In group A, 54 (60%) were females and 36 (40%) were male patients, while in group B, 65 (72.2%) were females and 25 (27.8%) were male patients, *p*-value=0.08 (figure).

Age distribution showed that majority of the patients were below 75 years of age. Two point two percent (n=4) were above 75 years, 48.9% (n=88) were between 56-75 years, 23.9% (n=43) were between 36-55 years and 25% (n=45) were in the range of 18-35 years, *p*-value = 0.348. Mean age in telmisartan group was 50.75 years ± 15.39 years and in atenolol group was 52.73 years ± 14.77 years (table-I).

Table-I: Age wise distribution in both the groups.

		Drug Administered		Total
		Telmisartan	Atenolol	
Age	18-35	23 25.6%	22 24.4%	45 25.0%
	36-55	25 27.8%	18 20.0%	43 23.9%
	56-75	39 43.3%	49 54.4%	88 48.9%
	>75	3 3.3%	1 1.1%	4 2.2%
Mean ± SD		50.75 ± 15.39	52.73 ± 14.77	180 100%

p-value=0.348

Table-II: Comparison of measurement of systolic and diastolic BP after both the drugs.

	Drug Administered	N	Mean	Std Deviation	*p*-value
Age	Telmisartan Atenolol	90 90	50.7556 52.7333	15.3852 14.7730	0.380
Systolic BP at baseline	Telmisartan Atenolol	90 90	176.2000 174.1556	13.0816 13.0375	0.295
Diastolic BP at baseline	Telmisartan Atenolol	90 90	102.3444 102.2000	4.8533 5.4116	0.851
Systolic BP after 2 week	Telmisartan Atenolol	90 90	154.2000 160.1556	13.0816 13.0375	0.003
Diastolic BP after 2 week	Telmisartan Atenolol	90 90	88.3444 93.2000	4.8533 5.4116	<0.001
Systolic BP after 4 week	Telmisartan Atenolol	90 90	149.2000 156.1556	13.0816 13.0375	<0.001
Diastolic BP after 4 week	Telmisartan Atenolol	90 90	85.3444 86.2000	4.8533 5.4116	0.266
Systolic BP after 8 week	Telmisartan Atenolol	90 90	146.2000 154.1556	13.0816 13.0375	<0.001
Diastolic BP after 8 week	Telmisartan Atenolol	90 90	83.3444 85.2000	4.8533 5.4116	0.016

Average difference in systolic and diastolic BP at base line was not significant in both the groups with *p*-value=0.295 and *p*-value= 0.851 respectively. However, the difference both groups became significant at first visit (*p*-value=0.003 for SBP and <0.001 for DBP respectively) which gave the difference in efficacy of both the treatments. At second visit, SBP was reduced significantly (*p*-value<0.001). Though DBP was also reduced but not significantly (*p*-value=0.266). At third visit both SBP and DBP lowering were significant. Telmisartan was more effective than atenolol, with a reduction in SBP of 30 mm Hg vs. 20 mm Hg, mean supine SBP 146.2 ± 13.08 mm Hg vs. 154.15 ± 13.04 mm Hg with a *p*-value <0.001 and a non-significant decrease in DBP of 19 mm Hg vs. 17 mm Hg, mean supine DBP 83.34 ± 4.85 mm Hg vs. 85.20 ± 5.41 mm Hg with a *p*-value=0.016 (table-II). The efficacy of both drugs was compared using chi-square test which showed that telmisartan was significantly better than atenolol with *p*-value<0.001 (table-III).

Table-III: Efficacy in both the groups.

		Drug Administered		Total	*p*-value
		Telmisartan	Atenolol		
Efficacy	Yes	90 100.0%		90 50.0%	<0.001
	No		90 100.0%	90 50.0%	
Total		90 100.0%	90 100.0%	180 100.0%	

DISCUSSION

Angiotensin receptor blockers have various beneficial effects like cerebroprotection, cardio-protection and nephroprotection[15]. Telmisartan significantly improves insulin resistance compared to other antihypertensives[16] and is the only ARB approved for reduction of morbidity in patients with cardiovascular disease[17]. Our study showed reduction in final SBP of 30 and 20 mm Hg (*p*<0.001) and in DBP of 19 and 17 mm Hg (*p*=0.016) in telmisartan and atenolol treated patients respectively. These results are consistent with a 26-week, active-controlled, titration to response European study of 533 patients which showed final decrease of 20.9 and 16.7 mm Hg in SBP, 14.4 and 13.3 mm Hg in DBP with telmisartan and atenolol respectively; only the difference in SBP was significant (*p*=0.005). Similarly reduction in baseline SBP of ≥10 mm Hg was achieved in 80% of telmisartan-treated and 68% of atenolol-treated patients (*p*=0.003). If needed hydrochlorothiazide was added in both treatment groups[18].

Alcocer et al also demonstrated in an 8-week open-label comparison that telmisartan was associated with a decrease in SBP of 20.4 vs. 9.1 mm Hg with atenolol (*p*=0.03). However reduction in DBP was non-significant, 13 vs. 8.6 mm Hg with telmisartan and atenolol respectively (*p*=0.053)[19]. Blood pressure was measured at the end of the dosing interval (trough) in both the treatment groups which suggests that telmisartan has a longer-lasting duration of action as compared to atenolol. Epidemiological data suggests that early morning rise in BP is associated with a high incidence of acute cardiovascular events. Longer acting antihypertensive agents like telmisartan may provide additional benefits by effectively controlling BP at all times.

CONCLUSION

At the end of eight weeks of treatment, telmisartan was more effective than atenolol in lowering systolic and diastolic blood pressure.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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