

## ORIGINAL ARTICLE

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

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**Background:** Telmisartan and atenolol are widely used in the management of essential hypertension. This study was conducted to compare the efficacy of these two drugs in management of patients of essential hypertension. **Methods:** Diagnosed patients of essential hypertension were selected. Therapeutic option (telmisartan/atenolol) was allocated to the patients by lottery method and they were divided into two groups. The patients were followed on subsequent visits (4 in total) and their sitting systolic and diastolic blood pressures were recorded. **Results:** Total number of 180 patients were divided into two treatment groups (i.e., telmisartan and atenolol). Forty percent were male and 60% were female. Majority of the patients were of age group 56–75 years. Telmisartan reduced systolic and diastolic blood pressure significantly compared to atenolol at the end of 8 weeks of treatment ( $p=0.000$  and  $0.016$  respectively). **Conclusion:** Telmisartan 80 mg once daily is more effective than atenolol 50 mg once daily in lowering systolic and diastolic blood pressure at the end of 8 weeks of treatment.

**Keywords:** Telmisartan, Angiotensin II receptor blocker, atenolol, beta blocker, hypertension

## INTRODUCTION

Hypertension is one of the leading causes of death globally and has emerged as increasingly important medical and public health issue. It affects approximately 25% of the adult population worldwide, and its prevalence was predicted to increase by 60% by 2025.<sup>1</sup> It is a major treatable risk factor for coronary heart disease (CHD)<sup>2</sup>, congestive heart failure (CHF), ischemic and haemorrhagic stroke<sup>3</sup>, renal failure and peripheral arterial disease (PAD); and accounts for 6% of deaths worldwide.

According to the Seventh Report of the Joint National Committee (JNC-7) on prevention, detection, evaluation and treatment of high blood pressure, Systolic blood pressure (SBP) of greater than 140 mmHg is a more important CVD risk factor than diastolic (DBP) in those older than age 50 years.<sup>4</sup> Clinical trials and observational studies suggest that poor SBP control is largely responsible for the unacceptably low rates of overall BP control.<sup>5,6</sup> Interestingly SBP control rates were considerably less (60–70%) while DBP control rates exceeded 90% in the Controlled Onset Verapamil Investigation of Cardiovascular End Points (CONVINCE) trial, and Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT).<sup>7,8</sup>

Beta-blockers have long been prescribed for management of hypertension as first-line therapy.<sup>9</sup> However, the role of beta-blockers in uncomplicated hypertension has been challenged recently as they are less effective for preventing cardiovascular events.<sup>10</sup> Reasons for less favourable outcomes include some adverse metabolic abnormalities such as dyslipidemia, new-onset diabetes and less effective reduction of central aortic compared with brachial BP.<sup>11</sup> Inhibition of

the renin-angiotensin-aldosterone system is an important strategy for management of hypertension.<sup>12</sup> Angiotensin II type 1 (AT<sub>1</sub>) receptor antagonist are relatively a new class of anti hypertensive agents that selectively and specifically antagonize the action of angiotensin II, a potent vasoconstrictor.<sup>13,14</sup> Among the class of AT<sub>1</sub> receptor antagonist, telmisartan offers the advantage of very long half-life and enables BP control over 24 hours using once-daily administration. It is a non-peptide AT<sub>1</sub> receptor antagonist, which is orally active, highly selective, potent, and a relatively lipophilic compound. This high lipophilicity enhances tissue penetration, intracellular absorption, and bioavailability. Telmisartan lacks the tetrazole unit usually present in the structure of sartans, but has a common benzimidazole group with candesartan. The substitution of this benzimidazole moiety with a basic heterocycle results in potent AT<sub>1</sub> antagonism and good absorption after oral administration.<sup>15</sup> The AT<sub>1</sub> versus angiotensin type 2 (AT<sub>2</sub>) receptor affinity ratios for telmisartan is 3000-fold.<sup>16</sup> Angiotensin receptor blocker posses multiple beneficial effects such as cardioprotection, cerebroprotection, and nephroprotection which provide opportunity to select the most suitable drug for the target vascular bed.<sup>17</sup>

This study was conducted to compare the antihypertensive efficacy of telmisartan and atenolol in management of patients of essential hypertension in our local population.

## MATERIAL AND METHODS

Sample Size was calculated using WHO sample size calculator.<sup>14</sup> The sample size thus calculated was 180 patients of essential hypertension, 90 patients in each group. The study was conducted in the Medical

Department of Saidu Group of Teaching Hospitals, Saidu Sharif, from October 2010 to December 2011.

Patients were enrolled from medical outdoor. Detailed history was taken from each patient and complete physical examination was performed. Lactating, pregnant or planning to become pregnant during the study, patients with accelerated hypertension or those suffering from co-morbidity or complicated hypertension with compelling indication for use of other antihypertensive agents were excluded.

Patients were randomly allocated into 2 groups. Group A received telmisartan (80 mg once-daily) and group B received atenolol (50 mg once daily). Initial sitting SBP and DBP were recorded at the time of inclusion in the study (visit 0), and recorded in the individual patient Performa. The subsequent visits were planned at 2, 4 and 8 weeks. At each visit, sitting SBP and DBP were measured twice, (15 minutes apart). Mean of the two readings was recorded. Decrease in SBP and DBP was measured.

Data were analysed using SPSS-16, and  $p < 0.05$  was taken as significant.

## RESULTS

Total number of essential hypertension patients in the study was 180. Out of telmisartan group, 36 (40%) were male and 54 (60%) were female, while in atenolol group 25 (27.8%) were male and 65 (72.2%) were female. Forty-five (25%) patients were in the range of 18–35 years, 43 (23.9%) in age range of 36–55 years, 88 (48.9%) in the range of 56–75 years, and 4 (2.2%) patients had age more than 75 years. Mean age in telmisartan group was  $50.75 \pm 15.39$  years, and atenolol group had mean age  $52.73 \pm 14.77$  years.

There were no significant differences in mean systolic and diastolic BP at baseline in both groups ( $p=0.295$  and  $p=0.851$  respectively). Average SBP and DBP after two weeks of treatment was significantly different in both groups ( $p=0.003$ ,  $p=0.000$  respectively). At 4 weeks of follow-up, SBP was reduced significantly ( $p=0.000$ ) while DBP was also reduced but not significantly ( $p=0.266$ ). Similarly, SBP and DBP had also significant differences at 8 weeks of follow-up ( $p=0.000$  and  $p=0.016$ ) in both groups (Table-1).

**Table-1: Comparison of BP in both groups at baseline and after treatment (Mean±SD)**

Blood Pressure	Telmisartan (n=90)	Atenolol (n=90)	p
SBP at baseline	176.20±13.08	174.17±13.04	0.295
DBP at baseline	102.34±4.86	102.20±5.41	0.851
SBP after 2 weeks	154.20±13.08	160.16±13.04	0.003*
DBP after 2 weeks	88.34±4.85	93.20±5.41	0.000*
SBP after 4 weeks	149.20±13.08	156.16±13.04	0.000*
DBP after 4 weeks	85.34±4.85	86.20±5.41	0.266
SBP after 8 weeks	146.20±13.08	154.16±13.04	0.000*
DBP after 8 weeks	83.34±4.85	85.20±5.41	0.016*

\*Significant

## DISCUSSION

Telmisartan and atenolol, the drugs which were included in this study are frequent components of our day to day regimens for patients of essential hypertension. Both drugs are also quite favourite of all physicians now a days keeping in consideration their relatively fewer undesirable side effects and once daily dosing.<sup>18</sup> Telmisartan has been relatively recently been introduced in Pakistan. Although, no work has been done on the efficacy of telmisartan in our population, as no local material is available, it is very interesting to note the way this drug has replaced most of the conventional antihypertensive agents. Moreover, Angiotensin receptor blockers (like telmisartan) posses multiple beneficial effects such as cardioprotection, cerebroprotection, nephroprotection which provide opportunity to select the most suitable drug for the target vascular bed.<sup>19</sup>

Telmisartan has been shown to be more effective than atenolol in reduction of BP in international studies, with a decrease in SBP, mean supine SBP, and a non-significant decrease in DBP.<sup>20</sup> However, these international studies do not categorically give definite guideline for our own local population. Thus selection of either of these agents for treatment is more of physician's choice than evidence based knowledge in our own population. The results of the current study are comparable to that of international studies, and are consistent with that of a 26-week, active-controlled, titration to response European study conducted in 533 patients with mild to moderate hypertension. Telmisartan produced significantly greater reductions in SBP than atenolol. Hydrochlorothiazide could be added in both treatment groups if deemed necessary.<sup>21</sup>

Previous studies also suggest that telmisartan may have a longer-lasting duration of action at the end of the dosing interval.<sup>15</sup> This hypothesis is supported by the fact that telmisartan has a long half-life of approximately 24 hours,<sup>18</sup> while that of atenolol is only about 9 hours.<sup>22</sup> Antihypertensive drugs with longer half life may confer additional benefits as they may control BP at a time associated with rapid increases in BP (during the early morning hours). It is particularly very important as evidence suggests that the early morning surge in BP is associated with a high incidence of acute cardiovascular events.<sup>19</sup>

Atenolol is known to result in a significant reduction of heart rate but telmisartan is not known for this effect. Another important feature of atenolol is that it has negative chronotropic action which may result in bradycardia.<sup>23</sup> This effect is particularly of much importance in patients having HF as the bradycardia may end up in worsening of the condition. In addition, it may hinder the early detection of hypoglycaemic manifestations in diabetic hypertensive patients.<sup>24</sup>

Beta-blockers have been used for more than 40 years as first or second-line antihypertensive agents.<sup>14</sup> Among the beta-blockers, atenolol is probably one of the best conventional first-line antihypertensive drug widely used, but the incidence of adverse events that include sleep-related, gastrointestinal and physical activity-related symptoms along with sexual dysfunction can negatively effect the patient's quality of life that may discourage long-term compliance with the treatment.<sup>25,26</sup>

During the course of this study, it is worth mentioning that majority of hypertensive patients had strong family history of hypertension as well as ischemic heart disease, whereas many others were heavy smokers and obese. This interesting fact that if we address modifiable risk factors (like smoking, obesity and life style etc.) can greatly reduce the number of patients suffering from hypertension and ischemic heart disease in our society needs to be worked up further.

## CONCLUSION

Telmisartan has a better antihypertensive effect than atenolol in patients of essential hypertension. Once-daily telmisartan monotherapy presents a good choice for control of BP in patients having mild to moderate hypertension.

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