ISSN: 2581 – 3633
PubMed - National Library of Medicine - ID: 101745081

International Journal of Medical Science and Advanced Clinical Research (IJMACR)

Available Online at:www.ijmacr.com

Volume – 7, Issue – 5, October - 2024, Page No. : 275 – 282

Comparative efficacy and safety of Cilnidipine and Telmisartan in hypertension: A 8 week, prospective study

[1]Dr. Balbir Kaur, Assistant Professor, Dept. of Pharmacology, Adesh Medical College & Hospital, Shahbad, Haryana.

[2]Dr. Naresh Jyoti, Professor & HOD, Dept. of Pharmacology, Adesh Medical College & Hospital, Shahbad, Haryana.

[3]Dr. Gurleen Kaur, Professor, Dept. of Pharmacology, Adesh Medical College & Hospital, Shahbad, Haryana.

[4]Dr. Lalit Arora, Professor, Dept. of Medicine, Adesh Medical College & Hospital, Shahbad, Haryana.

Corresponding Author: Dr. Balbir Kaur, Assistant Professor, Dept. of Pharmacology, Adesh Medical College & Hospital, Shahbad, Haryana.

How to citation this article: Dr. Balbir Kaur, Dr. Naresh Jyoti, Dr. Gurleen Kaur, Dr. Lalit Arora, "Comparative efficacy and safety of Cilnidipine and Telmisartan in hypertension: A 8 week, prospective study", IJMACR- October - 2024, Volume – 7, Issue - 5, P. No. 275 – 282.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Hypertension is one of the most common disease affecting humans throughout the world. It is an important health issue due to the associated morbidity and mortality and the cost to society.

Objectives: To evaluate and compare the efficacy and tolerability of Cilnidipine and Telmisartan in patients of stage I hypertension.

Methods: This study included 50 patients with stage 1 hypertension. They were divided into two groups of 25 each to receive Cilnidipine and Telmisartan. Evaluation of efficacy was made by blood pressure measurement on day 0, week 2, week 4, week 6, and week 8. The difference in blood pressure reduction in two treatment groups from baseline to 8 weeks was the main outcome measure. Any adverse drug reactions were inquired, analyzed and recorded at each visit.

Results: At 8 weeks, both groups showed significant ($P<0.001$) reduction in B.P from baseline. Mean SBP was reduced from 153.28 ± 4.5 mm Hg to 135.5 ± 5.0 mm Hg (Cilnidipine) and 154.04 ± 3.1 mm Hg to 136.56 ± 6.7 mm Hg (Telmisartan) after 8 weeks treatment (percentage difference was 11.5%, 11.9%). Mean DBP was reduced from 93.92 ± 4.3 mm Hg to 80.6 ± 1.9 mm Hg (Cilnidipine) and 94.48 ± 3.4 mm Hg to 81.2 ± 4.04 mm Hg (Telmisartan) after 8 weeks treatment (percentage difference was 14.18%, 14.05%).

Conclusion: Both the drugs were equally efficacious in reducing blood pressure. The most common adverse effect reported was headache. All adverse effects were mild and did not require any alteration or discontinuation of treatment.

Keywords: Hypertension; Cilnidipine; Telmisartan; Headache; Blood pressure

Introduction

Hypertension is the most prevailing disease among the Indian population, leading to severe health problems if left untreated according to ICMR-INDIAB-17 study. [1] Hypertension is also known for its asymptomatic nature and individuals with HTN remains unaware about their condition. Hypertension is one of the main reasons of many co morbidities like stroke, CAD, MI and heart failure. If hypertension remains undiagnosed or uncontrolled, it can cause mortality or permanent disability.[2] In India, hypertension is diagnosed if office BP exceeds 140/90 mm Hg and ambulatory BP exceeds 130/80 mmHg, as per Indian guidelines on hypertension-IV.[3] Around 12% of patients with hypertension had their blood pressure under control with diagnosis of hypertension.[4] Now a days many antihypertensive drugs like angiotensin converting enzyme inhibitors, angiotensin receptor blockers, β blockers, α blockers & diuretics are used for the treatment of hypertension and other heart disease[5]. Anti-hypertensive agents is the foundation of hypertension management. Long term complications can be prevented by the use of anti hypertensive drugs. Anti-hypertensive drugs with long duration of action are necessary for effective control of BP. Cilnidipine inhibit N-type (neuronal) calcium channels in addition to the L-type channels. It does not cause reflex tachycardia. [6,7,8] Telmisartan is an angiotensin receptor blocker. It does not produce any active metabolite. It is largely excreted unchanged in bile.It is long acting and has large volume of distribution.[9] Currently both the drugs are in use of hypertension. The present study has done compare the efficacy and safety of cilnidipine and telmisartan in newly diagnosed patients of stage I hypertension.

Materials and Methods

Source of Data

The present study was undertaken in the Department of Pharmacology in collaboration with the Department of Medicine on newly diagnosed patients of HTN attending medicine outpatient department of Adesh Medical College and Hospital, Shahbad, Haryana, for period of 3 months from august 2024 to October 2024.

Study Population

After approval by the Institutional Ethics Committee (IEC), 50 adult patients aged 18–60 years of either sex of newly diagnosed stage 1 hypertensive patients were included in the study. The subjects were informed about the study and written informed consent was taken.

Study Design

The present study is a prospective, open-label, parallel group, comparative study

Inclusion Criteria

1. Newly diagnosed Stage 1 hypertensive patients (whose SBP=140-159 mm Hg and DBP=90-99 mm Hg as per JNC 8).
2. Age between 18 and 70 years
3. No previous use of antihypertensive medication
4. Patients of either sex are included.

Exclusion Criteria

The following criteria were excluded from the study:

1. Patients aged <18 years and >70 years.
2. History of severe hepatic, renal disease, and severe cardiac disease.
3. Pregnant and lactating mothers.
4. Major depressive disorder with psychotic symptoms.
5. Patients on drugs with known drug interactions with the study of drugs.

Method of Collection

After approval by the IEC, 50 consenting patients were screened in two steps, initial clinical examination by a

physician followed by required biochemical investigations. A detailed history which included information regarding comorbidities, allergies, past hospital admissions, reproductive history, and addictions was obtained. Fifty patients each on Cilnidipine and Telmisartan were selected and grouped as follows:

a. Group A – 25 patients who were prescribed tablet Cilnidipine (10 mg/day).

b. Group B – 25 patients who were prescribed tablet Telmisartan (40 mg/day).

General physical examination and systemic examination were performed during this time. The radial pulse was examined for the pulse rate and BP was recorded with a mercury sphygmomanometer in upright position. Complete cardiovascular and respiratory system evaluation was also performed.

Routine investigations were performed in hospital laboratory which included complete blood count, random blood glucose levels, liver function test (aspartate aminotransferase and alanine aminotransferase), and renal function test (urea and creatinine), lipid profile, and urine routine also performed before and after institution of therapy according to the scheduled requirements.

Baseline investigations- HR, SBP and DBP were performed and noted.

Patients were undertaken for a period of 8 weeks and were called for follow-up visit at the 2^{nd},4^{th}, 6^{th} and 8^{th} weeks. The data collected were entered into a specially designed pro forma (case recording form) for the study.

Outcome Measures: The primary endpoint of the study was the change in mean systolic blood pressure (SBP) and diastolic blood pressure (DBP) from baseline to 8 weeks. The secondary endpoints included the change in mean heart rate and adverse events. The blood pressure and heart rate were measured using a digital sphygmomanometer, and adverse events were asked from the patients during each visit and recorded by the investigators and graded according to their severity.

Statistical Analysis

All the data collected were entered into a preapproved, case recording form and tabulated using Microsoft Office and Excel software. Quantitative data are presented as means and standard deviation (SD) (mean ± SD). Change of BP readings in the intra group from baseline to end of the study was compared by using paired t-test. Intergroup analysis was done using unpaired Student's t-test. Statistical significance was defined as $p < 0.05$ and highly significant was defined as $p<0.001$.

Table 1: Demographic Analysis of Subjects under Cilnidipine and Telmisartan Drug

	Cilnidipine Group	Telmisartan Group	p – value
Age (mean ± sd)	50.6 ± 12.76	52.84 ± 10.15	>0.05
Male/Female (%)	10/15 (40/60)	10/15 (40/60)	1

Table 2: Assessment of heart rate of both the groups

Drugs	At Baseline Mean ± SD	At 8 weeks Mean ± SD	p - value
Cilnidipine	83.68 ± 10.4	82.48 ± 9.07	> 0.05
Telmisartan	83.48 ± 10.3	80.32 ± 7.89	>0.05

Results

Two groups of patients with newly diagnosed stage I hypertension were selected and analyzed for a period of 8 weeks.

- The mean age ± SD of 25 patients enrolled in group A was 50.6 ± 12.76 years and of 25 patients enrolled in group B was 52.84 ± 10.15 years. There was no statistically significant difference (p=0.5) between the ages of patients between the patients of two groups.

- The present study showed that the majority of subjects were females i.e. 15 (60%) as compared to the males 10 (40%) in both the groups. In the present study females outnumbered the males. (Table 1)
- The mean heart rate reduced from 83.68 ± 10.4 beats/min to 82.4 ± 9.07 beats/min from baseline to 8 weeks in group A (p>0.05). The mean heart rate reduced from 83.48 ± 10.03 beats/min to 80.32 ± 7.89 beats/min from baseline to 8 weeks in group B (p>0.05). There was no statistical significant change in heart rate observed with both treatment groups. (Table 2)

Intra group analysis of group A showed that the mean SBP reduced from 153.28 ± 4.5 mm Hg to 135.5 ± 5.0 mm Hg (baseline to 8 weeks), thus resulting in a fall of 17.78 mm Hg (11.5 %). There was statistically significant reduction in SBP (p<0.001) (Table 3, Figure 1).

Intra group analysis of group B showed that the mean SBP reduced from 154.04 ± 3.1 mm Hg to 136.56 ± 6.7 mm Hg (baseline to 8 weeks), thus resulting in a fall of 18.28 mm Hg (11.9 %). There were statistically significant reduction in SBP (p<0.001) (Table 3, Figure 1).

Intra group analysis of group A showed that the mean DBP reduced from 93.92 ± 4.3 mm Hg to 80.6 ± 1.9 mm Hg (baseline to 8 weeks), thus resulting in a fall of 13.32 mm Hg (14.18%). There were statistically significant reduction in DBP (p<0.001) (Table 4, Figure 2).

Intra group analysis of group A showed that the mean DBP reduced from 94.48 ± 3.4 mm Hg to 81.2 ± 4.04 mm Hg(baseline to 8 weeks), thus resulting in a fall of 13.28 mm Hg (14.05%). There were statistically significant reduction in SBP (p<0.001) (Table 4, Figure 2).

We also compared the reduced mean SBP and DBP from baseline to 8 weeks between both groups (inter group analysis of Cilnidipine and Telmisartan) which is not statistically significant (p>0.05) (Table 5).

- A total of 02 (8%) patients experienced adverse drug reactions in group A and 03 (12%) in group B; all were mild and did not require any alteration or discontinuation of treatment. 02 (8%) subjects reported headache in group A. 01(4%) subject reported dizziness, 01 (4%) subject reported nausea, and 01 (4%) subject reported hypotension in group B.

Table 3: Assessment of antihypertensive effect of Cilnidipine and Telmisartan in the reduction of SBP

	Cilnidipine Group		Telmisartan Group	
	Mean ± SD	p-value	Mean ± SD	p-value
Baseline	153.28 ± 4.5		155.04 ± 3.1	
Week 2	148.56 ± 4.2	< 0.001	146.88 ± 7.0	< 0.001
Week 4	144.4 ± 4.9	< 0.001	141.36 ± 10.4	< 0.001
Week 6	140.4 ± 5.0	< 0.001	139.92 ± 6.6	< 0.001
Week 8	135.5 ± 5.0	< 0.001	136.56 ± 6.7	< 0.001

Figure 1: Bar Chart Comparison of efficacy in SBP reduction by both the groups.

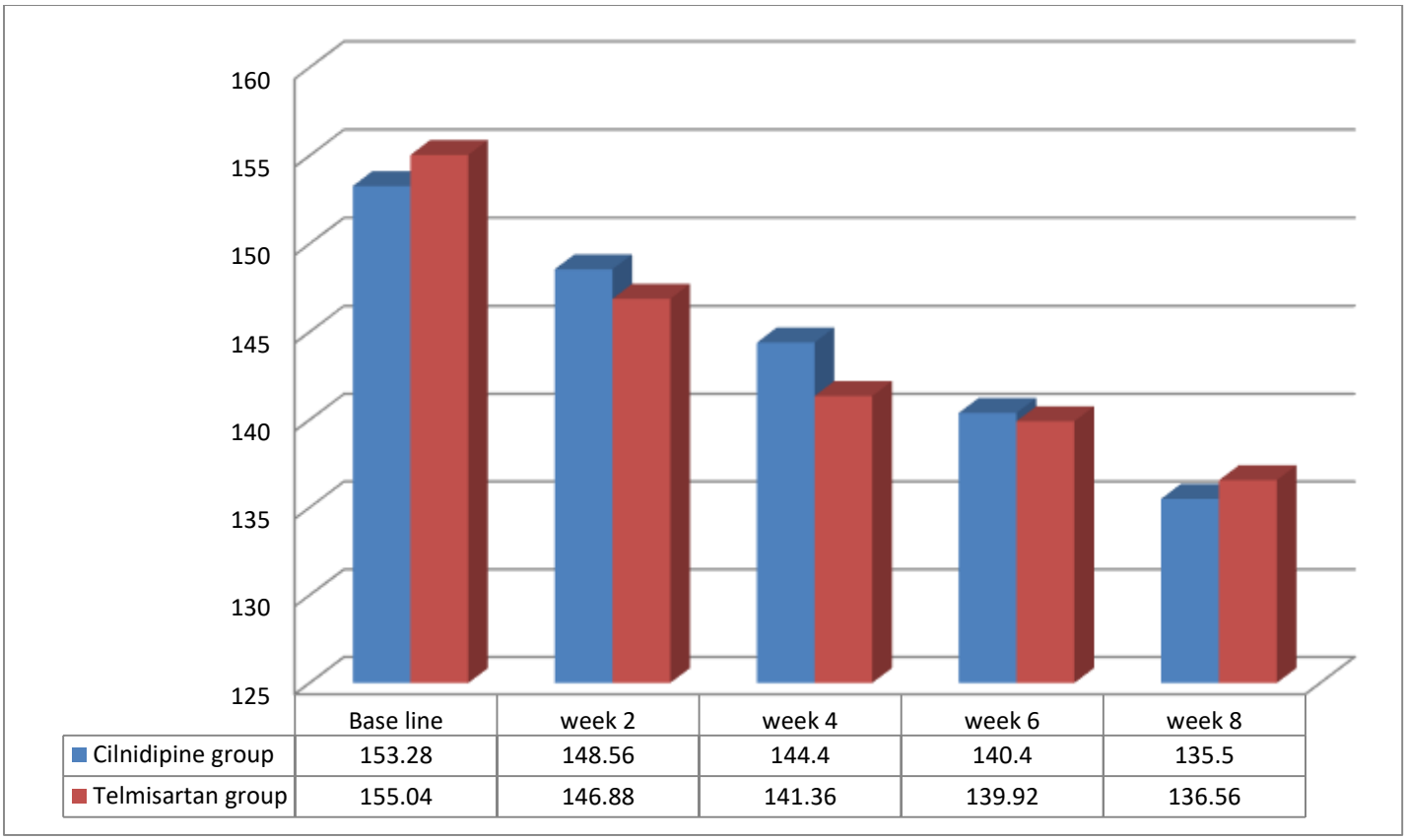

Table 4: Assessment of antihypertensive effect of Cilnidipine and Telmisartan in the reduction of DBP

	Cilnidipine Group		Telmisartan Group	
	Mean ± SD	p-value	Mean ± SD	p-value
Baseline	93.92 ± 4.3		94.48 ± 3.4	
Week 2	88.96 ± 4.1	< 0.001	88.8 ± 3.2	< 0.001
Week 4	84.88 ± 3.8	< 0.001	85.68 ± 4.7	< 0.001
Week 6	82.8 ± 3.4	< 0.001	83.36 ± 3.7	< 0.001
Week 8	80.6 ± 1.9	< 0.001	81.2 ± 4.04	< 0.001

Figure 2: Bar Chart Comparison of efficacy in DBP reduction by both the groups.

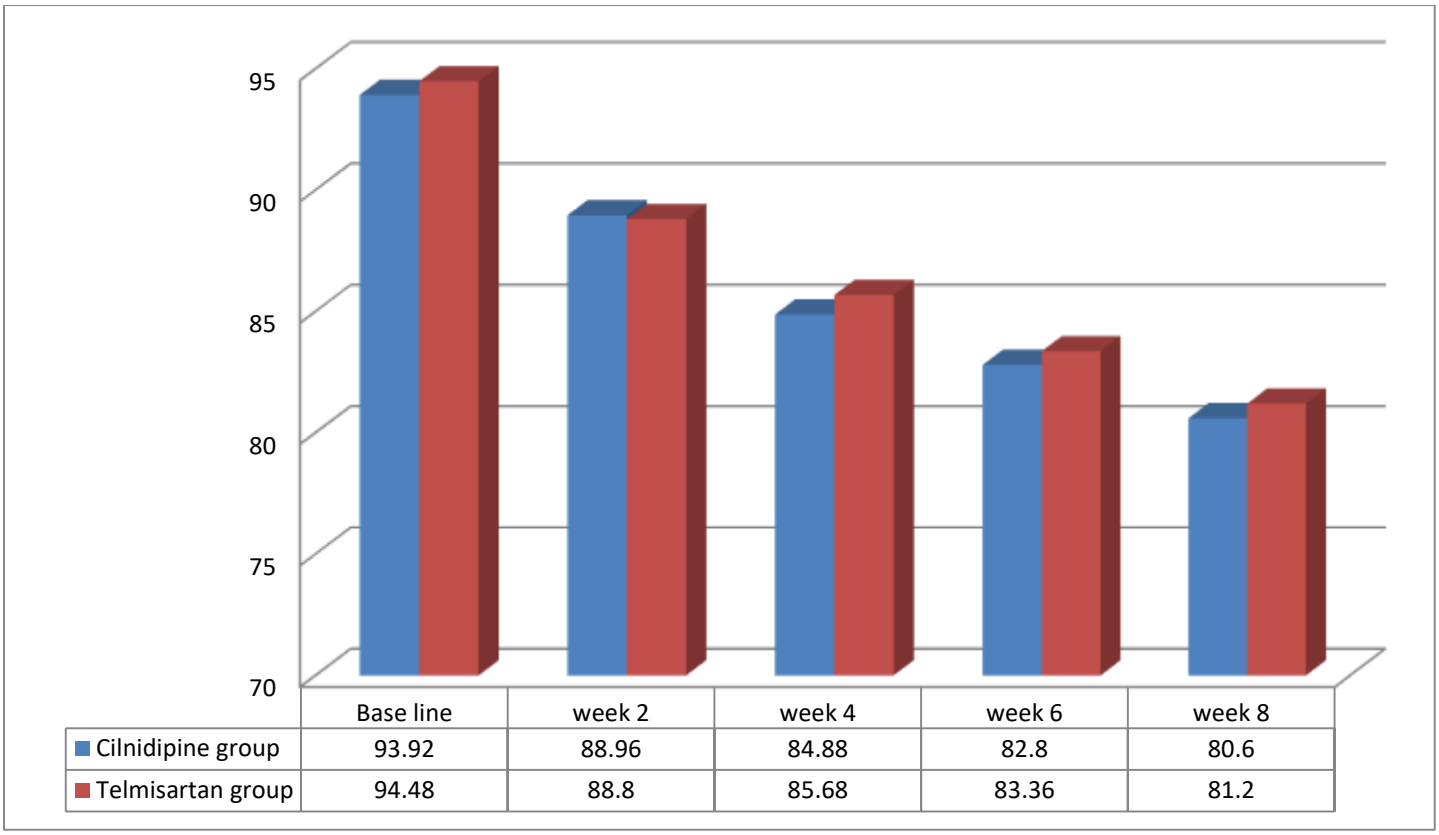

Table 5:Comparison between Cilnidipine group and telmisartan group of Systolic and Diastolic Blood Pressure

	Cilnidipine Group	Telmisartan Group		Cilnidipine Group	Telmisartan Group	
	SBP Mean ± SD	SBP Mean ± SD	p-value	DBP Mean ± SD	DBP Mean ± SD	p-value
Baseline	153.28 ± 4.5	155.04 ± 3.1	> 0.05	93.92 ± 4.3	94.48 ± 3.4	> 0.05
Week 2	148.56 ± 4.2	146.88 ± 7.0	> 0.05	88.96 ± 4.1	88.8 ± 3.2	> 0.05
Week 4	144.4 ± 4.9	141.36 ±10.4	> 0.05	84.88 ± 3.8	85.68 ± 4.7	> 0.05
Week 6	140.4 ± 5.0	139.92 ± 6.6	> 0.05	82.8 ± 3.4	83.36 ± 3.7	> 0.05
Week 8	135.5 ± 5.0	136.56 ± 6.7	> 0.05	80.6 ± 1.9	81.2 ± 4.04	> 0.05

Discussion

This study was done to compare the efficacy and safety of cilnidipine and telmisartan in the management of hypertensive patients attending a tertiary care teaching hospital.

In the present study females outnumbered the males. A study on prevalence of hypertension in a rural community of central India by **Kokiwar et al** in 2011 showed, prevalence of hypertension is higher in females (23.4%) than males (14.4%).[10]

The primary endpoint of the study was the change in mean systolic blood pressure (SBP) & (DBP) from baseline to 8 weeks. The results of this study showed

that both cilnidipine and telmisartan significantly reduced mean SBP from baseline to 8 weeks ($p < 0.001$). We also compared the reduced mean SBP and DBP from baseline to 8 weeks between both groups (Cilnidipine and Telmisartan) which is not statistically significant ($p>0.05$) (Table 5). Thus concluding that, although both cilnidipine and telmisartan produced statistically significant reduction in SBP as well as DBP, there is no difference between the treatment groups. They are both equally efficacious in the treatment of HTN.

Our findings are consistent with previous studies that have shown that both cilnidipine and telmisartan are effective in reducing blood pressure in hypertensive patients.[11,12] A meta-analysis of randomized controlled trials comparing the efficacy of different antihypertensive drugs found that both cilnidipine and telmisartan are effective in reducing blood pressure, with no significant difference between them. Another meta-analysis of randomized controlled trials found that telmisartan is effective in reducing blood pressure and has a good safety profile.[13,14]

In addition to blood pressure reduction, our study also evaluated the safety of cilnidipine and telmisartan. The results showed that both drugs were well-tolerated, with no serious adverse events reported in either group. The most common adverse events reported were dizziness and headache, which are known side effects of both drugs.

Limitations of this study are, it is an open-labeled study. Only 8-week follow-up is not sufficient.

Conclusion

It is concluded from the present study that both Cilnidipine and telmisartan are effective antihypertensive agents and cause smooth reduction in both systolic and diastolic blood pressure without causing any change in heart rate. Both the drugs were equally well tolerated.

References

1. Anjana RM, Unnikrishnan R, Deepa M, Pradeepa R, Tandon N, Das AK, et al.Metabolic non-communicable disease health report of India: The ICMR-INDIAB national cross-sectional study (ICMR-INDIAB-17).Lancet Diabetes Endocrinol 2023;11:474-89.
2. Bhatia M, Kumar M, Dixit P, Dwivedi LK. Diagnosis and Treatment of Hypertension among people aged 45 years and over in India: A sub-national analysis of the variation in Performance of Indian states. Front Public Health 2021;9:766458.
3. Shah SN, Munjal YP, Kamath SA, Wander GS, Mehta N, Mukherjee S, Kirpalani A, et al. Indian guidelines on hypertension-IV (2019). J Hum Hypertens 2020;34(11):745-58.
4. Amarchand R, Kulothungan V, Krishnan A, Mathur P. Hypertension treatment cascade in India: Results from National Noncommunicable Disease Monitoring Survey. J Hum Hypertens 2023;37:394-404.
5. Chandra SK, Ramesh G. The fourth-generation calcium channel blocker: Cilnidipine. Ind Heart J 2013;65:691-5.
6. Grassi G. Sympathetic overdrive and cardiovascular risk in the metabolic syndrome. Hypertens Res.2006;29(11):839-47.
7. Takahara A. Cilnidipine: a new generation Ca channel blocker with inhibitory action on sympathetic neurotransmitter release. Cardiovasc Ther 2009;27(2):124-39.
8. Konda T, Enomoto A, Aritomi S, Niinuma K, Koganei H, Ogawa T, Nitta K. Different effects of

L/N-type and L-type calcium channel blockers on the renin-angiotensin- aldosterone system in SHR/Izm. Am J Nephrol2009;30(2):155-61.

9. Wienen W, Entzeroth M, van Meel JCA, et al. A review on telmisartan: a novel, long-acting angiotensin II-receptor antagonist. Cardiovasc Drug Rev 2000;18:127-56.
10. Kokiwar PR, Gupta SS. Prevalence of hypertension in a rural community of central India. Int Bio Med Res 2011;2(4):950-3.
11. Takahara A. Cilnidipine: a new generation Ca channel blocker with inhibitory action on sympathetic neurotransmitter release. Cardiovasc Ther 2009;27(2):124-39.
12. Kario K, Nariyama J, Kido H, Ando S, Takiuchi S, Eguchi K, Niijima Y, Ando T, Noda M. Effect of a novel calcium channel blocker on abnormal nocturnal blood pressure in hypertensive patients. J Clin Hypertens (Greenwich). 2013;15(7):465-72.
13. Akat PB, Bapat TR, Murthy MB, Karande VB, Burute SR. Comparison of the efficacy and tolerability of telmisartan and enalapril in patients of mild to moderate essential hypertension. Indian J Pharmacol 2010;42(3):153-6.
14. Xu G, Wu H, Du B, Qin L. The efficacy and safety of cilnidipine on mild to moderate essential hypertension: a systematic review and meta-analysis of randomized controlled trials in Chinese patients. Cardiovasc Hematol Disord Drug Targets2012;12(1):56-62.