

Study of prescribing pattern of antihypertensive drugs in diabetic patients in a tertiary care centre, Vizianagaram, India

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Received: 18 February 2019

Accepted: 07 May 2019

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ABSTRACT

Background: Diabetes mellitus (DM) and Hypertension (HTN) are the two major chronic disorders frequently coexisting, with increased incidence with age. HTN is about twice as common in patients with DM. Prescribing pattern are powerful tools to ascertain the role of drugs in society. There are many variations in prescribing patterns of antihypertensive drugs in patients with HTN and DM. Since these patients requires lifelong treatment it has enormously increased the burden of patients particularly in developing countries like India. Physician needs to be more concerned while choosing drugs for the patients with HTN and DM. In a tertiary care hospital, there is a real need for drug utilization study to determine the appropriate, more safe and effective patterns of drug therapy among diabetic hypertensive patients.

Methods: A Cross sectional observational study was conducted in Maharajah's Institute of Medical Sciences from December 2016 to May 2018. A total of 360 prescriptions of the patients with hypertension and coexisting diabetes were analyzed. The prescriptions prescribed to these patients were collected, assessed and the following parameters were noted. The treatment pattern of different group of drugs for HTN with co-existing DM was evaluated. The intended work was divided into three steps: Step 1: To collect the prescriptions of hypertensive patients with DM. Step 2: To separate the prescriptions prescribing anti hypertensive Drugs. Step 3: To statistically analyze the prescriptions. Relevant information was recorded in a structured proforma & data was evaluated.

Results: In this study it was found that 36% of the patients were in the age group of 51-60 years with female preponderance among diabetic hypertensive patients. 77% of patients were treated with single antihypertensive drug and 23% of patients were treated with antihypertensive drug combinations. In monotherapy, telmisartan was most commonly prescribed. In combination therapy, amlodipine and telmisartan followed by amlodipine and atenolol were used.

Conclusions: In this study monotherapy was preferred compared to combination therapy and adherence to the JNC 7 guidelines was good except in case of usage of diuretics.

Keywords: Antihypertensives, Antihypertensive drugs, Hypertension, Prescribing pattern

INTRODUCTION

HTN is the term used to denote elevated blood pressure. It is defined as the condition in which blood pressure remains consistent to systolic blood pressure more than 140 mmHg and diastolic blood pressure more than 90 mmHg. Patients

with chronic HTN are at a greater risk for developing coronary artery disease, stroke, heart failure, peripheral vascular disease, vision loss and chronic kidney disease.^{1,2}

As of 2014, approximately one billion adults or 22% of the population of the world have hypertension. It is slightly more frequent in men in those of low socioeconomic status and prevalence increases with age.^{3,4} The prevalence varies markedly within WHO regions with rates as low as 3.4% (men) and 6.8%(women) in rural India.

There was a progressive decline in glomerular function that occurs in diabetic patients with hypertension, especially albuminuria can be delayed with antihypertensive therapy. Appropriate use of antihypertensive drugs can control blood pressure and reduce complications in patients with diabetes.⁵

This study was conducted to observe the pattern of utilization of different groups of antihypertensive drugs in patients with type 2 diabetes in a tertiary care hospital and correlating the data obtained from the study to these guidelines.

METHODS

This study was conducted at in-patient and out-patient department of general medicine of Maharajah's institute of medical sciences Nellimarla, Vizianagaram, Andhra Pradesh, India. The prescriptions prescribed to these patients were collected, assessed and the following parameters were noted. The treatment pattern of different group of drugs for HTN with co-existing DM was evaluated. The participants declared their willingness on the details of study and the treatment has been explained to the subjects enrolled into the study and they gave written informed consent. This study was approved by the institutional ethics committee.

Inclusion criteria

- Patients suffering from HTN with coexisting DM
- Patients of either sex
- Patients aged 18 and above

Exclusion criteria

- Patients with recent Myocardial infarction or stroke
- Immediate post-operative patients
- Those who are not willing to participate in this study

The intended work was divided into three steps:

- Step 1: To collect the prescriptions of hypertensive patients with DM.
- Step 2: To separate the prescriptions prescribing anti-hypertensive drugs.
- Step 3: To statistically analyze the prescriptions on the following aspects

- Incidence of HTN with DM according to different age groups
- Incidence of HTN with DM according to sex
- Patterns of utilization of major Pharmacological drug classes were derived using statistical analysis. Relevant information was recorded in a structured proforma & data was evaluated.

RESULTS

A total of 360 patients were included in this study. All the patients had DM and HTN. Out of 360 patients studied, 41% patients were male and 59% were female patients (Table 1). 13% patients were in the age group 18 to 40 years and 35% patients were between 41 to 50 years and 36% patients were between 51 to 60 years and 16 % patients were above 60 years age group (Table 2). Monotherapy was predominantly used than combination therapy. Monotherapy was prescribed to 277 patients and combination therapy to 83 patients (Table 3).

In this study, a total of 5 classes of antihypertensive drugs were used. They were angiotensin receptor blockers (ARB) Most commonly prescribed as monotherapy was telmisartan which was prescribed to 91 patients which accounts to 33% patients followed by amlodipine prescribed to 78 patients which corresponds to 28% patients. calcium channel blockers (CCB) amlodipine and atenolol combination was prescribed in 30 % patients. β -blockers were prescribed as a monotherapy in 25 patients which accounts to 9%.

ACEIs were prescribed in less frequency in this study. Enalapril was prescribed to 12 % patients angiotensin converting enzyme inhibitors (ACEI), beta blockers(β B), thiazide diuretics (Table 4). 277 patients received individual antihypertensive drug and 83 patients received combination of 2 antihypertensive drugs.

A total of 8 antihypertensive drugs were prescribed in this study. They were telmisartan, losartan, amlodipine, nifedipine, enalapril, atenolol, metoprolol, hydrochlorothiazide (Table 5).

Table 1: Gender wise distribution of patients.

Gender	No. of patients	Percentage
Male	148	41%
Female	212	59%

Table 2: Age wise distribution of patients.

Age in year	No. of patients	Percentage
18-40	47	13%
41-50	126	35%
51-60	129	36%
> 60	58	16%

Table 3: Distribution of hypertensive patients according to utilization pattern.

Drugs	No. of patients	Percentage
Monotherapy	277	77%
2 drug combination	83	23%

Table 4: Different anti hypertensive class of drugs prescribed.

Drugs	No. of prescriptions	Percentage
ARB	113	41%
CCB	106	38%
ACEI	33	12%
βB	25	9%

Table 5: Individual antihypertensive drugs prescribed in monotherapy.

Drugs	No. of patients	Percentage
Telmisartan	91	33%
Amlodipine	78	28%
Nifedipine	28	10%
Atenolol	14	5%
Enalapril	33	12%
Losartan	22	8%
Metoprolol	11	4%

Table 6: Two drug combination: utilization pattern of antihypertensive therapy.

Drugs	No. of patients	Percentage
Telmisartan + Amlodipine	37	44%
Telmisartan + Hydrochlorothiazide	21	26%
Amlodipine + Atenolol	25	30%

In this study, frequently used combination drug was Telmisartan and Amlodipine which were prescribed to 37 patients (44%). Hydrochlorothiazide were prescribed to 21 patients (26%) in combination with Telmisartan. Amlodipine and Atenolol combination was prescribed in 25 patients which corresponds to 30% patients. This was less frequently prescribed combination (Table 6).

DISCUSSION

In this study, monotherapy was predominantly used than combination therapy. Monotherapy was prescribed to 277 patients and combination therapy to 83 patients (Table 3). This is similar to study done by Hussain Z et al.⁶ While combination therapy was preferred in the study conducted by Mohan P et al, Cidda M et al.^{5,7}

Most commonly prescribed as monotherapy was telmisartan which was prescribed to 91 patients which

accounts to 33% patients followed by amlodipine prescribed to 78 patients which corresponds to 28% patients. This is similar to study done by Hussain Z et al 6 and Mohan P et al.^{5,6} While Mishra R et al, reported that amlodipine was frequently prescribed, and which was followed by telmisartan.⁸

In this study, frequently used combination drug was telmisartan and amlodipine which were prescribed to 37 patients (44%). Similarly Mohan P et al, and Mishra R et al, reported in their study that ARB and CCB combination was frequently prescribed.^{5,8} While Cidda M et al, reported that ARB and Diuretics combination was most frequently prescribed.⁷

Amlodipine and atenolol combination was prescribed in 30 % patients. βBs were prescribed as a monotherapy in 25 patients which accounts to 9%. ACEIs were prescribed in less frequency in this study. Enalapril was prescribed to 12 % patients.

Telmisartan helps to improves glucose metabolism in hypertensive patients with DM in addition to its anti-hypertensive effect. This effect may depend on specific peroxisome proliferator-activated receptor gamma agonism by telmisartan.⁹ Amlodipine affords cardioprotection by reducing oxidative stress induced in experimental myocardial infarction through prevention of free radical mediated injury of catecholamine assault.¹⁰ Amlodipine had the most potent antioxidant activity due to distinct biophysical interactions with the membrane lipid bilayer.¹¹

Diuretics were used less frequently in this study. Diuretics were not prescribed as monotherapy and used only in combination therapy with telmisartan in this study. Hydrochlorothiazide were prescribed to 21 patients (26%) in combination with Telmisartan. While Cidda M et al, reported that diuretics were used as first line therapy which complies with JNC-7 guidelines.⁷

In this study, the adherence of prescribing pattern of Antihypertensive drugs to the JNC 7 guidelines was good except in case of usage of diuretics. This is similar to the study done by Hussain Z et al.⁶

Amlodipine and atenolol combination were prescribed in 25 patients which corresponds to 30 % patients. This was less frequently prescribed combination. This is similar to study done by Mohan P et al, and Sharma AK et al.^{5,12} βBs were prescribed as a monotherapy in 25 patients which accounts to 9%. While study done by Alavudeen S et al, also have prescribed βBs to 16 % patients.¹³ Enalapril was prescribed to 12 % patients. In this study, ACEIs were prescribed in less frequency which is similar to study done by Mohan p et al, Mishra R et al.^{5,8} While Sharma JK et al, reported that ACEIs were prescribed more frequently in their study.¹⁴

This study has shown that telmisartan was prescribed in majority of the patients for HTN. Next to temisartan, amlodipine was the most prescribed drug. Lacuna in the present prescribing pattern is underutilization of diuretics. The adherence to the JNC 7 guidelines was good except in case of diuretics.

CONCLUSION

Further it can be concluded that more studies are required from time to time for analysing the drug utilization pattern of antihypertensive drugs. Furthermore, physicians should be sensitized to adhere to the standard treatment guidelines.

ACKNOWLEDGEMENTS

The authors are grateful to the staff of general medicine department and the management of maharajah's institute of medical sciences for providing facilities to carry out this project successfully.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Lackland DT, Weber MA. Global burden of cardiovascular disease and stroke: hypertension at the core. *Canad J of Cardio*. 2015;31(5):569-71.
2. Mendis S, Puska P, Norrving B, eds. Global atlas on cardiovascular disease prevention and control. Geneva, Switzerland: World Health Organization; 2011. Available at: http://www.who.int/cardiovascular_diseases/publications/atlas_cvd/en/
3. World Health Organization. Global Health Observatory (GHO) data: Raised Blood Pressure 2018. Available at: http://www.who.int/gho/ncd/risk_factors/blood_pressure_prevalence/en
4. Carretero OA, Oparil S. Essential hypertension: part I: definition and etiology. *Circulation*. 2000 Jan 25;101(3):329-35.
5. Mohan P, Bhandare B. Pattern of Antihypertensive therapy among Diabetic hypertensives. *World J Pharm Res*. 2015;4(8):2403-10.
6. Hussain Z, Sana A, Mohammed SA, Razzaq MA. Patterns of drug therapy among diabetic hypertensive patients with other complications. *Int J Pharm Pharm Sci*. 2014;6(6):270-7.
7. Cidda M, Mateti UV, Batchu MK, Martha S. Study of prescribing patterns of antihypertensive in South Indian population. *Int J of Bas Clini Pharmacol*. 2017;3(2):303-7.
8. Mishra R, Kesarwani P, Keshari SS. Prescription pattern of antihypertensive drugs in a tertiary care teaching hospital. *Int J Med Sci Public Health*. 2017 ;6(4):684-86.
9. Benson SC, Pershadsingh HA, Ho CI, Chittiboyina A, Desai P, Pravenec M, et al. Identification of telmisartan as a unique angiotensin II receptor antagonist with selective PPAR γ -modulating activity. *Hypertension*. 2004;43(5):993-1002.
10. Begum S, Akhter N. Cardioprotective effect of amlodipine in oxidative stress induced by experimental myocardial infarction in rats. *Bangladesh J Pharmacol*. 2007;2(2):55-60.
11. Mason RP, Mak IT, Trumbore MW, Mason PE. Antioxidant properties of calcium antagonists related to membrane biophysical interactions. *Ameri J Cardio*. 1999;84(4):16-22.
12. Sharma AK, Dahiya N, Kairi JK, Bharati SM. Prescription patterns of antihypertensive drugs in a tertiary care hospital in India. *Int J Basic Clin Pharmacol*. 2017;4(1):55-9.
13. Shaik S, Alavudeen S, Alakhali KKM, Shaik MA, Khan NNA. Prescribing pattern of antihypertensive drugs in diabetic patients of Southern Province, Kingdom of Saudi Arabia. *Ars Pharm*. 2015;56(2):109-14.
14. Sharma JK, Parmar SP, Trivedi HR. A study of prescribing pattern of antihypertensive drugs in hypertensive patients with co morbid diabetes in a tertiary care teaching hospital. *Int J Basic Clin Pharmacol*. 2018;7(3):375-80.

Cite this article as: Elenchezhiyan V, Moorthy S, Sagar MK, Bheemesh Naidu MB, Sayana S. Study of prescribing pattern of antihypertensive drugs in diabetic patients in a tertiary care centre, Vizianagaram. *Int J Basic Clin Pharmacol* 2019;8:1192-5.