

A Retrospective Study on Use of Antihypertensive drugs in Type 2 Diabetes Mellitus – A Hospital Based Study

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ABSTRACT

Background: Association of Hypertension and diabetes has already been established. Hypertension is risk factor for development of diabetes as well for complications like nephropathy, CAD and neuropathy etc. Therefore, Hypertension control is vital to prevent and retard progression of microvascular and macrovascular complications. With this aim, we undertook this study to evaluate treatment patterns in diabetic patients with hypertension, those are being followed at our institute.

Materials & Methods: This study was conducted on diabetic patients suffering from hypertension as well. Analysis of Antihypertensive drugs prescriptions was undertaken in all diabetic patients with hypertension reporting to OPD at Department of Medicine, Grant Government Medical College and Sir JJ Group of Hospitals, Mumbai, India. **Results:** Of 125 patients screened initially, only 100 were eligible for participation. Out of n=100 patients, 58 were males and 42 were females. Mean age of group was 55.2 years. 38 (38%) patients were on monotherapy and remaining 62 (62%) patients were on combination antihypertensive drugs. There were a total of n= 170 antihypertensive drug exposures. Angiotensin receptor blockers were the most commonly prescribed drugs. Angiotensin inhibitors (angiotensin receptor blockers and ACE inhibitors) were utilized in 74% patients.

Conclusion: Our study showed that majority of diabetic hypertensive patients needed multiple drug therapy to control hypertension. Most of the patients were on ARBs/ACE inhibitors. This was according to recommendation by ADA or JNC8.

Key words: Diabetes, Hypertension, Antihypertensive drugs, Angiotensin receptor blocker

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INTRODUCTION

Hypertension and Diabetes are way of life sicknesses and are a significant burden on worldwide wellbeing because of complexities associated with them. India as of now has 40.9 million diabetic patients and it is relied upon to ascend to 69.9 million by 2025 unless pressing and successful preventive strides are taken.^[1] Globally, one and half billion people will suffer from hypertension^[2] and 300 million will suffer from diabetes by 2025.^[3] Prevalence of hypertension is 60% in type 2 DM.^[4] Patients with T2DM have two fold higher chances of suffering from hypertension in comparison to age matched subjects without diabetes.^[5] Hypertension has appeared as a noteworthy hazard calculate for the vascular complications like neuropathy, nephropathy, retinopathy, coronary artery disease, stroke, and Peripheral Vascular

Infection (PVD). The advantages of blood pressure control in diabetic patients surpasses the advantages of tight glycemic control and is crucial to counteract and retard progression of both microvascular and macrovascular complications of hyperglycemia.^[6] Therefore, all of the hypertension management guidelines, that is, eighth report of Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure-2013 (JNC-8),^[7] American Diabetes association (ADA) 2014^[8] and European Society of Hypertension (ESH 2013)^[9] focused on aggressive Blood Pressure (BP) control in diabetic patients to below 140/80-90 mmHg. JNC 8 recommended target diastolic BP <90 mmHg and ESH 2013 recommended <85

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mmHg. Be that as it may, ADA suggested target DBP <80 mmHg. There is limited information from India as regards to antihypertensive treatments in patients with diabetes in single and multiple medication based regimens. Thus, we attempted to assess antihypertensive prescriptions in type 2 diabetic patients with hypertension.

METHODS

This study was conducted on diabetic patients who had hypertension as well. Prescribing Pattern of Antihypertensive drugs was analysed on diabetic patients reporting to medicine OPD at Department of Medicine, Grant Government Medical College and Sir JJ Group of Hospitals, Mumbai. Around n= 125 patients were screened and 100 out of those were recruited on the basis of inclusion and exclusion criteria.

Patients with advanced renal failure (serum creatinine >3.0 mg %) and patients with malignant hypertension were excluded. Patients with thyroid disorders, adrenal disorders, proven renovascular hypertension, congestive heart failure, pregnant patients were excluded from the study. Patients were diagnosed hypertensive if they had at least 2 consecutive visits with diagnosis of hypertension or they had prescription of antihypertensive drug with one recording of elevated BP or they had elevated BP on two visits. Elevated BP was defined as systolic BP >139 mmHg and Diastolic BP (DBP) >89 mmHg.^[7] Patients were diagnosed as diabetic if they had two visits with diagnosis of diabetes or they had a prescription of antidiabetic drugs or insulin or raised glycosylated haemoglobin.

Antihypertensive drugs were grouped in to seven groups - Calcium channel blockers, Beta blockers, Diuretics, Alfa blockers, Angiotensin Converting Enzyme Inhibitors (ACEI), Angiotensin Receptor Blockers (ARB), centrally acting drugs. Data for antihypertensive drugs was recorded in form of need of monotherapy, two drugs or more antihypertensive drugs therapy. Data for non-pharmacological therapy was also recorded like salt restriction, loss of weight or exercise.

RESULTS

100 patients, participated in the study. Our study group comprised of n=58 males and n=42 females. Demographic data of patients has been described in Table 1. Only 38 (38%) were on monotherapy and remaining patients were on combination antihypertensive drugs. There were total n= 170 antihypertensive drug exposures (Table 2).

Type of drug - Angiotensin receptor blockers were the most commonly prescribed drugs. Angiotensin inhibitors (angiotensin receptor blockers and ACE inhibitors) were utilized in majority of the patients. These were followed by calcium channel blockers, diuretics, and beta blockers (Table 2).

Combination Utilization pattern - 48(48%) patients were on dual drug therapy. Angiotensin receptor blocker with diuretics was the most commonly used dual drug combination strategy in our study. It was followed by combination of beta blocker with calcium channel blocker, ACEI with CCB, calcium channel blocker with angiotensin receptor blocker, ACE inhibitor with diuretic and ACE inhibitor with beta blocker. Combination utilization pattern has been shown in Table 3. 10 (10%) patients were on triple drug therapy. Combination of Beta blocker with calcium channel blocker and diuretic was most commonly used in patients on triple drug combination.

For the few patients on quadruple therapy, alfa blocker was the common additional drug.

Table 1: Showing epidemiology data.

Age (years)	Number	Male	Female
<35	7	5	2
35-50	54	32	22
50-75	32	17	15
>75	7	4	3
Total	100	58	42

Table 2: Showing utilization of various drugs.

Drug	No. of patients
Angiotensin receptor blocker	46
Calcium channel blocker	38
Diuretic	32
ACE inhibitor	28
Beta blocker	20
Alfa blocker	4
Central agonist	2
Total	170

Table 3: Description of combination utilization (Dual drug).

Drug Combination	Number
ARB+D	18
CCB+BB	9
ACEI + CCB	8
ARB+CCB	5
ACEI+D	4
ACEI+BB	4
Total	48

DISCUSSION

Our study tried to find utilization of various antihypertensive drugs in diabetic hypertensive patients and awareness about hypertension. A prescription based study is an effective way to assess and evaluate prescribing attitude of physicians.^[10] Fewer patients in our study were on Monotherapy and majority on Multiple Drug therapy. It is consistent with other similar studies.^[11,12]

Berlowitz et al.^[13] have shown worse BP control in patients with diabetes and less intensive anti-hypertensive medication therapy. ARB was the most common drug prescribed in patients either alone or in combination with diuretic. ACEI/ARB were used in patients either alone or in combination. Most of the patients on single drug were receiving either ACEI or ARB. There is suggestion that ARBs should be a regular component of combination treatment and preferred drug in patients on monotherapy in diabetics.^[14] It has been described that initial monotherapy with ACE inhibitors may be superior to dihydropyridine CCB in reducing cardiovascular events.^[15,16] Calcium channel blockers were used in 38% patients either in combination or as monotherapy. JNC 8 also recommends calcium channel blockers as first line drug in diabetic hypertensive patient.^[7] CCBs ranked second followed by diuretics when considering overall utilization pattern of various anti-hypertensive drugs but Johnson et al found thiazide was second most frequently prescribed drug followed by CCBs and beta blocker. CCBs ranked second followed by diuretics when considering overall utilization pattern of various anti-hypertensive drugs in an Indian study.^[17] Diuretics were used in 32% patients

either as single or combination therapy. Diuretic use ranked third after CCBs and these were more commonly used as part of multidrug regimen. Dhanraj et al. described same pattern in their study on diabetic hypertensives.^[18] Beta Blockers were used in 28% patients. Usage of BB was significantly higher in patients with CAD in our study. BB has protective effect in CAD and other studies^[19,20] also found higher use of BB in patients with CAD.

ARB/ACEI with diuretic was the most commonly used combination therapy. It is consistent with other studies. Patients with nephropathy needed higher no of antihypertensive drugs. Use of ACEI/ARB was higher in patients with nephropathy than without nephropathy. Shah et al.^[18] also found similar pattern in their patients. Use of ACEI and ARB has been recommended by ADA^[9] also. Blood pressure control was achieved in 40.16% patients. Our control rates are better than other studies^[19,21] with control rate of 25-32%. Which may be due to difference in sample size. Patients with nephropathy had lesser percentage of patients with control of hypertension than patients without nephropathy. Shah et al^[18] also described similar pattern.

CONCLUSION

This study disclosed that majority of diabetic hypertensive patients were on multiple drug therapy to control hypertension. Most of the patients were on ARBs/ACE inhibitors. This was according to recommendation by ADA or JNC8. Patients with diabetes had lesser chance of control of hypertension. There is a need for better control of hypertension and optimization of antihypertensive therapy.

REFERENCES

- Sicree R, Shaw J, Zimmet P. Diabetes and impaired glucose tolerance. In: Gan D, eds. Diabetes Atlas. International Diabetes Federation. 3rd ed. Brussels, Belgium: International Diabetes Federation; 2006: 15-103.
- Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: analysis of worldwide data. *Lancet*. 2005;365(9455):217-23.
- Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care*. 2004;27(5):1047-53.
- National Institutes of Health. Diabetes in America. In: NIH, eds. National Institutes of Diabetes and Digestive and Kidney Diseases. 2nd ed. Bethesda, MD: NIH Publication; 1995: 95-1468.
- Miller GJ, Maude GH, Beckles GLA. Incidence of hypertension and non-insulin dependent diabetes mellitus and associated risk factors in a rapidly developing Caribbean community: the St James survey, Trinidad. *J Epidemiol Community Health*. 1996;50(5):497-504.
- UKPDS 38. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UK prospective diabetes study group. *BMJ*. 1998; 317(7160):703-13.
- James PA, Oparil S, Carter BL, Cushman WC, Dennison HC, Handler J, et al. 2014 evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the eighth Joint National Committee (JNC 8). *JAMA*. 2014;311(17):1809.
- Mancia G, Fagard R, Narkiewicz K, Redon J, Zanchetti A, Bohm M, et al. 2013 ESH/ESC guidelines for the management of arterial hypertension: the task force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). *Eur Heart J*. 2013 Jul;34(28):2159-219.
- American Diabetes Association. Standards of medical care-2014. *Diabetes Care*. 2014 Jan;37(Suppl 1):S14-80.
- Ref Yuen YH, Chang S, Chong CK, Lee SC, Critchlev JA, Chan JC. Drug utilization in a hospital general medical outpatient clinic with particular reference to antihypertensive and antidiabetic drugs. *J Clin Pharm Ther*. 1998;23:287-94.
- Bakris GL, Williams M, Dworkin L, Elliott WJ, Epstein M, Toto R, et al. Preserving renal function in adults with hypertension and diabetes: a consensus approach. National Kidney Foundation Hypertension and Diabetes Executive Committees Working Group. *Am J Kidney Dis*. 2000;36(3):646-61.
- ALLHAT Officers and Coordinators for the ALLHAT Collaborative Research Group. The Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial. Major outcomes in high-risk hypertensive patients randomized to angiotensin-converting enzyme inhibitor or calcium channel blocker vs. diuretic: The Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT). *JAMA*. 2002;288(23):2981-97
- Berlowitz DR, Ash AS, Hickey EC, Glickman M, Friedman R, Kader B. Hypertension management in patients with diabetes: the need for more aggressive therapy. *Diabetes Care*. 2003;26(2):355-9.
- Mancia G, De Backer G, Dominiczak A, Cifkova R, Fagard R, Germano G, et al. Guidelines for the management of arterial hypertension: the task force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). *Eur Heart J*. 2007;28(12):1462-536.
- Nather A, Bee CS, Huak CY, Chew JL, Lin CB, Neo S, et al. Epidemiology of diabetic foot problems and predictive factors for limb loss. *J Diabetes Complicat*. 2008;22(2):77-82.
- Reiber GE. The epidemiology of diabetic foot problems. *Diabet Med*. 1996;13(Suppl 1):S6-11.
- Shah J, Khakhhar T, Bhirud S, Shah RB, Date S. Study of utilization pattern of antihypertensive drugs in hypertensive diabetic patients with or without reduced renal function at tertiary care teaching hospital. *Int J Med Sci Public Health*. 2013;2:175-80.
- Dhanaraj E, Raval A, Yadav R, Bhansali A, Tiwari P. Prescription pattern of antihypertensive agents in T2DM patients visiting tertiary care centre in North India. *Int J Hypertens*. 2012;2012:520915.
- Yusuf S, Sleight P, Pogue J, Bosch J, Davies R, Dagenais G. Effects of an angiotensin-converting-enzyme inhibitor, ramipril, on cardiovascular events in high-risk patients. The heart outcomes prevention evaluation study investigators. *New Engl J Med*. 2000;342(3):145-53
- Sweileh WM, Sawalha AF, Zyoud SH, Al-Jabi SW, Tameem EJ. Patterns of antihypertensive therapy in diabetic patients with and without reduced renal function. *Saudi J Kidney Dis Transpl*. 2010;21:652-9.
- Johnson M, Singh H. Patterns of antihypertensive therapies among patients with diabetes. *J G Intern Med*. 2005;20(9):842-6.