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Original Article

Use of Antihypertensive Drugs in Type 2 Diabetic Patients - A Hospital Based Study in Rajsamand

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ABSTRACT

Introduction: *Diabetes Mellitus has been closely associated with Hypertension. Hypertension is major risk factor for development of diabetes as well for complications like nephropathy, CAD and neuropathy etc. Therefore, controlling Hypertension is vital to prevent and retard progression of microvascular and macrovascular complications. Therefore, we undertook this study to evaluate treatment patterns in diabetic patients with hypertension, those are being followed at our institute.*

Materials and Methods: *This study was conducted on diabetic patients who had hypertension as well attending Medicine department of Ananta Institute of Medical Sciences & Research Center, Rajsamand, Rajasthan. Antihypertensive drugs were analysed on all diabetic patients reporting to medicine OPD from February 2016 to April 2016 at our institute were screened.*

Results: *Around 145 patients were included in our study. Out of 145 patients, only n=112 patients completed our study. Out of n=112 patients, 62 were males and 50 were females. Mean age of group was 52.5 years. N=33 patients were on monotherapy and remaining patients were on combination antihypertensive drugs. There were total 331 antihypertensive drug exposures. Angiotensin receptor blockers were the most commonly prescribed drugs. Angiotensin inhibitors (angiotensin receptor blockers and ACE inhibitors) were utilized in n=150 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.*

INTRODUCTION

Hypertension and Diabetes are basically related to our life style pattern and are the major burden of global Health due to associated complications. India currently has 40.9 million diabetic patients and it is expected to rise to is expected to rise to 69.9 million by 2025 unless urgent and effective preventive steps are taken.[1] One and half billion people will suffer from hypertension[2] and 300 million will suffer from diabetes by 2025.[3] Prevalence of hypertension is found to be 60% in type 2 DM.[4] Patients with T2DM has two fold higher chances of suffering from hypertension in comparison to age match subjects without diabetes. [5] Hypertension has been shown as a major risk factor not only for the development of diabetes but also for the development of micro and macro vascular complications like neuropathy, nephropathy, retinopathy, coronary artery disease, stroke, Peripheral Vascular Disease (PVD) in diabetic patients. The benefits of Blood Pressure (BP) control in diabetic patients exceed the benefits of tight glycemic control and vital to the prevent 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 aggressively on Blood Pressure (BP) control in diabetic patient to below 140/80-90 mmHg. JNC 8 recommended target of diastolic BP <90 mmHg and ESC 2013 recommended <85 mmHg. But ADA recommended

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target of DBP <80 mmHg. There are limited data from India regarding physician's choices of anti-hypertensive therapies for a patient with diabetes in single- and multiple-drug based regimens. Therefore, we undertook this study to evaluate treatment patterns in diabetic patients with hypertension, those are being followed at our institute.

MATERIALS AND METHODS

This study was conducted on diabetic patients who had hypertension as well attending Medicine department of Ananta Institute of Medical Sciences & Research Center, Rajsamand, Rajasthan during February 2016 to April 2016. Prescribing Pattern of Antihypertensive drugs was analysed on all diabetic patients reporting to medicine OPD at our institute were screened. Around n=112 patients were recruited on the basis of inclusion and exclusion criteria.

Patients with advance renal failure (serum creatinine >3.5 mg %) and patients with malignant hypertension were excluded. Patients were diagnosed hypertensive if they had at least 2 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 diagnosed of diabetes or they had prescription of antidiabetic drugs or insulin or raised glycosylated haemoglobin.

Data of antihypertensive drugs was recorded and grouped according to class of drug. Antihypertensive drugs were grouped in to seven groups - Calcium channel blockers, beta blockers, diuretics, Alfa blockers, Angiotensin Convertase 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 three drugs therapy. Data for non-pharmacological therapy was also recorded like salt restriction, loss of weight or exercise.

RESULTS

Around 145 patients were included in our study. Out of 145 patients, only n=112 patients completed our study, rest n=33 were left outs. Out of n=112 patients, 62 were males and 50 were females. Demographic data of patients has been described in Table 1. Around n=33 patients were on monotherapy and remaining patients were on combination antihypertensive drugs. There were total n=331 antihypertensive drug exposures Table 2.

Number of drugs prescribed- Monotherapy was needed in n =33 patients and dual therapy was required in n=49 patients. N=25 were on triple drug therapy and n=5 were on quadruple drug therapy.

Type of drug - Angiotensin receptor blockers found to be most commonly prescribed drugs. Angiotensin inhibitors (angiotensin receptor blockers and ACE inhibitors) were mostly prescribed in n=150 patients. These were followed by Diuretics, calcium channel blockers, and Beta Blockers Table 2.

Combination Utilization pattern - 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, calcium channel blocker with angiotensin receptor blocker, ACE inhibitor with diuretic and ACE inhibitor with beta blocker. Combination utilization pattern has been shown. Combination of Beta blocker with calcium channel blocker and diuretic was most commonly (51.28%) used in patients on triple drug combination. Combination of ARB, diuretic with CCB was used in 33.3% and combination of Alfa blocker, BB and diuretic was used in 10.24%. Combination of ACEI, CCB with diuretic was used in 5.12% patients. Combination of ACEI/ARB, diuretic was used in 15.9% patients. Patients on quadruple therapy were on combination of Alfa blocker, diuretic, ACE inhibitor and central agonist.

Table 1: Demographic details of Diabetic patients (n=112)

Age (years)	Number	Male	Female	Monotherapy	Dual Therapy	Triple Therapy	Quadruple Therapy
<35	14	9	5	3	9	2	0
35-50	56	30	26	15	25	13	3
50-75	28	16	12	8	10	8	2
>75	14	5	9	7	5	2	0
Total	112	60	52	33	49	25	5

Table 2: Showing utilization of various drugs.

Drug	No. of patients
Angiotensin receptor blocker	88
Calcium channel blocker	66
Diuretic	72
ACE inhibitor	62
Beta blocker	38
Alfa blocker	5

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 altitude of physicians.[10] Majority of patients in our study were on multidrug regimens. Only n=33 patients were on single drug therapy. It is consistent with other 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 44.39% patients either alone or in combination. ACEI/ARB were mainly used in our study 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 ACE inhibitors may be superior to dihydropyridine CCB in reducing cardiovascular events.[15,16] Calcium channel blockers were used in n=66 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 Indian study.[17] Diuretics were used in n=72 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 n=38 patients. Usage of BB was significantly higher in patients with early age and patients diagnosed as 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 study. 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.[17] also found similar pattern in their patients. Use of ACEI and ARB has been recommended by ADA[9] also. Patients with nephropathy had lesser percentage of patients with control of hypertension than patients without nephropathy. Shah et al[17] also described similar pattern.

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. Patients with diabetes had lesser chance of control of hypertension. There is higher use of Diuretics in our study. Still there is room for better control of hypertension and optimization of antihypertensive therapy. Sample Size of patients is very less. Therefore follow-up study should be carried out in future.

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