ORIGINAL ARTICLE

Prevalence of Hypertension in Diabetes

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ABSTRACT

Objective: To know the prevalence of hypertension in diabetes in our setup.

Methods: This descriptive cross-sectional study was conducted at diabetic clinic sponsored by Rotary club Nawabshah from Feb 2016 to Feb 2017 where 150 patients were examined. After taking consent of patient, demographic data was collected. It included age, duration of diabetes, history of hypertension, weight & height. Blood Pressure was measured by sphygmomanometer.

Result: Seventy eight out of 150 subjects had hypertension giving prevalence rate of 52%. Two out of eight (25%) type1 subject had hypertension while seventy six out of 142 (53.25%) type2 diabetes had hypertension.

Conclusion: Prevalence of hypertension in diabetes is high leading to many complications. Strict control of hypertension can prevent these complications.

Key Words: Hypertension, Diabetes, Prevalence.

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INTRODUCTION:

Hypertension is common in patients with Diabetes. It is twice more common in diabetic than in non-diabetic patients[1]. Prevalence of hypertension in diabetes depends on type of diabetes, duration of diabetes, age, BMI, degree glycemic control and kidney disease[2].

In insulin-dependent, diabetic patient hypertension is usually not present at diagnosis[3], in type-1 diabetes these is close relationship between hypertension and degree of albuminuria. Blood pressure begins to rise within few years after onset of albuminuria and goes on increasing as renal insufficiency progresses[4]. In type-2 diabetes many patients at time of diagnosis are hypertensive, which may related to obesity, age and atherosclerosis, or it may be due to essential hypertension[3].

Hypertension is associated with progression of both macro vascular and micro vascular complications including coronary artery disease, stroke, peripheral vascular disease retinopathy and nephropathy[5]. Macro vascular disease is responsible for majority of deaths in type2 diabetes. Hypertension in type2 diabetes is associated with increase in mortality due to ischemic heart decease and stroke by four to five fold[6]. Recent studies have shown that antihypertensive therapy is effective in reducing complication of diabetes[7]. Maximum benefits are seen when multiple risk factor are managed simultaneously[8]. Mortality and morbidity due to atherosclerotic cardiovascular disease in diabetic patients has decreased since 1990[9] due to better control of blood pressure[10].

Patients with blood pressure more than 140/90 mmHg without known Hypertension should have blood pressure checked multiple time for confirmation. In hypertensive patients, blood pressure should also be monitored at home for identification of white coat hypertension. Cuff size of apparatus is important. Too small cuff gives higher value and too large cuff gives lower value than actual blood pressure. In correct cuff size, bladder covers 80% of arm circumference. Many trials have shown that antihypertensive therapy in diabetic patients with blood pressure more than 140/90 mmHg reduces risk of coronary heart

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diseases, heart failure, albuminuria and Retinopathy[11].

Therefore all patients with type1 and type2 diabetes who are hypertensive should be treated to targets blood pressure level of less than 140-90mmgh. Patients having high risk of cardiovascular events, stroke and albuminuria should be intensively treated to target blood pressure level lower than 130/80 mmHg or 120/80 mmHg if it can be attained easily without adverse effects[12].

In contrast, in older patients having multiple diseases and functional limitation taking multiple drugs less intensive control of blood pressure is suitable. When blood pressure is reduced below systolic 130mmgh there was significant reduction in stoke rate. Adverse effects of intensive blood pressure control below systolic 130mmgh are symptomatic hypotension, bradycardia and arrhythmia[13]. It can decrease perfusion of central nervous system in diabetic patients who are already having micro vascular disease and impaired autoregulation[14]. Despite advances in management of hypertension during last decades, 50% of hypertensive patients are still not properly controlled. This is due to ethnicity, low income, male sex and poor adherence to medication[15].

Diabetes patients with systolic blood pressure more than 120mmhg or diastolic blood pressure more than 80mmhg are at risk of development of Hypertension. Life style intervention can prevent or delay onset of hypertension, which needs pharmacologic therapy. Life style intervention consist of weight loss, decreased sodium intake, increased use of vegetable and fruit, use of low fat dairy products, avoidance of smoking and increased physical activity. This therapy reduces systolic and diabetic BP, body weight, and glucose level. Lipid profile is also improved. Sodium reduction from daily intake of 4.6g to 2.3g sodium daily reduces blood pressure[16].

Brisk walking for 30 to 45 minutes daily for three to five days in a week has shown to lower blood pressure. It also improves lipid profile and decreases insulin resistance. Therefore, regular aerobic exercise is important in preventing cardio vascular disease[17].

Keeping all these facts in view we conduct this study to know the prevalence of hypertension in diabetic patients in our setup.

METHODS:

This was descriptive cross sectional study. It was conducted from Feb 2016 to Feb 2017 at diabetic clinic Rotary Club Nawabshah. This is free diabetic clinic, which is run by support of Rotary club Nawabshah. It is weekly clinic where more than fifty diabetic patients come for regular follow up and here free medication is given. Before starting the study, permission was taken from Rotary Club authorities.

After taking consent of patients' data was collected including age, duration of diabetes, history of hypertension and drugs used. Height & Weight was noted and BMI calculated. Before taking blood pressure, patients were seated for 5-10 minutes for relaxation. Blood pressure was taken in sitting position using mercury sphygmomanometer. Blood recorded at onset of korotkoff sounds was systolic and at disappearance of sounds was diastolic.

Average of two readings taken 3 minutes apart was noted. Hypertension was diagnosed when syntonic blood pressure was $\geq$ 140 mm hg or diastolic blood pressure was $\geq$ 90 mm Hg or if patient was taking antihypertensive drugs. All the data was recorded on a proforma and statistically analyzed.

RESULTS:

A total of 150 patients were studied. Age of patients was 15 to 70 years (mean $\pm$ SD) 42.5$\pm$27.5, 120 patients were male and 100 were female with male to female ratio of 1.2:1. BM was 24.51. Baseline characteristics are given in table-I.

Out of 150 patients, 78 were having hypertension giving prevalence rate of 52%. Out of 78 hypertension patients, 76 were having type2 diabetes and only 2 patients were of type 1 diabetes (table-II).

Prevalence of hypertension according to duration of diabetes is given in table No-III. The majority (56%) of patients were having diabetes since more than 10 years.

Table I. Baseline Characteristics of Study Patients (n=150)

No of Patients	150
With Hypertension	78
Without Hypertension	72
Age	15-70 (40±25)
Male	120
Female	100
BMI	24.5±1
Type 1 DM	30
Type 2 DM	170

Table II. Association between Hypertension and Type of Diabetes

Type of Diabetes	Hypertensive Cases	Non-Hypertensive Cases	Total
Type1 DM	02	06	08
Type 2 DM	76	66	142
Total	78	72	150

Table III: Frequencies of Hypertension According to Duration of Diabetes

Duration of Diabetes (Years)	No. of Patients with Hypertension	%
1-5	09	11.4
5-10	25	32
> 10 Years	44	56

DISCUSSION:

In this study, prevalence of hypertension in diabetes was 52%, and it was more common in type2 and duration of diabetes was predictor of hypertension.

Hypertension aggravates both macro vascular and micro vascular complication of DM[18,19]. Cardio vascular disease (CVD) risk is increased by four-fold in patient having both DM and of Hypertension as compared to non-diabetic normotensive controls[20]. Population with hypertension at time of diagnosis of DM had high mortality rate for all causes and cardiac disease as compared to normotensive diabetic patients suggesting coexistent hypertension as a cause[21].

Obesity is main factor behind DM and hypertension coexistence[19]. Chronic inflammation in adipose tissue cause increased production of angiotensinogen with activation of renin angiotensin aldosterone system (RAAS)[22] leading to Hypertension, Increased aldosterone also causes hypertension[23]. Adipose tissue produce lipid soluble factor, which causes increased production of aldosterone[24]. Aldosterone causes sodium retention with increased plasma volume and hypertension.

For DM and hypertension both insulin resistance plays a role. 50% of patients of hypertension have Insulin resistance[25]. Hyperinsulinemia causes increased sympathetic output[26] and increased sodium reabsorption leading to hypertension[27].

There should be strict control of blood pressure in setting of DM and high BP. Goal of BP for patients having DM and hypertension should be <140/80mm kg[28]. In this study, 2 patients of type1 diabetes and 76 patient of type2 diabetes were having hypertension.

In type1, DM hypertension is usually not present at diagnosis but develops as albuminuria occurs and then exacerbates the renal failure. In type2 DM at time of diagnoses, many patients are already hypertensive. Hypertension type2 DM is related to obesity, age, and atherosclerosis and insulin resistance[25].

In this study, development of hypertension was directly related to duration of diabetes. In DM, duration of diabetes is important predictor to develop hypertension. With long duration, renal insufficiency is important cause of hypertension. 52% prevalence of hypertension in this study is comparable to 53% in Saudi Diabetics[29] and 44% in Omani diabetics[30], and 54% in Nigeria[31]. In other studies, prevalence of hypertension is 64% in Qatari diabetes[32] and 72.4% in Jordanian diabetics[33] and 70.4% in morocco[34]. Difference in frequency for each country may be due if difference in definition of hypertension and difference in population characteristics.

Limitation of study was that sample size was small. In patients who were, having

hypertension it could not be said whether hypertension was due to diabetes or it was pre-existent.

CONCLUSION:

Prevalence of hypertension in Diabetic patient is high. Patients with both diabetes and hypertension are at risk of macro and micro vascular complications. Strict control of hypertension can prevent these complications.

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