



A Correlation Between Hypertension And Microalbuminuria In Type 2 Diabetic Women Patients

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ABSTRACT

Background: Hypertension is the most important co-existing risk factor for death at a young age in patients with type 2 diabetes.

Objective: The present study was correlation between hypertension and microalbuminuria in type 2 diabetes women patients of central Indian population.

Methods : One hundred twenty three type 2 diabetic women patients attending the department of medicine of L N Medical college and Research Centre, Bhopal. Microalbuminuria and raised blood pressure patients were included in this study. Patients age range from 20-60 years.

Results: A total of 123 subjects were studied out of these (83 microalbuminuric patients, and 50 Normoalbuminuric patients). Mean Age, BMI, duration of T2DM was statistically significant. Mean Diastolic blood Pressure (DBP), systolic blood pressure (SBP) was also statistically significant between microalbuminuria and normoalbuminuria patients.

Conclusion : Central Indians type 2 diabetic women patients showed that MA having higher blood pressure as compared to NA.

KEYWORDS

Type 2 diabetes mellitus, Hypertension, Microalbuminuria, Normoalbuminuria Central Indians.

INTRODUCTION :

Diabetes is one of the most common non communicable diseases found in our country as well as globally because of urbanization. India has been recognised as the diabetes capital of the world by the international diabetes federation with approximately around 40.9 million people affected by diabetes as of 2006¹. The problem of diabetes and its complications globally accounts 6.6%, in India 9% in urban population. T2DM is a non-autoimmune, complex, heterogeneous and polygenic metabolic disease condition in which the body fails to produce enough insulin, characterized by abnormal glucose homeostasis. T2DM occurs when impaired insulin effectiveness (insulin resistance) is accompanied by the failure to produce sufficient cell insulin. Type 2 diabetes is risk factor for microvascular and macrovascular disease²⁻³. Microalbuminuria was predictor of renal failure in patients with diabetes mellitus⁴.

Hypertension in the diabetic individual markedly increases the risk and accelerates the course of cardiac disease, peripheral vascular disease, stroke, retinopathy, and nephropathy⁵. The development of diabetic nephropathy is characterized by a progressive increase in the excretion of protein, particularly albumin, an early and continuing rise in systolic blood pressure, and a late decline in glomerular filtration rate, leading eventually to end stage renal failure⁶. Hypertension is the most important co-existing risk factor for death at a young age in patients with type 2 diabetes. Almost 75% of the cardiovascular complications in patients with diabetes can also be attributed to hypertension⁷.

Microalbuminuria is defined as a urinary albumin excretion rate of 30 to 300 mg in 24 hour urine collection or as a urinary albumin excretion rate of 20 to 200 mg/min in a timed overnight urine collection. Increased urinary excretion of albumin ranging between 30 and 300 mg/d (i.e., microalbuminuria) has been found in a relatively large number of patients with essential hypertension⁸. Microalbuminuria is a indicator of endothelial dysfunction and marker for cardiovascular morbidity and mortality in individuals with and without DM⁹. American Diabetes Association recommends that patients with type 2 diabetes be tested for albuminuria at the time of initial diabetes diagnosis and yearly thereafter¹⁰.

Endothelial function and chronic inflammation have been sug-

gested as possible candidates to explain the associations between microalbuminuria and cardiovascular disease¹¹. Several studies have revealed a relationship between microalbuminuria and other cardiovascular risk factors, target organ damage and risk of cardiovascular disease, particularly in essential hypertension and even in the general population¹²⁻¹⁴.

The present study was correlation between hypertension and microalbuminuria in type 2 diabetes women patients of central Indian population.

MATERIALS AND METHODS:

The study was performed at outdoor patients in L N Medical college and Research centre, Bhopal. We selected 133 women patient with type 2 diabetes mellitus with hypertension. The patients age range from 20-60 years. Consent was obtained from each patients. An administered questionnaire was used to collect data on: age; sex; self-reported ethnicity; Family history of T2DM; duration of T2DM; and treatment with oral hypoglycemic, insulin or both.

Blood pressure was measured with a mercury sphygmomanometer three times in the same arm after the patient was seated and at rest for a minimum of 15 min. The systolic and diastolic measurements in mercury units reported represent the mean of the three readings. Hypertension was defined as having blood pressure $\geq 140/90$.

Body mass index was calculated as the ratio of body weight in Kg/height in square meter. Cases and controls were asked to remove heavy clothes and shoes before measurement of weight and height.

Body mass index (BMI) is derived mathematically from the height and weight measures.

$BMI = \text{weight (kg)} / \text{Height (m}^2\text{)}$.

Microalbuminuria was determined by measuring with the albumin excretion rate (AER) in three non consecutive first morning urine samples. Normal albumin excretion rate was < 30 mg/g creatinine and microalbuminuria was defined as AER in the range of 30 and 299 mg/g creatinine. The ACR (albumin to creatinine ratio) was calculated as follows: urinary al-

bumin concentration (mg/liter) urinary creatinine concentration (mg/dl). The mean value of each patient's three ACRs was used to indicate the level of albumin excretion.

Data analysis was done using the statistical package for social sciences (SPSS) for windows version 8.

RESULTS :

The present study was carried out on 133 women patients with type 2 diabetes mellitus. Out of these (83 microalbuminuric patients, and 50 Normoalbuminuric patients).

Table :1 represent basic Characteristics of normoalbuminuria and microalbuminuria patients. The mean age of NA was 52.28 in while in MA was 44.8. Duration of T2DM has been calculated in average year from date of T2DM diagnosis.

The mean BMI of NA was 23.12 in while in MA was 26.9. The positive family history of NA was 35 % and in MA was 51 %. While negative family history of NA was 15 % and MA was 32 %.

TABLE NO:1 BASIC CHARACTERISTICS OF NORMOALBUMINURIA AND MICROALBUMINURIA

Variables	Normoalbuminuria (NA) (50 women patients)	Microalbuminuria (MA) (83 women patients)	P Value
Age	52.28±13.2	44.8±11.8	0.0009*
BMI	23.12 ± 3.3	26.9 ±4.1	0.0001*
Family History	Positive	51 (61.4%)	
	Negative	32 (38.5%)	
Duration of T2DM	7.1 ± 4.3	5.6 ± 3.61	0.0325*

*Statistically significant (P<0.001), # Non significant (p>0.005).

TABLE NO:2 BLOOD PRESSURE BETWEEN NORMOALBUMINURIA AND MICROALBUMINURIA WOMEN PATIENTS.

Variables	Normoalbuminuria (NA) (50 women patients)	Microalbuminuria (MA) (83 women patients)	P Value
Systolic Blood Pressure	140.2±17.3	147±15.4	0.005*
Diastolic Blood Pressure	85.9 ± 10.4	92.4±12.3	0.002*

*Statistically significant (P<0.001), # Non significant (p>0.005).

Table no -2 results represent that MA mean Diastolic blood Pressure (DBP) higher than NA, that is statistically significant. Similarly mean MA mean systolic blood pressure (SBP) higher than NA, that is also statistically significant. These result showed that MA having higher blood pressure as compared to NA.

DISCUSSION :

In the present study observed that microalbuminuria detection is a first-line tool for identifying hypertensive patients who are at higher cardiovascular risk¹⁵. Previous studies shown that microalbuminuria to be an important cardiovascular risk factor in patients with or without diabetes and/or hypertension¹⁶⁻¹⁷. Our result reported that the mean age was statistically significant correlation found between NA and MA. Bhoomika et al¹⁸ no significant correlation found between age and microalbuminuria as compared to normoalbuminuria.

In this study, it was found that mean BMI was statistically significant compared between MA and NA. No correlation was found between the BMI and albumin excretion (r2 = 0.0271) even though it is reported that microalbuminuria is more prevalent in obese hypertensive¹². The high value of BMI in MA patients indicated that obesity to be a potential risk factor for albuminuria¹⁹. Few studies reported that a strong correlation between the severity of UAE and duration of diabetes

in type-2 diabetes²⁰⁻²¹. Kedam Durga prasad et al²² duration of diabetes and obesity are found to be risk factors for microalbuminuria. In present observation the duration of diabetes statistically significant between NA and MA. Afkhami et al²³ found that a good statistically significant correlation was found between microalbuminuria and duration of diabetes.

Increase of cardiovascular diseases that primarily accounts for the increase in morbidity and mortality seen in patients with diabetes²⁴. T2DM is becoming the main reason for patient to start renal disease²⁵. Our study the mean value of SBP and DBP was statistically significant. albuminuria is a powerful predictor of renal and cardiovascular risk in patients with type 2 diabetes and hypertension. Nishijo et al concluded that urinary albumin was significantly related to systolic and diastolic blood pressure in a manner independent of other factors such as BMI and plasma insulin²⁶. United Kingdom prospective diabetes study (UKPDS) explain reducing the incidence of chronic complications was significantly associated with the amplitude of systolic blood pressure decrease, the lowest risk corresponding to a systolic blood pressure below 120mmHg⁶.

Few authors opinion that hypertension occurs in 50% of patients with Diabetes and results in a sevenfold increase in mortality²⁷. Similarly Arkedani et al²³ reported a good statistical correlation between the prevalence of microalbuminuria and the diastolic blood pressure. Alia Ali et al²⁸ also found a significant statistical correlation between hypertension and microalbuminuria and this finding was also strongly associated with poor glycemic control. Bruno et al reported high blood pressure levels among MA patients. Bhoomika et al¹⁸ reported that high percentage of hypertensive patients (58.3%) had microalbuminuria and significant correlation found between microalbuminuria and blood pressure.

The present study reported specially in women patients with hypertension and diabetes. The results of the study was good statistically significant correlation was found between microalbuminuria and diabetes. No one is discusses about females patients in central India.

Conclusion :

Our study suggested according to above findings in women patients with Type 2 diabetes mellitus and microalbuminuria BMI, duration of diabetes, family history of diabetes was significant compared with patients with type 2 diabetes mellitus and normalalbuminuria. Patients suggest that hypertension is associated with microalbuminuria. Increased albumin excretion rate is related to diabetes and high blood pressure.

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