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Original Research Article

Study of Microalbuminuria and its correlation with Glycemic status in Type 2

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Abstract

Background & Methods: The aim of the study is to study of Microalbuminuria and its correlation with Glycemic status in Type 2 DM. Frequency of microalbuminuria was detected among these patients. Demographic and clinical details were recorded regarding microalbuminuria, duration of diabetes, glycated hemoglobin (HbA1c), blood glucose, gender and age.

Results: Average duration of diabetes was 5.91 ±7.36 years.We found Albuminuria in 31% of diabetes patients with significantly associated p value = 0.049.

Conclusion: Microalbuminuria was found with increased frequency in patients with type 2 diabetes mellitus. The relationship of microalbuminuria with glycemic control and duration of diabetes was statistically significant.

Keywords: microalbuminuria, correlation, glycemic & Type 2 DM.

Study Design: Observational Study.

Introduction

Type 2 diabetics are at risk of developing several serious complications including diabetic nephropathy. Microalbuminuria is considered an independent predictor of nephropathy as well as cardiovascular disease[1]. It progresses at a rate of 5-10% per year to overt nephropathy and with continued decline in glomerular filtration rate will end up in end stage renal disease. Endothelial damage is proposed as the likely mechanism for appearance of albumin in urine. If the renal glomerulus had high permeability for albumin, it will be leaked into the urine. When this excretion of urinary albumin is 30-300 mg/24 hours or 20-200 μg/min, it is known as microalbuminuria.

Diabetes is an important metabolic disorder worldwide and is characterized by variable degree of insulin resistance, impaired insulin secretion, and increased glucose production[2]. India is one of the epicentres of the global diabetes mellitus pandemic. Rapid socioeconomic development and demographic changes, along with increased susceptibility for Indian individuals, have led to the explosive increase in the prevalence of diabetes mellitus in India over the past four decades[3].

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Pathogenesis appears to involve complex interactions between genetic and environmental factors. The patho-physiologic basis for elevated urinary albumin excretion entails the binding of glucose to proteins resulting in excessive protein glycosylation with the build-up of advanced glycated end products. This leads to deposition of advanced glycated end products on the glomerulus resulting in renal and glomerular hypertrophy, mesangial matrix accumulation and thickening of glomerular basement membrane[4]. This abnormality permits the leakage of low molecular weight proteins [albumin]. This is the stage of microalbuminuria (incipient nephropathy) which could be reversible with good glycemic control. However, with persistent microalbuminuria, further leakage of protein in urine will result in overt diabetic nephropathy. Increased level of microalbuminuria is associated with increased risk of progressive kidney disease leading towards end stage renal disease[5-7].

Material and Methods

Present study was conducted at Department of General Medicine. Subjects included in this study will comprise of patients are admitted in the Medicine department who are found to have Type 2 Diabetes Mellitus according to ADA criteria.

102 patient of diabetes were studied, the patient were taken from the medical ward of the hospital based on random selection, patient were considered to be diabetic based on ADA criteria for the diagnosis of diabetes mellitus which is symptoms of diabetes plus a RBS >200 mg/dl or FBS >126 mg/dl defined as no caloric intake for at least 8hours or 2hours PPBS >200 mg/dl.

Inclusion Criteria

1. Adults with type 2 diabetes mellitus, age >40years based on blood sugar records as per American Diabetic Association (ADA) criteria Irrespective of control of blood sugar, duration of diagnosis and treatment.

a. Fasting blood sugar >126mg/dl.

b. Post prandial blood glucose >200mg/dl.

Exclusion Criteria

1. Patient with macroalbuminuria.
2. Patient with congestive cardiac failure.
3. Patients with UTI.
4. Patient with metabolic complications like Diabetic keto-acidosis.
5. Pregnant patient.
6. Patient with established kidney diseases.
7. Patients on nephrotoxic/ nephromodulatory drugs.

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Result

Table No. 1: Demographic Profile

Age	No.	Percentage
upto 50	46	45
51-60	29	29
61-70	26	25
>70	01	01
Gender	No.	Percentage
Male	38	37
Female	64	63

We found 38 (37%) were males and 64 (63%) females.

Table No. 2: Lab parameters

Parameters	Mean	SD
FBS (mg/dl)	171.57	3.27
PPBS (mg/dl)	237.32	27.11
HbA1C%	9.47	4.61
Duration of Diabetes	5.91	7.36

Average duration of diabetes was 5.91 ±7.36 years.

Table No. 3: Hypertension & eGFR

Parameters	No.	Percentage
Present	38	67
Absent	64	33
eGFR	No.	Percentage
≥ 90 mL/min/1.73 m2	62	61
<90 mL/min/1.73 m2	40	39

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Table No. 4: Albuminuria Diabetes

Albuminuria	No.	Percentage	P Value
Yes	**31**	**31**	**0.049**
No	**71**	**69**	
	102		

We found Albuminuria in 31% of diabetes patients with significantly associated p value = 0.049.

Discussion

Type 2 diabetes mellitus is being increasingly recognized as a disease, which is characterized by dysfunction of the endothelium. Endothelial dysfunction occurs in a generalized and widespread manner in diabetic subjects[8].

The severity of the dysfunction is directly proportional to the age of the patient and duration of the diabetes. The clinical markers of the generalized endothelial dysfunction get manifested in several forms. Microalbuminuria marks the onset of endothelial dysfunction related to the kidney[9]. Since its original description by Mogensen, the estimation of microalbuminuria is made easy and practical. Microalbuminuria serves as a warning for imminent nephropathy. But its true value is that it heralds generalized endothelial dysfunction. Thus diabetic subjects with microalbuminuria not only have ongoing progressive nephropathy but are also likely to have retinopathy, neuropathy and cardiovascular problems including coronary artery disease and hypertension[10-12]. An effort has been made in this study to highlight this issue. Even among randomly selected patients, an incidence of 38% for microalbuminuria is evident. Among various other studies the prevalence of microalbuminuria ranges from 25% to 35%. A slight increase in the percentage of microalbuminuria in our study can be attributed to several factors such as, large number of elderly patients, longer duration of diabetes and poor glycemic control.

It is very well recognized that microalbuminuria occurs more commonly in diabetic subjects who are more than 50 years of age. In our study microalbuminuria tended to be 2.54 times more common in the age group of above 50 years as compared to the age group of less than 50 years. There are many reasons for this phenomenon[13-14]. Firstly deterioration in the b -cell function, which is the likely factor to contribute to worsening glycemic control. Poor values of HbA1c are known to be associated with increasing incidence of microalbuminuria.

Amini et al observed an association between microalbuminuria and male gender. Severity of microalbuminuria was also recorded more in males as compared to females[15-16]. The differene in results of these studies might be due to diffrence in sample selection and size.

Conclusion

Microalbuminuria was found with increased frequency in patients with type 2 diabetes mellitus. The relationship of microalbuminuria with glycemic and duration of diabetes was statistically significant. Microalbuminuria is highly prevalent among patients with type 2 diabetes and is

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associated with poor glycemic control and hypertension, necessitating aggressive and timely screening and treatment.

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