



Original Research Article

Incidence of Microalbuminuria & Retinopathy in Type II Diabetics

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Abstract

Background & Objective: *Diabetes Mellitus has become a major health problem in India & it has been estimated that the burden of Type 2DM is projected to increase to 87 million by 2030. Diabetic microvascular complications are retinopathy, nephropathy & neuropathy leads to morbidity & mortality. Microalbuminuria is associated with diabetic retinopathy in Type2DM patients and is a reliable marker of retinopathy. The demonstrated relationship between proteinuria and the development of retinopathy and nephropathy in type1 diabetes makes this an important issue to be studied in much more common type2 diabetes too.*

Materials & Methods: *The study group comprised of diagnosed 60 Type II diabetes mellitus randomly selected patients within the age group of 40 – 60 years. After taking informed consent from each patient, complete clinical details & systemic examinations were noted. 24 hours urine sample was obtained for detection of microalbuminuria & macroalbuminuria, presence or absence of retinopathy was detected with the help of ophthalmologist among all study group patients.*

Statistics: *The results obtained were analyzed by chi-square test. p-value<0.05 considered as statistically significant.*

Results: *Microalbuminuria was present in 23 patients represented a 38.33% rate of occurrence and Retinopathy was present in 16 patients represented 26.67% rate of occurrence. Subjects with microalbuminuria showed significantly higher occurrence of retinopathy as compared to subjects without microalbuminuria (p<0.05).*

Conclusion: *Microalbuminuria is the best documented predictor of diabetic nephropathy and is associated with retinopathy in Type II diabetic patients. Regular screening with microalbuminuria & retinopathy will prevent from further worsening of diabetes related complications.*

Keywords: *Type II diabetes mellitus, microalbuminuria, retinopathy.*

Introduction

The impact of Type 2 DM are considerable: as a lifelong disease, it increases morbidity and mortality and decreases the quality of life. Type 2 Diabetes Mellitus is a non-autoimmune, complex, heterogeneous and polygenic metabolic disease condition in which the body fails to produce enough insulin, characterized by abnormal glucose homeostasis¹. Microvascular complications are predominantly seen in patients in the age group of 40 to 60 years. Microalbuminuria, defined as an elevation of urinary albumin excretion in the range of 30-300 mg/24hr or 20-200 µg/min, is associated with adverse health outcomes in adults². One of the earliest signs of diabetic nephropathy is microalbuminuria which is strongly associated with endothelial dysfunction, which increases the risk of nephropathy and other complications in diabetes and microalbuminuria is the best documented predictor of diabetic nephropathy³, which is a major cause of end stage renal disease (ESRD)⁴.

Patients with Type 2DM often have a long asymptomatic period of hyperglycaemia and many have complications at the time of diagnosis⁵. Diabetic Nephropathy is a common consequence of long standing diabetes mellitus. Its pathogenesis appears to involve complex interactions between genetic and environmental factors⁶. 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. This abnormality permits the leakage of low molecular weight proteins [albumin]⁷. 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.

Diabetic retinopathy is a major cause of blindness in population of working age. Diabetes is one of the leading causes of blindness in the industrialized countries^{8,9} where the chances of losing the sight are about 25 times higher than normal population. The prevalence of diabetic retinopathy is about 34% in Indian studies¹⁰. The prevalence of diabetic retinopathy in Type II DM is 28% after 5 years and 77% after 15 years of onset of DM¹¹. In India retinopathy was detected in 52% of patients with NIDDM of over 25 years duration¹². Early detection and treatment of diabetic retinopathy can save the vision in majority of the affected patients¹³.

Aim of the Study

The present study aimed at evaluating the incidence & prevalence of microalbuminuria & retinopathy in type 2 diabetes mellitus.

Materials & Methods

The study group comprised of diagnosed 60 Type II diabetes mellitus randomly selected patients within the age group of 40 – 60 years, irrespective of duration of diabetes and sex taken randomly from the outpatient and admitted patients of Sri Devaraj Urs Medical College (SDUMC), Kolar. Ethical clearance was obtained from the Institution. After taking informed consent from each patient, complete clinical details & systemic examinations were noted. 24 hours urine sample is collected in a sterilized container for detection of microalbuminuria (detected by Micral test Roche Diagnostics Ltd, dipstick method in urine) & macroalbuminuria was ruled out by heat coagulation test on patient's urine, presence or absence of retinopathy was detected among all study group patients. Retinopathy was detected by direct ophthalmoscopy, indirect ophthalmoscopy & three mirror slit lamp fundoscopy with the help of ophthalmologist.

Macroalbuminuria positive subjects, hypertensives, smokers, alcoholics, subjects on drugs affecting renal function and retinal vascularity were excluded.

Results

In our study microalbuminuria was present in 23 subjects represented a 38.33% rate of occurrence in the study group. Retinopathy was present in 16 subjects represented a 26.67% rate of occurrence in the diabetic population (Table No. 1 & Table No. 2).

Among 60 Type II diabetics, 23 subjects exhibited microalbuminuria and remaining 37 were subjects without microalbuminuria. 4 patients had

retinopathy among subjects without microalbuminuria (n=37). Retinopathy was present in 12 patients among subjects with microalbuminuria (n=23). On comparison of occurrence of retinopathy in subjects with microalbuminuria and subjects without microalbuminuria, the subjects with microalbuminuria showed significantly higher occurrence of retinopathy as compared to subjects without microalbuminuria ($p<0.05$) (Table No. 3).

Table No. 1: Occurrence of microalbuminuria & retinopathy among study group

STUDY GROUP	Subjects with microalbuminuria	Subjects with retinopathy
60 TYPE II DM	23	16

Table No. 2: Percentage distribution of microalbuminuria & retinopathy among study group

STUDY GROUP	Microalbuminuria percentage	Retinopathy percentage
60 TYPE II DM	38.33% (n = 23)	26.67% (n = 16)

Table No. 3: Comparison of occurrence of retinopathy in subjects with microalbuminuria and without microalbuminuria using Chi-square test

GROUPS	Retinopathy Frequency	χ^2	p Value
Subjects with microalbuminuria (n=23) n = 23	12	4	<0.05
Subjects without microalbuminuria (n=37)	4		

* p Value<0.05 is statistically significant.

Discussion

Many studies have shown that microalbuminuria is a marker of wide spread microvascular damage in Type II DM^{14,15}. The association between overt proteinuria and proliferative retinopathy has been demonstrated and there is increasing evidence that microalbuminuria could be a marker of early diabetic retinopathy^{15,16}. Microalbuminuria assessed by simple dipstick test may be used as a surrogate marker of both diabetic retinopathy and incipient diabetic nephropathy. Mogensen (1984) has concluded that microalbuminuria in patients with Type II DM is predictive of clinical proteinuria and increased mortality^{17,18}. Diabetes & its complications cause a heavy economic burden for diabetic patients themselves, their

families and society^{19,20}. In our study microalbuminuria was present in 23 subjects drawn from study group; this represented a 38.33% rate of occurrence in the diabetic population. Various studies have reported the prevalence of microalbuminuria ranging from 25% to 35%²¹⁻²⁴. The slightly higher percentage of microalbuminuria in our study can be attributed to smaller sample population could also be a contributory factor.

In our study retinopathy was present in 16 subjects (26.67%). Numerous earlier studies reported incidence of retinopathy in Type II diabetes between 16 to 53.4%²⁵⁻²⁸. Our study showed the prevalence rate of 26.67% which is somewhere in median range. It is thus in agreement with most of the earlier reports.

In our study out of 60 cases, 37 were normoalbuminuric (subjects without microalbuminuria). Out of these 4 subjects exhibited retinopathy. There were 23 subjects with microalbuminuria, out of which 12 had retinopathy. This shows that most of the patients with retinopathy had microalbuminuria, while only a small fraction of normoalbuminuric subjects presented with retinopathy. Statistically also, the occurrence of retinopathy in patients with microalbuminuria was significantly higher than normoalbuminuric subjects ($p < 0.05$). This observation coincides with findings of other studies²². The findings suggest that presence of microalbuminuria is a strong predisposing factor for the development of retinopathy.

There are several studies which have shown microalbuminuria is a strong predictor of development of retinopathy^{29,30}. In 1996 Jaisankar et al showed, the prevalence of retinopathy was higher in microalbuminuric patients ie 76% when compared to normoalbuminuric patients ie 38.6%³¹. Barnett and Dallinger (1985) have shown that half of the patients with microalbuminuria exhibit retinopathy, although those without nephropathy may also have this complication³². However, Krepmt and Peltier (1987) have shown over 50% of patients with retinopathy, regardless of severity, did not show microalbuminuria. Even in their study, patients with microalbuminuria, showed a significantly higher percentage (75%) of retinopathy³³. Erasmus et al (1992) have shown that in 113 patients suffering from NIDDM, the incidence rate of microalbuminuria was as high as 54% among males and 59% among females. Prevalence of retinopathy and hypertension was 16% and 41% respectively. They concluded that microalbuminuria may not predict retinopathy and occurs independently from either glycemic control or elevated blood pressure levels²⁶. The results of our study are not in corroboration of their findings as we have not considered duration of illness.

From the foregoing, it is logical to conclude that there is concurrent existence of microalbuminuria

and retinopathy in majority of patients with diabetes.

Conclusion

Microalbuminuria is the best documented predictor of diabetic nephropathy and is associated with retinopathy in Type II diabetic patients. Regular screening with microalbuminuria & retinopathy every 2 - 3 months will prevent from further worsening of diabetes related complications. Diabetic patients who have microalbuminuria should be under periodic ophthalmological surveillance for prevention of retinopathy. Our results obtained from rural Indian population were similar to the studies done earlier in western urban population.

Conflict of Interest: None

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