

Frequency of Micro Albuminuria in Diabetic Patients at the Diabetic Clinic of Bahawal Victoria Hospital Bahawalpur

J I MALIK M A AZHAR M S CHANNAR. A H SHAH M A KHAN

Department of Medicine, Quaid-e-Azam Medical College/Bahawal Victoria Hospital, Bahawalpur

Correspondence to dr. Munir ahmed Azhar, Assistant Professor E. mail: muneerazhar@hotmail.com

Study was carried out to determine the prevalence of Microalbuminuria in patients suffering from Diabetes Mellitus type-II. attending the "diabetic clinic" at the medical outpatient department of Bahawal Victoria Hospital from May 2003 to September 2003. Three hundred diagnosed cases of diabetes mellitus on oral hypoglycemic agents with ages between 40-60 years, irrespective of their sex, were included in the study. Patients having fever, Urinary Tract Infections, hypertension, heart failure, known renal parenchyma diseases and connective tissue diseases like SLE: RA etc. involving the kidney were excluded from the present study. The study population was, evaluated for albuminuria. They were first screened for Macroalbuminuria. Eighteen patients had Macroalbuminuria. They were not followed up further. Of the remaining, 282 patients, 43 (28 males and 15 females) were found to have Microalbuminuria. Overall frequency of Microalbuminuria was 14.34%. Very few studies have so far been conducted to determine the prevalence of Microalbuminuria in Pakistan. Microalbuminuria is considered to be a marker of the earlier & reversible stage of nephropathy. Therefore these patients were advised to modify their life style. ACE inhibitors were prescribed to such patients to prevent progression of renal disease.

Key Words: Microalbuminuria, prevalence: Diabetes Mellitus type-II.

Diabetes Mellitus is one of the commonest endocrine disorder^{1,2,4,6,12}. There has been a threefold increase in the prevalence of diabetes mellitus during the last 30 years^{3,4,5,7}. The kidney disease associated with type-II Diabetes Mellitus is increasing at an alarming rate. About 1/3 of all the diabetic patients eventually develop End-stage Renal Disease (ESRD)^{2,3,5,10}.

Microalbuminuria is thought to be one of the earliest signs of diabetic kidney disease and represents the stage of incipient nephropathy. Microalbuminuria is a sub clinical rise in 24 hours urine concentration between 30-300mg/24 hours^{9,10,11}. It is a predictor of diabetic nephropathy^{7,8}. Screening for Microalbuminuria is urgently needed in order to detect nephropathy at an early and reversible stage. Keeping in view all the facts we planned a study to detect renal disease in Diabetes Mellitus type-II patients subjecting them to screening for Microalbuminuria. This early detection of nephropathy enables us to institute appropriate measures to prevent the further progression of kidney disease and even to revert Microalbuminuria to normal.

Objectives:

- i. To determine the prevalence of microalbuminuria among patients suffering from Diabetes Mellitus type-II.
- ii. To prevent progression of diabetic nephropathy.

Study Design:

This was an observational descriptive cross-sectional study carried out at the diabetic clinic present in the medical outpatient department of Bahawal Victoria Hospital Bahawalpur from May, 2003 to September, 2003.

"Purposive sampling technique" was used to collect a sample of 300 diagnosed cases of Diabetes Mellitus type-II (on rest of 122 patients were females). All the other

diabetic patients having fever, Urinary tract infection, hypertension, congestive cardiac failure, and patients with known renal parenchyma diseases as well as systemic connective tissue disease like Rheumatoid Arthritis, and SLE leading to kidney dysfunction were excluded from the study.

Material and Methods:

A proforma was designed which contained, name, sex, age, duration of diabetes mellitus; address and information regarding the history of intake of Kushtas, NSAIDS and ACE inhibitors was taken. Patients were inquired about any history of dyspnea, orthopnea, paroxysmal, nocturnal, and hypertension. Each patient was instructed to collect 24 hours urine sample as follows. A day before the clinical visit, each patient was instructed to discard the first morning sample on the day of clinical visit. Microalbuminuria was defined as; "Urinary albumin excretion rate of 30-300mg/24 hours or 20-200 microgram / minute on two of three measurements over a period of 3-6 months". Screening for microalbuminuria was done by "Micral test". The test is highly sensitive as well as specific. Test is positive when at least two of the three morning urine samples tested, produce a reaction corresponding to 20mg/L albumin. (threshold for microalbuminuria). Albumin concentration of each urine sample was measured by using "Albustix" marketed by Bayer Corporation USA. The patients having urine albumin level in macroalbuminuria range (7300mg/24 hours) as detected by Albustix, were dropped from further follow up.

Those patients exhibiting negative results with "Albustix Method" were then analyzed for microalbuminuria on DCA 2000 analyzer using DCA 2000 Kit for microalbuminuria marketed by Bayer

Corporation USA. The test was repeated twice over a period of six months to establish "persistent microalbuminurea". DCA 2000 is a convenient and quantitative method of detecting microalbuminurea. Albumin reagent used was 3.3-10% purified polyclinic goat anti-human albumin antiserum in 50MM TRIS. Results were tabulated and subjected to test of significance (standard error of difference between two proportions) to have their statistical significance. P value less than 0.05 was statistically significant.

Results:

Age range of the sample population, In our study varied from 40-60years,with mean age 50 years of the total 300 patients, 178 (59.3%) were males and the remaining 122 (40.7%) were females. Thus male to female ration was 1.5:1 as shown in table-1 below.

Of the total patients, 18 (6%) were found to have macroalbuminurea on their first visit. Therefore such patients weren't further followed up.

Rest of the 282(94%) patients were screened for microalbuminurea. Out of these, 8 patients were having microalbuminurea only initially and 43 patients had persistent microalbuminurea. Of these 43 microalbuminurea patients, 28(65.2%) were males and 15(34.8%) were females. Male to female ratio was thus 1.9:1, these results are tabulated in table-II. Of the 43 microalbuminurea patients, 18(41.86%) had ages ranging from 40-50 years. While the remaining 25(58.14%) patients had ages between 51-60 years.

Out of the total patients, 43 had persistent microalbuminurea, 9(21%) were having the disease for less than 5 years, while 15 patients were having diabetes mellitus for 5-10 years. Rest of the 19 patients (44.2%) had disease duration ranging from 11-20 years.

Table 1: Detail of cases of different types of albuminurea:

Type of albuminurea	n=	%age
No albuminurea	231	77
Macroalbuminurea	18	6
Microalbuminurea	51	17
Initial microalbuminurea	8	
Persistent microalbuminurea	43	

Table 2. Sex of patients (n=300)

Sex	n=	%age
Males	178	59.30
Females	122	40.70

Discussion:

Diabetes Mellitus is one of the most common endocrine disorders and diabetic kidney disease i.e. nephropathy is a very serious complication of it. Diabetic nephropathy is an important cause of morbidity and mortality and is now considered to be among the commonest cause of end-stage renal diseases¹. Microalbuminurea represents the early and the reversible stage of diabetic nephropathy². It predicts development of overt nephropathy in type1-Diabetic

patients and is also strongly associated with very dreadful cardiovascular complications,^{3,4,5} micro-albuminurea affects 20-40% of patients, 10-15 years after the onset of diabetes⁶.

Our study revealed 43 out of 300 type 2 diabetic patients having persistent microalbuminurea. The frequency of microalbuminurea in our study was found to be 14.43% which is comparable to the prevalence (14.7%) reported by Sheikh et al⁷. A prospective study carried out by Gall et al showed a five year cumulative frequency of microalbuminurea to be 23% which is quite high as compared to the prevalence seen in our study⁸. The type of patient groups included in that study belonged to the white population only. It is known that the incidence of diabetic nephropathy varies in different racial groups, (High incidence in Blacks, Native Americans and Hispanics) 9. Moreover, hypertensive patients were excluded in the above-mentioned study.

Another study conducted by Vargese et al in Southern India, has reported a prevalence of microalbuminurea in type-II diabetic patients as 36.3%¹⁰. This study also did not exclude the hypertensive patients. Whereas, hypertensive patients were excluded from our study. Hypertension is one of the most important risk factors for the development and progression of diabetic kidney diseases¹¹.

In eight studies on type-II diabetic patients the prevalence of microalbuminurea varied from 12-36% 12. Out of 43 patient exhibiting persistent microalbuminurea in our study, 28 were males (65.12%) and 15 were females (34.88%) with a male to female ratio of 1.9:1, reflecting the susceptibility of male sex to diabetic nephropathy. A male to female ratio of 2:1 was also observed by Shaikh WM et al⁷. Male sex was also found to be as a significant determinant of diabetic nephropathy in the study conducted by Gall et al⁸.

The patients in our study with disease duration of less than 5 years were 9(21%), while 15 patients (34.8%) were having duration of diabetes falling in between 5-10 years. These findings are in consistent with the observations made by Varghese A et al¹⁰, and support the fact that the incidence of diabetic nephropathy, rises with the increase in the duration of diabetes mellitus. But in the study conducted by Gall et al⁸, duration of diabetes was not found to be significant risk factor for the development of diabetic kidney disease. However, this study was a prospective one, in which patients were followed up for a median period of only 5.8 years.

Conclusion and recommendations:

1. The prevalence of microalbuminurea type-II diabetic patients at our diabetic clinic was 14.34%. The study is hospital based, therefore not representative of the entire area.
2. The frequency of microalbuminurea is higher in the male than in the female patients.

3. More patients with increasing duration of diabetes mellitus show microalbuminuria.
4. The most important implication of our study is that in these patients, which were found to have persistent microalbuminuria appropriate measures were instituted to prevent and postpone the progression of their kidney disease. These patients were advised to :-
(a) Modify their life style (such as cessation of cigarettes smoking, performance of regular exercise, weight loss if obese, predication of salt and protein in the diet),(b) To have tight glycemc control (a target HbAlc<7%),(c) These patients were prescribed ACE inhibitors.
5. Such measures as instituted above are very important and postpone the progression of their kidney disease to an overt and irreversible stage and to reduce the associated complications. This would be a very cost-effective way of managing their kidney disease.

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