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RESEARCH ARTICLE

A Prospective Observational Study on Microalbuminuria as Risk factor of Chronic Renal Failure in patients with Type 2 Diabetes

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ABSTRACT:

Objective:
Microalbuminuria was initially entrench predicator for renal failure and risk factor of cardiovascular diseases in type 2 diabetes mellitus patients as well as in general population. The main aim of the study was to determine the risk factor of chronic renal failure in type 2 diabetes mellitus patients using microalbumuria as a marker.

Methods:
One hundred patients with type 2diabets mellitus patients, who are admitted in department of genral medicine in tertiary care hospital. The patients were evaluated patients age, detection of diabetes, sex, duration and clinical and biochemical observations: Blood pressure(BP), Blood sugar levels, serum creatinie (SrC), blood urea nitrogen (BUN) and microalbumuria.

Results: In this study men population were found to be more percentage compared to female. The age group mean (50-70) patients was higher (22.5±8.26). Total no. of microalbuminuric in the study population was found to be 47.HbA1c were statistically significant. Duration of diabetic patients in microalbumuric patients is (15.6±8.621)

Conclusion: Microalbuminuria is an accurate predicator for Renal failure. Microalbumuria use of the screening test in those type 2 diabetes patients is to detect the early renal failure. Elderly patients with type 2 diabetes have the great risk of renal failure . It is possible to delay the progression of chronic renal failure by treatment of ACE inhibitors. In some research study suggest that early treatment with ACE inhibitors has proven to improve the renal progression

KEYWORDS: Microalbuminuria, hypertension, type2 diabetes.

INTRODUCTION:

Renal failure is the major cause of mortality and morbidity in patients with diabetes mellitus[1]. Albumuria is the best means of identifying the risk of End Stage Renal disease (ESRD). High blood pressure can damage blood vessels in kidneys by reducing their function. When the force of blood is high, blood vessels are stretched so blood flow more easily. Finally the stretching scars and weakness blood vessels throughout the body, including kidneys. If kidneys vessels damaged the function of kidneys are stopped.

Extra fluid in the blood vessels may then raise blood pressure (BP) even more, creating dangerous cycle.

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Renal failure is strongly linked with cardiac disease and presence of microalbumuria is a predicator of worse outcomes for both kidneys and heart patients.
Diabetes is a stage of persistent hyperglycemia due to absolute or relative deficiency of insulin.

Diabetes mellitus or carbohydrates intolerance is a group of syndrome characterized by hyperglycemia; altered metabolism of lipids, carbohydrates and proteins; and an increased risk of complications of vascular disease. The disorder is characterized by metabolic abnormalities and by long term complications involving retinopathy, nephropathy and neuropathy.

First clinical sign of renal dysfunction in patients with diabetes is generally microalbumuria (a sign of endothelial dysfunction that is no necessary confined to kidney), which develops in 2to 5% patients per year[2].
Proteinuria, more specifically albumuria, is the earliest predicator of diabetic nephropathy[6].

Microalbumuria is defined as a Urinary albumin to creatinine ratio. A ratio greater than 30-30mg/gm of creatinine considered as microalbumuria[3].

It is also defined as the range in between urinary albumin excretion 20-200µg/min or 30-300mg/24hrs. If excretion is lower is lower than 20µmg/min then subject is considered to be normoal bumuric. If it is higher than 200µmg clinically proven to proteinuria or macro albuminuric.

Diabetic nephropathy is characterized by progressive increase in the excretion of protein (albumin), an early continuing raise in systemic blood pressure, decrease in GFR, leading eventually to ESRD. It is difficult to identify in type2 diabetes subjects because onset of the diabetes is not usually well established. Symptoms may take 5to 12 years to appear after kidney damage. Late symptoms include tiredness, headache, itchy skin and leg swelling.

The KDQI guidelines define major treatment goals for all patients with Chronic renal failure[2]. These goals include slowing disease progression, detecting and treating complications and managing Cardio vascular disease.

The main aim of this study is to determine the risk of renal failure in type 2 diabetes patients using microalbumria as indicator.

MATERIALS AND METHODS:

A prospective observational study of 9months was carried out. The study site was conducted in the general medicine department in tertiary care hospital. Ethical clearance was obtained on

Sample size : 100 patients
Inclusion criteria:

- Patient of both sex above 18 years of age.
- Diabetic patients (type2)
- Hypertension patients
- Obese patients
- Hyper-lipidemics
- Smokers
- Alcoholics

Exclusion criteria:

- Chronically ill patients.
- Type1 diabetic patients.
- Patients below 18 years of age.
- Gestational diabetes

A regular ward round into study department was carried out.
Ethical clearance is obtained on 31/08/2016 and **REF : IEC/DOPI/2016/24**

DATA ANALYSIS:

The collected study data were analyzed by using MS office excel 2007 for using mean, percentage analysis and standard deviation.

RESULTS:

A total number of 100 patients included in the study based on inclusion and exclusion criteria.

Table 1: Gender distribution (n=100)

Gender	No. of patients	Percentage (%)
Male	57	57.0
Female	43	43.0

In this study male population was higher than female

Table 2: Age group (n=100)

Age group	No. of patients(n=100)
18-30	19
31-50	26
51-70	42
71-90	13

In age group (50-70) patients was higher (22.5±8.266)

Table 3: Distribution of patients in relation with Biochemical investigations:

Investigations	Normal	Low	High	Mean and SD
FBS (Fasting blood sugar)	-	68	32	(100±25.455)
PPBS (Post Prandial)	-	23	77	(50±38.1837)
Serum creatinine	49	18	33	(33.33±15.502)
BUN(blood urea nitrogen)	63	14	23	(33.3±26.0832)
Microalbuminuria(MA)	53	47	-	(50±4.242)

Normoalbumuric subjects was found to be 53 Microalbuminuric patients found to be 47

Table 4: HbA1c with urinary albumin excretion level.

HbA1c level	Normoal bumuric		Micro albumuric		Total	P value <0.073
>7%	31	47.6%	34	52.3%	65	
>8%	22	62.8%	13	37.1%	35	

The above table shows the maximum number of microalbumurics were seen in when the HbA1c levels in >7% which statically siginificant (p<0.03)

Table 5: Smoking, alcohol family history, with incidence of Microalbumin level

Personal history	No. of patients	MA(microalbumuria)	NA(normoalbumuria)
Smokers	21	12	9
Non smokers	59	22	37
Alcoholics	7	02	05
Family history	13	11	02
(Mean±SD)	(25±23.38)	(11.75±8.180)	(13.25±16.090)

Patient who are smokers were found increase in microalbumuria and to those patients with family history found to be have microalbumuria.

Table 6: Duration of Diabetes.

Duaration	No.of patients	Normoal bumuric	Micro albumuric
≥5 years	64	39	25
6-10 years	17	3	14
11-15 years	19	11	8
(Mean±SD)	(33.3±26.57)	(17.66±18.90)	(15.6±8.621)

In this study Patients who are more than and equal to 5 years found to be more microalbumuric.

Table7: Age distribution relation with albumin level.

AGE	Normoal bumuric	Micro albumuric	P Value
18-30	5	15	
31-50	23	13	
51-70	14	17	<0.77
71-90	11	02	
Total	53(13.25±7.5)	47(11.75±6.70)	

The maximum number of patients found in the age group at 51-70 years of age. Mean age detection was found (11.5±6.70). Statically significant with <0.77. There were no patients above 85year of age.

Table 8: Mean parameters in relation with Albumin.

Blood sugar	Microalbuminuria	Normoalbuminuria
FBS	41±3.53	9.5±6.3
PPBS	43±4.106	10±26.18
Serum creatinine	3±9	17±6.506
Blood urea nitrogen	4±12.5	18±7.5

Table 9: Co morbidity in microalbuminuric patients (n=47).

Co morbidities	No. of patients
Hypertension /type2 diabetes	38
Type2 diabetes	9

The patients with hypertension /type2 Diabetes (80.8%) were seen in microalbuminuric patients.

Table 10 Treatment given to the study patients.

DRUGS	No. of patients
ACEI (Anigotensin converting enzyme inhibitors)	56
Beta blockers	18
Calcium channel blockers	15
Metformin	38
Glibinclamide (Sulphonyl ureas)	23
Thiazolidinediones	14

Most of the commonly prescribed drugs in the microalbuminuric patients was found to be enalpril, metformin and glibenclamide.

DISCUSSION:

The present study carries out total of 100 patients of diabetes type 2 and hypertension patients. Patients blood pressure, serum creatinine, blood urea and HbA1c were estimated.

The treatment which were given for hypertension are noted in the microalbuminuric patients.
The findings were compared with study of other researchers.

The age of diabetic patients of study varied from 30-90 the mean age was in group of (50-70) (22±8.266) these findings were similar to the study of Dadhania et.al shows the mean age 57.5 years.

In the study conducted by vishwanathan et.al (1991) Giri(2000) Dadhania (2012) the percentage of hypertensive was found to be more in present study (81) in microalbuminuric patients.

High percentage of FBS> 120mg/dl (87.23%) had microalbuminuria significant correlation found to be compared to studies with Dadhania et.al 2012, Hashim et.al (2003) and Parah et.al (1960)

Patients having serum creatinine more than normal value in present study. Other studies have higher in Parikh et.al and Frakas et.al

CONCLUSION:

Microalbuminuria is an accurate predicator for Renal failure. Microalbumuria use of the screening test in those type 2 diabetes patients is to detect the early renal failure. Elderly patients with type 2 diabetes have the great risk of renal failure.

It is important and it is suggested to be screened to the patients who are all having the type 2 diabetes mellitus for 5 years.

It is possible to delay the progression of chronic renal failure by treatment of ACE inhibitors. In some research study suggest that early treatment with ACE inhibitors has proven to improve the renal progression.

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