Study of Micro Albuminuria and Other Parameters in NIDDM Individuals

Dr A.Navaneetha lakshmi[1], Dr B. Kiranmayi[2], Dr R.Tagore[3]

Department of Biochemistry, Siddhartha medical college, DR.N.T.R.U.H.S, Vijayawada

Abstract: *Diabetes mellitus is a group of metabolic disorder carbohydrate metabolism in which glucose is under used producing hyperglycemia. As the disease progresses patients are at increased risk of development of specific complications including retinopathy, leading to blindness, nephropathy leading to renal failure, neuropathy, and atherosclerosis. Present study planned to review the degree of association in NIDDM patients with Micro albuminuria & other parameters like T.cholesterol and Triglycerides, HDL cholesterol.*

Present Study includes 50 cases (Males and Females) With NIDDM and 15 metabolically healthy individuals (Both sexes). All the individuals included are between the age group of 30-70 yrs. All the cases were chosen from the O.P of Government General hospital, Vijayawada. In all these patients Micro albuminuria levels estimated with detailed history regarding complications of Diabetes noted. The incidence of dyslipidemia is noted in these individuals. There is increased incidence of micro albuminuria in smokers, alcoholics and Hypertensive individuals of NIDDM patients Majority of them having Dyslipidemia.

Aim: *Study of risk factors like Micro albuminuria, T.Cholesterol etc., in NIDDM individuals.*

Inclusion criteria: *1. Diabetes with complications like Hypertension, Neuropathy*
2. NIDDM Patients with age group of 30-70 yrs

Exclusion criteria: *UTI and Chronic infections like TB, Acute febrile illness, H/O CHF, Patients with Nephropathy*

Keywords: *Type II Diabetes mellitus, Micro albuminuria, T.cholesterol , Triglycerides, HDL Cholesterol*

I. Introduction

Diabetes mellitus is a syndrome characterized by chronic hyperglycemia and disturbances of carbohydrate, fat and protein metabolism associated with absolute or relative deficiencies in insulin secretion and/ or insulin action. Diabetes mellitus is a group of metabolic disorder of carbohydrate metabolism in which glucose is under used producing hyperglycemia. As the disease progresses patients are at increased risk of development of specific complications including retinopathy, leading to blindness, nephropathy leading to renal failure, neuropathy, and atherosclerosis. In 1987 the prevalence of diagnosed diabetes was 6.8 million. In 1995 prevalence of diabetes in adults was estimated to be 4% . In 2001 the CDC (CENTER FOR DISEASE CONTROL) which estimated the prevalence of Diabetes is7.9% equivalent to16.7million In 2005 the Diabetes affects 300 million adults which is greater than 75% of who are living in the developing countries. This large increasing in the diabetes has been observed globally. These statistics revealed that the diabetes being described as one of the main threats to human health in the 21 century. The measurement of blood glucose remains the most important laboratory test in diabetes. But its inherent drawback is that it may change very quickly. Estimation of micro albuminuria is valuable in monitoring diabetes mellitus, which helps to identify the increased risk of renal disease and cardiovascular mortality

The present study was planned to review the degree of association between micro albuminuria along with other parameters by a random survey of 50 patients of Type II Diabetes mellitus. The relationship between micro albuminuria with Hypertension, cardiovascular disease in these patients was also studied. Incidentally there were few smokers and alcoholics among them. So I also studied the incidence of micro albuminuria in them. Hypertension in diabetes increases incidence of retinopathy, increases incidence of renal disease and also increase progression of micro vascular disease.

II. Materials And Methods

Present Study includes 50 cases (Males and females) With NIDDM and 15 metabolically healthy individuals (Both sexes). All the individuals included are between the age group of 30-70 yrs. All the cases were chosen from the OP of GGH, Vijayawada. Detailed case history was taken from both the groups regarding their habits, family history of Diabetes, duration of Diabetes Complications like Hypertension, Neuropathy and Cardiovascular disease. .

The Following Bio-chemical parameters were included along with Micro albuminuria. Fasting blood glucose by GOD-POD method T.cholesterol by zlatkis, zak & boyles method S.tryglycerides by GPO-POD with ESPAS method HDL Cholesterol by CHOD/POD Phosphotungstate method

Microalbuminuria (Pyrrogallol Red Method)
Principle: When the Pyrogallol red molybdate complex binds to basic amino acid groups of protein molecules there is a shift in reagent absorbance. The increase in absorbance at 600 nm is directly proportional to protein concentration   in the sample.

Kit Contents:
Reagent   1   Dye reagent
Reagent   2   Standard

Reagent Composition:
1. Pyrogallol Red 0.05 %
2. Activators and stabilizers

Specimen:
Urine: Early morning   mid-stream urine collected.

III. Procedure
Pipetted into test tubes which are labeled   BLANK (B), STANDARD (S), And TEST   as follows:

	B	S	T
Dye reagent	1000μl	1000μl	1000μl
Standard	-	20μl	-
Sample	-	-	20μl
Water	20μl	-	-

Mixed well incubated for 3 min at 37°C.
Read Absorbance of Standard   (S), and Test (T) against Blank (B) at
600 nm within 20 minutes.

IV. Calculations

$$\text{Protein concentration   mg/dl} = \frac{\text{Absorbance of test} \times 100}{\text{Absorbance of Standard}}$$

For conversion to 1000ml of urine multiplied by 10.
Total Micro protein excreted / 24hrs = Protein concentration in mgs /dl × 10 × volume of urine in 24 hrs. in liters.
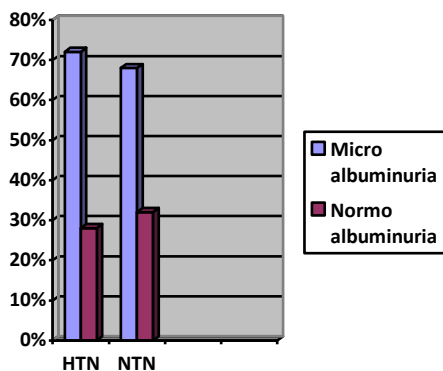
V. Results
In the study 50 cases are NIDDM and 15 are sex matched apparently healthy normal individuals

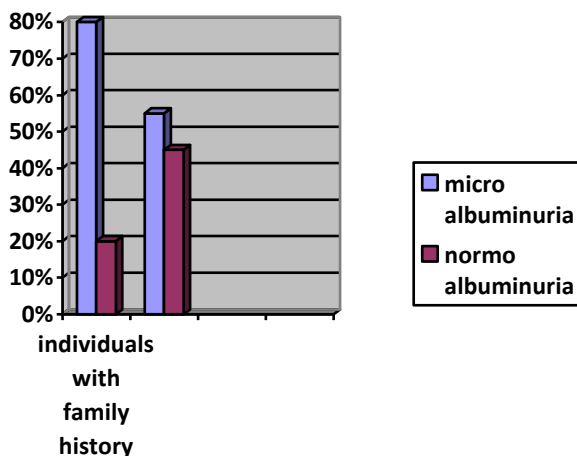**The Levels of Micro Albuminuria with Duration Of Diabetes**

	0-5yrs	6-10yrs	>11yrs
Micro albuminuria>30mgs/day	40%	86%	92%

Relationship between HTN & Micro Albuminuria

	Hypertensives	Normotensives
Micro albuminuria	72%	68%
Normo albuminuria	28%	32%

Relationship between Family History of DM & Micro Albuminuria

	Individuals with family history	Individuals without family history
Micro albuminuria	80%	55%
Normo albuminuria	20%	45%

Relationship between Smokers and Microalbuminuria
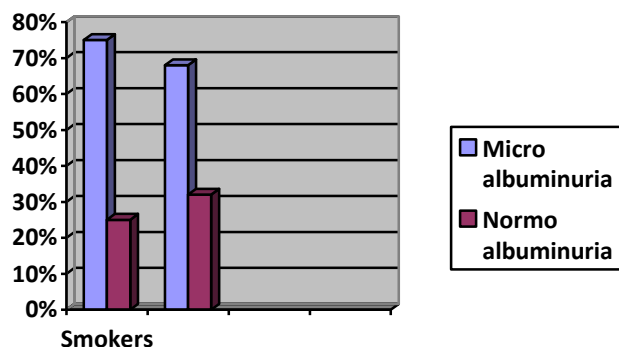
	Smokers	Non smokers
Micro albuminuria	75%	32%
Normo albuminuria	25%	68%

Relationship between Dyslipidemia& Micro Albuminuria
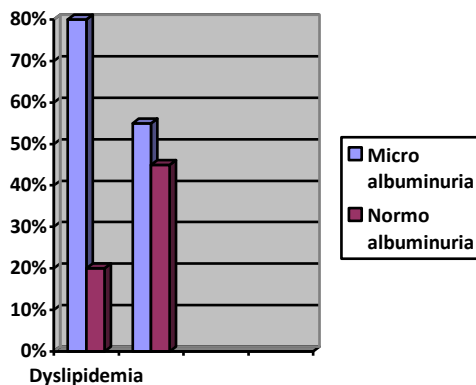
	Dyslipidemia	Normolipidemia
Micro albuminuria	80%	55%
Normo albuminuria	20%	45%

VI. Discussion

Progression of micro albuminuria to overt proteinuria is concerned; HTN is the most crucial factor in elderly NIDDM patients.

In Type II diabetics, the lower the average blood glucose level, the lower the rate of nephropathy, retinopathy and neuropathy. A high risk of kidney disease noticed in smokers. In our study there is an increased incidence of micro albuminuria in NIDDM smokers as compared to non-smokers.

In our present study there is positive correlation between increased levels of micro albuminuria with family history of diabetes. Microalbuminuria is a major predictor of future nephropathy in diabetes mellitus. It has been identified as predictor of micro vascular disease and mortality. Because of difficulty in dating the onset of NIDDM, screening for albuminuria should be performed at the time of diagnosis of these patients and annually thereafter. The development of Micro albuminuria in NIDDM patients is closely related to abnormality of lipid metabolism. In present study there is increased incidence of Micro albuminuria in smokers, hypertensive individuals of NIDDM patients.

Dyslipidemia (Triglycerides>150mg&HDL<35mg) in Type II DM is due to insulin resistance and obesity.
Hyper triglyceridemia should not be delayed in patients with DM as this increase the risk of CHD.   In present study out of 50 NIDDM patients 30 are dyslipidemia state.
Prolonged hyperglycemia is a significant factor in causing micro albuminuria. Albumin is subject to non-enzymatic glycation at increased rates and induces microvasculature in glomerulus that may lead to endothelial dysfunction and nephropathy.

VII Conclusion

Present study comprises a total of 65 subjects of which 50 were NIDDM patients and 15 metabolically healthy individuals
1. There is positive correlation between the severity of NIDDM as determined by Micro albuminuria.
2. Diabetic smokers have increased incidence of micro albuminuria when compared to non-smokers.
3. Higher percentage of micro albuminuria was observed in diabetics with Dyslipidemia
4. It is also seen that people with family history of diabetes have higher incidence of micro albuminuria than those without family history.

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