

Microalbuminuria And Serum Creatinine Levels In Diabetic And Non Diabetic Group—A Comparative Study.

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Abstract:

Back ground: Diabetes mellitus is a metabolic disorder characterized clinically by the presence of features such as polyuria, polydypsia and polyphagia. Patients with this problem are at increased risk for the development of specific complications including retinopathy, nephropathy, neuropathy and atherosclerosis. Microalbuminuria and serum creatinine has emerged as a important indicators to diagnose the high renal risk. The scope of this study is to observe levels of microalbuminuria and Serum Creatinine in the Diabetic and Non diabetic group.

Materials and Methods:

The comparative study was conducted between diabetes and non diabetic group with 30 participants in each group at Maharajah's Institute of Medical Sciences, Nellimarla during the period from April 2012 to March 2013. Estimation of serum creatinine was done by Jaffe's method and estimation of micro protein by Pyrogallol Red method.

Results

Diabetic group has more mean serum creatinine values i.e. 1.20 ± 0.78 mg/dL when compared to non diabetic group 0.94 ± 0.15 mg/dL which is not statistically significant. The mean urine micro albumin values in Diabetics was higher i.e. 76.26 ± 96.31 when compared to the Non Diabetic group 22.26 ± 4.40 and this difference is statistically significant.

Key words: Microalbuminuria, Serum creatinine, Diabetes, renal disease.

I. Introduction:

Diabetes mellitus is a metabolic disorder involving carbohydrate, lipid and protein metabolism resulting from defects in insulin secretion, insulin action or both¹ in which glucose is underutilized, producing hyperglycemia and is characterized clinically by the presence of features such as polyuria, polydypsia and polyphagia². As the disease progresses, patients are at increased risk for the development of specific complications including retinopathy, nephropathy, neuropathy and atherosclerosis³. Albumin is a protein, which is present in blood. The kidneys act as a filter for waste products in the blood but protein is not allowed to spill over into the urine unless the filter system is leaky⁴. The term microalbuminuria refers to urinary excretion of albumin, a major component of serum proteins, in micro quantities within the range of 30 –300 mg/24 hrs. Serum creatinine is another important indicator of renal function. Evidence from large prospective studies suggest that, diabetes mellitus is currently a leading cause of end-stage renal disease⁵. In the quest for new clinical tools that enable the identification of patients at high renal risk, Microalbuminuria and serum creatinine has emerged as a important indicators. The scope of this study is to observe levels of microalbuminuria and Serum Creatinine in the Diabetic and Non diabetic group.

II. Methodology:

Study setting:

The present study was carried out at Maharajah's Institute of Medical Sciences, Nellimarla

Study period: During the period from April 2012 to March 2013.

Selection of groups

Two groups of subjects were included in the study. In both the two groups, ages of the subjects were from 45 years to 65 years. 60cases were taken up for the study and divided into two groups, each comprising of 30cases. First group included the subjects who were healthy and non-diabetic and the second group included the subjects of Type 2 diabetes mellitus.

1. Non Diabetics

This group included completely healthy subjects (n=30) of either sex, who were not suffering from Type 2 diabetes mellitus and came as attendants of the patients admitted to Department of General Medicine . A detailed clinical examination was performed upon them with reference to age and gender. The individuals with conditions, likely to alter the albumin level in urine such as inflammatory conditions (sepsis, trauma, acute pancreatitis), pregnancy, and hypertension were excluded from the study.

2. Patients (type 2 Diabeted Milletes)

This group of subjects (n=30) was selected from persons of either sex of Type 2 DM. They were diagnosed as type 2 DM on the basis of history, clinical features and laboratory investigations (FBS & PPBS). Patients who have inflammatory conditions (sepsis, trauma, acute pancreatitis), pregnancy and hypertension are excluded.

Estimation of serum creatinine by Jaffe’s method⁶.

Estimation of micro protein by Pyrogallol Red method, End point^{7,8}.

III. Results:

In the present study the mean age of Diabetic was 52 ± 5 years and the mean age of Non Diabetics was 53± 5 years.

Table-1 : Sex Wise Distribution Of Two Groups

Group	Total Number	Male		Female	
		Number	Percentage	Number	Percentage
Non Diabetic	30	20	67%	10	33%
Diabetic	30	21	70%	09	30%

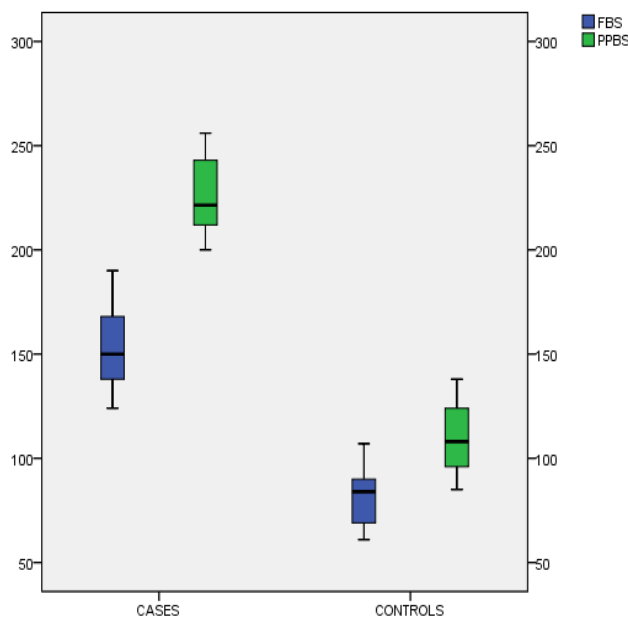


Figure 1: Comparison Of Fasting Blood Sugar And Post Prandial Blood Sugar In Two Groups

The mean values Fasting Blood Sugar of diabetic group is 152±19 and non diabetic group is 81±12 and the difference is found to be statistically significant with Z value 17.13 and p <0.001.

The mean values PPBS of diabetic group is 226.33±18.46 and non diabetic group is 110.43±15.21 and the difference is found to be statistically significant with Z value 26.53 and p <0.001.

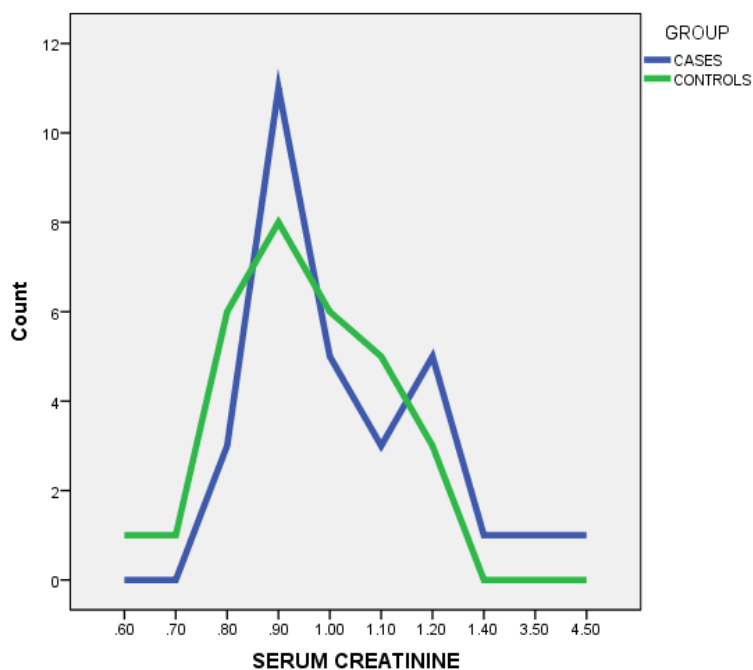


Figure 2: Serum Creatinine Levels In Both Groups

The proportion of people showing higher serum creatinine values are more in diabetic group than non diabetic group .

TABLE 2: Serum Creatinine levels in both groups

Group	Serum Creatinine mg/dL			
	Range	Mean ± SD	Z value	p value
Non Diabetic n=30	0.6 – 1.2	0.94±0.15	1.73	NS
Diabetic n=30	0.8 – 4.5	1.20±0.78		

Table 2, shows that the mean serum creatinine value in diabetic group was higher than non diabetic group but the difference was statistically not significant.

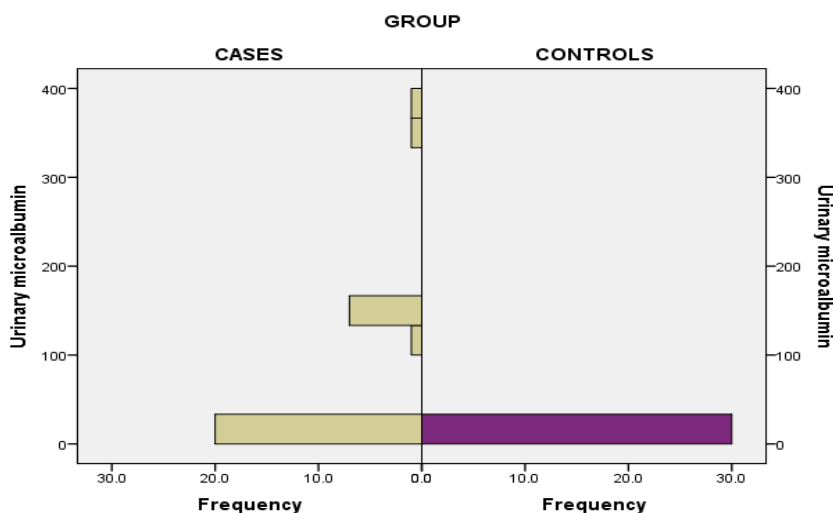


FIGURE 3: COMPARISON OF URINE MICRO ALBUMIN IN DIABETIC AND NON DIABETIC

The higher Urinary micro albumin values are found in Diabetics than Non Diabetics. The mean urine microalbumin value registered in Diabetics was higher when compared to the Non Diabetic group and this difference is statistically significant. (Table 3).

Table-3: Urine Micro albumin levels

Group	Microalbumin mg/day		Z value	p value
	Range	Mean ± SD		
Non Diabetic n=30	13 - 29	22.26±4.40	3.06	<0.01
Diabetic n=30	10 - 370	76.26±96.31		

Table-4: Frequency Distribution of subjects with microalbuminuria

Group	Normoalbuminuria (< 30mg/day)	Microalbuminuria (30-300mg/day)	Macroalbuminuria (>300mg/day)
Non Diabetic (n=30)	30(100%)	Nil	Nil
Diabetic (n=30)	20(67%)	8(27%)	2(6%)

In Non Diabetic groups all are normoalbuminuria, whereas in Diabetic microalbuminuria accounts for 27% and in macroalbuminuria accounted for 6%.(Table 4).

IV. Discussion:

Many studies showed that people with poor glycemic control have higher levels of microalbuminuria.

Nelson RG in his study on 2728 Pima Indians found that excessive albumin excretion was present in 8% of subjects with normal glucose tolerance, 15% of those with impaired glucose tolerance, and 47% of subjects with diabetes. The intermediate prevalence of abnormal albuminuria in those with impaired glucose tolerance suggests that hyperglycemia even at levels below those diagnostic of diabetes is associated with renal abnormalities in some subjects and that these abnormalities may precede the onset of diabetes. Abnormal albuminuria at levels not reliably detected by the usual dipstick methods was commonly observed in Pima Indians with diabetes, even those with diabetes of recent onset. Associations were found with age, duration of diabetes, level of glycemia, blood pressure, and treatment with insulin.⁹

Haffner SM measured lipids, lipoproteins, Lp(a), blood pressure, and albumin excretion in 234 subjects with NIDDM from the San Antonio Heart Study found that Seventy-two subjects had microalbuminuria (> or = 30 mg/dl).¹⁰

Wagle T.J in his comparative study of serum sugar and creatinine levels in male and female type 2 diabetic patients observed that blood glucose and serum creatinine concentrations are elevated in type 2 diabetic patients compared with non-diabetic male and female. Male diabetic patients were found to present significantly higher serum creatinine level than females.¹¹

Blessing O. Idonije showed that elevated blood sugar level in type 2 diabetes mellitus, plasma creatinine and urea concentration are significantly increased in diabetics compared with their levels in apparently healthy non-diabetics¹².

V. Conclusion:

The findings from our study showed that serum sugar ,creatinine ,albumin levels were higher in the diabetic patients compared with non-diabetic people. Albumin levels are significantly higher in diabetic group which shows that it can be used as a good tool for screening in preventing renal complications.

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