Micro-albuminuria in non-diabetic, non-hypertensive cardiovascular disease (CVD) patients: A case control study

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Abstract—*Cardiovascular disease (CVD) is a prominent health problem and micro-albunemia is one of the major causes of morbidity and mortality in these CVDs in developing countries. This case control study was designed to find out burden of micro-albuminuria in non-diabetic non-hypertensive CVD patients and its associating factors. In this study, 50 Non Diabetic Non Hypertensive CVD Patients were submitted to a complete clinical and laboratory evaluation. Patients with known micro-albuminuria, UTI and congestive heart failure were excluded. These cases were compared with matched controls. It was observed that 36% of non-diabetic, non-hypertensive CVD patients had microalbuminuric by Clinitek method. There was a positive association between dyslipidaemia and micro-albuminuria was also observed in this study. The microalbuminuric CVD patients (non-diabetic, non-hypertensive) had significantly elevated levels of serum cholesterol ($p<0.05$), triglycerides ($p<0.05$) and LDL ($p<0.05$) as compared to normoalbuminuric patients. It can be concluded from this study that the micro-albuminuria was present in more than one third of non-diabetic non-hypertensive CVD patients. Older age group, Body Mass Index (BMI) and lipid profile had significant relationship with the presence of micro-albuminuria.*

Keywords: Cardiovascular disease (CVD), Triglycerides, Micro-albuminuria.

I. INTRODUCTION

Cardiovascular disease (CVD) is fast emerging as a prominent health problem and is one of the major causes of morbidity and mortality in the developing countries. It accounts for approximately 12 million deaths annually and is the commonest cause of death globally.[1]

The risk factors very well associated with development of coronary heart disease includes age above 60 years, male sex, sedentary life style, diabetes, hypertension, hyper-cholesterolaemia, obesity, family history of cardiovascular disease, increase oxidative stress and certain dietary factors. Micro-albuminuria is also associated with an increased risk for cardiovascular morbidity and mortality.[2] Authors[2,3,4] have reported 6% to 10%. increased risk for cardiovascular morbidity and mortality with microalbuminia.

Micro-albuminuria is also an independent predictor of cardiovascular disease in both diabetic and non-diabetic patients and may be a stronger indicator for future cardiovascular events than hypertension or serum cholesterol.[5,6]

The present study is undertaken to find out the problem of micro-albuminuria in non-diabetic non-hypertensive CVD patients and its associating factors.

II. METHODOLOGY

This present study is a hospital based case control type of observational study conducted at S.M.S. Medical College and Hospital in Jaipur.

This study was conducted to find out the burden of micro-albuminuria in non-diabetic non-hypertensive CVD patients and to study its associating risk factors like age, sex, obesity, dyslipidaemia.

The subjects selected for study were grouped as follows viz :

1. Group I "Study group" i.e. Non Diabetic Non Hypertensive CVD Patients (N=50) (IHD and myocardial infarction patients).
2. Group I "Control group" (N=25): This group consisted of age, sex, and BMI matched healthy subjects. They were taken from medical or paramedical staff, attendants of patients and general public.

Cases with confirmed micro-albuminuria i.e. urinary excretion rate>300 mg/day or presence of other renal disease, urinary tract infection or recent intercurrent illness and patients having evidence of congestive heart failure were excluded. Written informed consent were taken from all subjects after getting approved this study protocol by the ethics committee of the institute.

Detailed physical examination was carried out with emphasis on blood pressure, height and weight. Blood samples were collected after at least twelve hours overnight fasting for complete blood counts, blood glucose (fasting and postprandial), glycated hemoglobin (HbA1c), blood urea, serum creatinine, lipid profile (including total cholesterol [TC], low-density lipoprotein cholesterol [LDL-C], high-density lipoprotein cholesterol [HDL-C] and triglycerides [TG]) of all participants. Complete urine examination, urinary albumin excretion rate / creatinine ratio in morning urine sample was also done along with ECG (standard 12 leads).

Data was analyzed with the help of SPSS trial version 16 statistical software using student 't' test and chi square test. For significance p value <0.05 was considered as significant.

III. RESULTS

Study and control groups were matched as per age (p=0.145), sex (p=0.986), height (p=0.652) and weight (p=0.122) only BMI was significantly more in study group than control group i.e. mean BMI 25.0±2.64 and 22.3±2.8 kg/m^2 respectively. (Table 1)

Table 1
Comparison of basic characteristics of study and control group

S. No.	Characteristics	Study Group (N=50)	Control Group (N=25)	P value	LS
1	Sex ratio (Male: Female)	34:16	18:07	0.986	NS
2	Age (Mean ± SD) in Years	50.3±7.1	47.5±9.0	0.145	NS
3	Weight (Mean ± SD) in Kg	60.7±.7.2	57.9±7.5	0.122	NS
4	Height (Mean ± SD) in Meters	1.54±0.17	1.56±0.20	0.652	NS
5	BMI (Mean ± SD) in kg/m^2	25.0±2.64	22.3±2.8	<0.05	S

All the individuals in control group were negative on micro albumin test whereas in study group 36% were positives on micro albumin test i.e. 36% of non-diabetic non-hypertensive C.V.D cases were having microalbunemia. male 38.24 31.25% (Table 2)

When this positivity of micro-albunemia was seen as per sex, it was found positive in 38.24% of males and 31.25% of female. This distribution of positivity of micro-albunemia as per sex was without significance difference (p>0.05). (Table 2)

Table 2
Comparison of basic Micro-albunemia status of study and control group

S. No.	Characteristics	Study Group (N=50)			Control Group (N=25)		
		Male	Female	Total	Male	Female	Total
1	**Micro albumin Test Negative**	21	11	32	18	07	25
2	**Micro Albumin Test Positive**	13	05	18	0	0	0

When level of serum cholesterol, serum triglycerides, serum LDL and serum HDL was compared in both study and control groups, serum cholesterol was found 163 .0±28.4 V/s 196.44±31.4), serum triglycerides 107.0±44.5 V/s 137.0±30.5, serum LDL 88.0±47.0 V/s 129.7±30., serum HDL 49.0±3.50 V/s 44.1±5.0, in study and control groups respectively. These lipid levels were found significantly more (P<0.05) in study group i.e. non-diabetic non-hypertensive C.V.D. patients compared to controls. (Table 3)

Table 3
Comparison of serum lipid levels of study and control group

S. No.	Serum Lipid level (mg/dl)	Study Group (N=50)	Control Group (N=25)	P value	LS
1	**Serum cholesterol (Mean ± SD)**	196.44±31.4	163.0±28.4	<0.05	S
2	**Serum Triglycerides (Mean ± SD)**	137.0±30.5	107.0±44.5	<0.05	S
3	**Serum LDL (Mean ± SD)**	129.7±30.0	88.0±47.0	<0.05	S
4	**Serum HDL (Mean ± SD)**	44.1±5.0	49.0±3.50	<0.05	S

When association of lipid profile with micro albunemia was discovered it was revealed that serum cholesterol, serum triglycerides and serum LDL in microalbuminurics were 216.0±33.6, 156.2±32.2 and 142.0±32.0 mg/dl which was significantly more in cases with micro-albunemia as where it was 188.6±27.7, 130.0±27, 117.0±28 and 45.0±5.30 respectively. There was no significant difference in serum HDL between two groups. (Table 4)

Table 4
Comparison of lipid profile of Normoalbuminuric and Microalbuninuric

S. No.	Serum Lipid level (mg/dl)	Normoalbuminuric (N=32)	Microalbuninuric (N=18)	P value	LS
1	**Serum cholesterol (Mean ± SD)**	188.6±27.7	216.0±33.6	<0.05	S
2	**Serum Triglycerides (Mean ± SD)**	130.0±27.0	156.2±32.2	<0.05	S
3	**Serum LDL (Mean ± SD)**	117.0±28.0	142.0±32.0	<0.05	S
4	**Serum HDL (Mean ± SD)**	45.0±5.30	43.2±4.7	>0.05	NS

IV. DISCUSSION

The present study was conducted on 25 age, sex, height and weight matched healthy controls and 50 non-diabetic non-hypertensive CVD patients. In this study microalbunia was found in 36% of non-diabetic non-hypertensive CVD cases.

In the present study the level of serum cholesterol (216.0±33.6 V/s 188.6±27.7), serum triglyceride (156.2+32.2 V/s 130.0+27.7 and serum LDL (142.0±32.0 V/s 117.0±28.0) were found higher in microlbuminuric than normoalbuminuric and this difference was statistically significant (P<0.05)

whereas the serum HDL (43.2±4.7 V/s 45.0±5.3) was lower in microalbuminuric than normoalbuminuric but the difference was not statistically significant (P>0.05).

Haffner SM et al (1990) demonstrated an association of micro-albuminuria with a number of cardiovascular risk factors, namely hypertension, hyperinsulinemia, hyper-triglyceridaemia and self reported myocardial infarction in non-diabetic subjects.[7]

The presence of micro-albuminuria predicts vascular disease in non diabetic population makes it more universal marker of early death from cardiovascular disease in human beings (Yudkin et al 1988), thus the onset of micro-albuminuria in diabetic and non diabetic patients signals atherogenic milieu.[8]

V. CONCLUSION

This study aimed to find out burden of micro-albuminuria in non-diabetics, non -hypertensive CVD acses and its associating factors. Microalbunemia was found in 36% of non-diabetic, non-hypertensive CVD patients detected to be microalbuminuric by Clinitek method.

There was a positive association was found between dyslipidaemia and micro-albuminuria. The microalbuminuric CVD patients (non-diabetic, non-hypertensive) had significantly elevated levels of serum cholesterol ($p<0.05$), triglycerides ($p<0.05$) and LDL ($p<0.05$) as compared to normoalbuminuric patients.

CONFLICT OF INTEREST

None declared till now.

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