TO STUDY THE RELATIONSHIP BETWEEN MICROALBUMINURIA AND ISCHAEMIC HEART DISEASE IN NON-DIABETIC SUBJECTS

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ABSTRACT

BACKGROUND

Microalbuminuria is known to be an independent risk factor for ischaemic heart disease in diabetics; however, its association in non-diabetics has not been addressed in detail.

Aims and Objectives- To determine an independent association between microalbuminuria and IHD in non-diabetic subjects.

MATERIALS AND METHODS

A descriptive study was conducted in the Department of Medicine, Government Medical College, Kota in the year 2017-18. 100 non-diabetic subjects with IHD attending the outpatient clinic or admitted as inpatients in the Medicine wards of MBS Hospital, Government Medical College, Kota who were diagnosed as first time reported case of IHD on the basis of inclusion criteria (Electrocardiographic changes and Cardiac Enzyme Estimation and the Rose questionnaire) and exclusion criteria were included.

Statistical Analysis- Data was compiled in MS Excel and checked for its completeness, correctness and then it was analysed.

RESULTS

In the present study, out of 100 cases, 72 cases were male and 28 cases were female. In our study, age group 56 - 65 years constituted 38% of the cases. Out of the 100 cases, 77 cases (77%) had microalbuminuria. Microalbuminuria is slightly higher in patients who presented with infarct pattern on ECG (78.2%) compared to ischaemia pattern (74.2%). Majority of patients had microalbuminuria level between 30 - 100 mg/day. 82.1% of females had microalbuminuria $\geq$ 30 mg/day compared to 75% of males in the present study. Hypertension was present in 58% of study subjects, in which females had higher percentage (Male-to-Females- 51.3% to 75%). Total 70 patients had history of smoking, out of which 77.1% (54 patients) had Microalbuminuria as compared to 75.8% non-smoker (22 patients) with Microalbuminuria. Mean Total Cholesterol, Mean Triglyceride and Mean LDL Cholesterol were higher in female in this study. Major dyslipidaemia was hypertriglyceridaemia in 34% of cases and low HDL in 31% of cases, which is typical Indian profile pattern.

CONCLUSION

Microalbuminuria is positively associated with Ischaemic Heart Disease in non-diabetic subjects and can be regarded as an important additional risk factor for Ischaemic Heart Disease.

KEY WORDS

Ischaemic Heart Disease, Microalbuminuria, Non-Diabetics.

HOW TO CITE THIS ARTICLE: Varshney MK, Meena CP, Verma GC, et al. To study the relationship between microalbuminuria and ischaemic heart disease in non-diabetic subjects. J. Evolution Med. Dent. Sci. 2018;7(21):2562-2565, DOI: 10.14260/jemds/2018/577

BACKGROUND

Ischaemic Heart Disease refers to disorders resulting from an imbalance between myocardial oxygen supply and demand.¹ Cardiovascular disease is the leading global cause of death accounting for more than 17.3 million deaths per year, a number that is expected to grow to more than 23.6 million by 2030. IHD causes more death and disability and incurs greater economic cost than any other illness in the developed world.²

'Financial or Other Competing Interest': None.

Submission 13-04-2018, Peer Review 06-05-2018,

Acceptance 12-05-2018, Published 21-05-2018.

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DOI: 10.14260/jemds/2018/577

Risk factors for ischaemic heart disease include age, male gender, a positive family history of premature atherosclerotic disease, smoking, diabetes mellitus, hypertension, abnormalities of serum lipids.³ To reduce the burden of cardiovascular disease, management strategies are increasingly focusing on preventive measures by early detection of marker of atherosclerosis that's why intense discussion is going on Lipoprotein (a),⁴ C-Reactive Protein,^{5,6} Fibrinogen,⁷ Homocysteine⁸ and Microalbuminuria.⁹

In this study, we specially focused on microalbuminuria which is gaining recognition as a simple marker of an atherogenic milieu.

Microalbuminuria is a well-accepted marker of micro and macrovascular damage in patients with diabetes mellitus. It gradually became increasingly evident that microalbuminuria is associated with an increased risk of cardiovascular disease even in non-diabetic patients.¹⁰

The aim of the study is to determine an independent association between microalbuminuria and IHD in non-diabetic subjects.

MATERIALS AND METHODS

This descriptive study was conducted in the Department of Medicine, Government Medical College, Kota in the year 2017 - 18. 100 non-diabetic subjects with Ischaemic Heart Disease attending the outpatient clinic or admitted as inpatients in the Medicine wards of MBS Hospital, Government Medical College, Kota who were diagnosed as first time reported case of Ischaemic Heart Disease.

Inclusion Criteria

The diagnosis of Ischaemic Heart Disease will be based on the 12-lead ECG, cardiac enzymes estimation and the Rose questionnaire.

Exclusion Criteria

1. Diabetic patients by ADA criteria.
2. Congestive cardiac failure at presentation.
3. Urine showing:
 - Macroalbuminuria (dipstick positive albuminuria).
 - RBCs > 50/ μ L.
 - Leucocytes > 75/ μ L.
4. Female patients with vaginal discharge.

Test for Microalbumin

24-hour urine albumin excretion estimation (Gold standard test for microalbuminuria) done by Esbach's Method.

RESULTS

100 patients fulfilling the criteria for study were included. The study was done over a period of one year. In the present study, out of 100 patients 72 were males and 28 were females.

Age	Sex		Total
	Male	Female	
26-35	6	0	6
36-45	12	0	12
46-55	19	7	26
56-65	22	17	39
66-75	13	4	17
Total	72	28	100

Table 1. Age and Sex Distribution

The mean age of study population was 55.09 ± 10.43 years. It was 53.90 ± 11.27 years for males and 59.48 ± 6.13 years for females. Subjects in the age group of 56 - 65 years constituted 38% of study group. Majority of females were aged above 55 years (75%).

Family history of IHD was present in 38% of the cases.

History of smoking was present in 70% of the study subjects ($p < 0.0001$). There was no female patient with history of smoking, whereas 97.2% of the male patients gave a history of smoking.

Hypertension was present in 58% of study subjects, in which Females had higher percentage (Male-to-Females 51.3% to 75%). The Mean Systolic BP was 143.33 ± 10.8 in males and 149.71 ± 11.19 in females. The Mean Diastolic BP was 88.16 ± 7.28 in males and 89.21 ± 8 in females.

The Mean FBS was 99.12 ± 7.71 and Mean PPBS was 137.7 ± 15.8 in this study group.

Lipid Parameter	Male (n= 72)	Female (n= 28)	Total
Total cholesterol (> 200 mg%)	19 (26.39%)	9 (32.14%)	28 (28%)
Triglyceride (> 150 mg%)	18 (25%)	16 (57.14%)	34 (34%)
HDL (M < 40 mg%, F < 50 mg%)	6 (8.3%)	25 (89.2%)	31 (31%)
LDL (> 150 mg%)	6 (8.3%)	2 (7.1%)	8 (8%)

Table 2. Abnormal Lipid Parameters

In this study the major dyslipidaemia was hypertriglyceridaemia in 34% of cases and low HDL in 31% of cases, which is typical Indian lipid profile pattern.

Of the whole study the mean total cholesterol was 192.43 ± 23.03 , mean triglyceride was 143.75 ± 37.14 , mean HDL cholesterol was 41.94 ± 3.80 and mean LDL cholesterol was 122.31 ± 21.06 .

Microalbuminuria	Male (n= 72)	Female (n= 28)
< 30	18	5
30-50	32	15
> 50	22	8

Table 3. Level of Microalbuminuria (mg/day) in both Sex and Risk of Developing IHD

In the present study, there was 54 males (75%) and 23 females (82.1%) with abnormal microalbuminuria. This shows that patients with microalbuminuria had higher risk of developing IHD ($p < 0.05$). More Female patients in the present study had microalbuminuria (82.1%) as compared to male patients (75%). The incidence of microalbuminuria increased with increasing age except in 66 - 75 age group in the present study.

Relation of Microalbuminuria with Ischaemia/ Infarct Pattern

77 patients (77%) of the study group had microalbuminuria, which was statistically significant ($p < 0.05$). There was a slight increase in number of patients who presented with infarct pattern on ECG (78.2%) compared to ischaemia pattern (74.2%) in patients having microalbuminuria.

Relationship between Microalbuminuria, Hypertension and Ischaemia/ Infarct Pattern

Out of 48 patients of hypertension, 38 patients had microalbuminuria i.e. 79.2% of hypertensive had abnormal microalbuminuria. 29 out of 42 normotensive patients had microalbuminuria, i.e. 69%.

Relationship between Smoking, Microalbuminuria and Ischaemia/ Infarct

There were 70 patients had history of smoking, out of which 77.4% smoker (54 patients) had microalbuminuria as compared to 75.8% non-smoker (22 patients) with microalbuminuria.

74.1% of smokers with microalbuminuria presented with myocardial infarction compared to 61% of non-smokers with microalbuminuria.

Relationship between Total Cholesterol, Microalbuminuria, Ischaemia/ Infarct

Out of patients with abnormal total cholesterol level 25 patients had microalbuminuria > 30 mg/day i.e. 86%; whereas out of 71 patients with normal cholesterol 52 patients had microalbuminuria i.e. 73%.

DISCUSSION

Ischaemic Heart Disease will become a major disease burden in India in upcoming years, therefore to target preventive strategies, risk stratification of the population should be effective. There are many reports emanating from the western literature about microalbuminuria as an independent risk factor for development of ischaemic heart disease.

Hitherto, microalbuminuria was considered as a marker of endothelial dysfunction in diabetes mellitus, but many studies have shown microalbuminuria is an effective marker of generalised vascular dysfunction even in non-diabetic population. This study was done to find out whether there is an association between IHD and Microalbuminuria in non-diabetic subjects.

In the present study, the diagnosis of IHD was made by ECG changes. De Bruyne MC et al¹¹ have shown that ECG can be used to determine the presence of IHD in a population at large.

This study had 72% male patients compared to 28% female patients. This is in accordance with the knowledge that males are more prone for ischaemic heart disease than females. The mean age of the study population was 55.09±10.43 years. It was 59.48±6.13 years for females. All the females were in the post-menopausal age group, which shows that sex hormones has a protective effect as far as cardiovascular risk is concerned.

In this study, history of smoking was present in 70% of the study subjects indicating that smoking is an important risk factor for IHD. Umesh N Khot et al had found a prevalence of 41.6% in males and 29.5% in females in their study for smoking as a risk factor.¹²

58% of patients in the present study had hypertension (51.3% in males and 75% in females). This is much higher than the prevalence found by Umesh N Khot et al¹² (38.4% in males and 55.9% in females), but shows a similar trend.

34% of the patients had hypertriglyceridaemia and 31% of patients had low HDL levels, which was similar to that obtained by Khot UN et al¹² (39.6% of females and 34.1% of males had abnormal lipid parameters).

The present study showed that 77% of the patients with ischaemic heart disease had microalbuminuria, which shows a positive association.

In the PREVENT Study,¹³ Microalbuminuria was detected in 32.7% of Non-Diabetic IHD Patients.

In the HOPE Study,¹⁴ Microalbuminuria was detected in 14.8% of Non-Diabetics at baseline. This study showed that 20.4% of patients with microalbuminuria had Myocardial Infarction, Stroke or Cardiovascular cause of death as compared to 13.8% of these without microalbuminuria.

In our study, Microalbuminuria was detected in 77% of patients. This was probably due to our study had a cohort of IHD patients, in whom microalbuminuria was detected in contrast to above studies which was done in general populations.

CONCLUSION

Since there is the strong and independent association of elevated urine microalbumin with Ischaemic Heart Disease in non-diabetic subjects, as demonstrated in our study, it can be regarded as an important additional risk factor for Ischaemic Heart Disease and can be utilised as a simple, inexpensive and practical independent marker of Ischaemic Heart Disease.

ACKNOWLEDGEMENTS

We wish to acknowledge the administration, laboratory technicians and staff of Government Medical College and Associated Group of Hospitals, Kota, Rajasthan.

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