

Estimation of the Prevalence of Microalbuminuria in Non-Diabetic Patients with Coronary Artery Disease (CAD)

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Abstract

Background: The new WHO report global atlas on cardiovascular disease prevention and control, September 19th, 2011, states that coronary artery disease (CAD) is the leading cause of death and disability in the world.

Materials and Methods: Sixty non-diabetics subjects of both sexes with CAD admitted as inpatients in Rajeev Gandhi Institute of Medical science Hospital and Research Institute in during the study period between May 2014 and July 2015 were included in the study.

Results: In this study, the prevalence of microalbuminuria among CAD patients without diabetes mellitus is 88.3% with high statistical significance in the age group of 30–60 years (40%), followed by more than 60 years (30%). 41–50 years (20%) and <40 years (10%). This suggests that CAD is more common after 50 years of age. The mean age is 55.13 ± 9.95 years.

Conclusion: In this study, majority of subjects were males (78.3%) and 21.7% were females. This observation was statistically significant. 66.7% of CAD subjects had a positive family history of CAD. This observation was statistically significant. 58.3% smoking history. There was a significant association between smoking and microalbuminuria among CAD subjects in the study.

Key words: Hypertension, Obesity, Smoking

INTRODUCTION

The new WHO report global atlas on cardiovascular disease (CVD) prevention and control, September 19th, 2011, states that coronary artery disease (CAD) is the leading cause of death and disability in the world.

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Microalbuminuria may be a marker of generalized vascular disease, with arterial endothelial dysfunction being involved in the pathogenesis of atherothrombotic vascular disease.

Studies have shown microalbuminuria that is positively associated with ischemic heart disease (IHD) in non-diabetic subjects and can be regarded as an important additional risk factor for IHD.

Microalbuminuria is an important cardiovascular and mortality risk factor, irrespective of diabetes or hypertension.

Smoking was associated with excessive urinary albumin excretion in hypertensive subjects.

Microalbuminuria seems to reflect a state of pathophysiologic vascular dysfunction that makes an individual susceptible to organ damage.^[1-9]

Aim of the Study

The aim of this study was as follows:

Access this article online	
 www.ijss-sn.com	Month of Submission : 10-2017
	Month of Peer Review : 11-2017
	Month of Acceptance : 11-2017
	Month of Publishing : 12-2017

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1. To estimate the prevalence of microalbuminuria in non-diabetic patients with CAD
2. To study the association between microalbuminuria and other risk factors for CAD.

Microalbuminuria

The urinary protein called albumin is increasingly recognized as the earliest sign of vascular damage in both the kidney and the heart.

Microalbuminuria abnormally high amounts of albumin in the urine is commonly thought of as an important risk factor for kidney disease. However, recently, studies have emerged highlighting microalbuminuria as an important, independent marker for endothelial dysfunction and CVD. Heightened awareness of microalbuminuria as an early prognostic indicator of CVD risk knowing when, how, and in whom to screen for it, and finally, owing the strategies to manage it are therefore essential prerequisites for cardiologists and other healthcare providers.

Microalbuminuria does not directly cause cardiovascular events; it serves as a marker for identifying those who may be at increased risk.

According to steno hypothesis, albuminuria might reflect a general vascular dysfunction and leakage of albumin and other plasma macromolecules such as low-density lipoproteins into the vessel wall that may lead to inflammatory responses and in turn start the atherosclerotic process.

Microalbuminuria and Hypertension

1. In 1974, Parving *et al.* reported the finding of elevated urine albumin excretion levels in insufficiently treated essential hypertensives, which correlated significantly with blood pressure levels and fell after blood control.
2. Prevalence of an elevated urine albumin excretion increases with age and with longer duration and a higher severity of hypertension.
3. Hypertensive target organ damage is more common in microalbuminuria patients. In summary, microalbuminuria is an independent predictor of cardiovascular morbidity and mortality in both men and women with essential hypertension.
4. There is a positive link between high blood pressure and microalbuminuria.
5. Timed urine collection over 4 h or overnight.

Inclusion Criteria

The following criteria were included in the study:

- CAD patients based on coronary angiogram.
- Both sexes.
- Non-diabetic patients.

MATERIALS AND METHODS

Design

This was a cross-sectional clinical study to estimate the prevalence of microalbuminuria in non-diabetic patients with CAD.

Study Period

The study period was from May 2014 to July 2015.

Sampling Procedure

The patients were given a container for a collection of urine over 24 h which was sent for the estimation of albumin level by immunoturbidimetry method. In-patients admitted and diagnosed to have CAD by Coronary angiogram were included in the study.

RESULTS

Albuminuria has been identified as a life-threatening and cardiovascular renal risk profile. This important diagnostic parameter can not only predict renal or concurrent renal and cardiovascular adverse events in high-risk patients.

Age Distribution

In this study, majority of subjects were in the age group of 51–60 years (40%), followed by >60 years (30%), 41–50 years (20%), and <40 years (10%). This suggests that CAD is more common after 50 years of age. There was a significant difference in proportions. The mean age is 55.13 ± 9.95 years.

Gender Distribution

In this study, majority of subjects were males (78.3%) and rest were females (21.7%).

Family History of CAD

In this study, 66.7% of CAD subjects had a family history of CAD. There was no significant association between family H/O CAD and microalbuminuria among CAD subjects in the study.

Smoking

In this study, 58.3% of subjects had a history of smoking, but there was no significant difference in proportions. There was a significant association between smoking and microalbuminuria among CAD subjects in the study.

Body Mass Index (BMI)

There was no significant association between BMI and microalbuminuria among CAD subjects in the study. Odds ratio was 1.19, i.e., CAD subjects with BMI >23 are at 1.19 times higher risk for microalbuminuria than subjects

with BMI <23, but the risk was not statistically significant. Similar results were observed by the above-mentioned studies.

In this study, there was a significant association between hypertension and microalbuminuria among CAD subjects in the study. 69.8% of hypertensive subjects and 30.2% of normotensive subjects had microalbuminuria.

Lipid Profile

In this study, there was no significant association between total cholesterol and microalbuminuria among CAD subjects in the study.

Microalbuminuria and CAD

Prevalence of microalbuminuria among CAD patients without diabetes was 88.3%. This observation was highly statistically significant ($P < 0.001$). Mean microalbumin levels was 56.9 ± 30.4 mg.

In Danish Hospital a study done by Jensen J. S, Feldt-Rasmussen concluded microalbuminuria as an independent risk factor for IHD among hypertensive individuals who are non-diabetic.

DISCUSSION

In this study, the prevalence of microalbuminuria among CAD patients without diabetes mellitus is 88.3% with high statistical significance. Mean urinary albumin excretion is 56.9 ± 30.4 mg/24 h.

- Analyses of the association between the risk factors of CAD and microalbuminuria showed that risk factors such as smoking and hypertension have a statistically significant association with microalbuminuria (odds ratio is 10.74 and 32.38, respectively).
- Whereas the other risk factors of CAD like age, high BMI and dyslipidemia did not have any significant statistical association.
- The studies done by Deckert *et al.*^[14] in large population using univariate and multivariate logistic regression analysis have shown that microalbuminuria is independently associated with increased cardiovascular risk factors and cardiovascular morbidity. Even in the present study, there is a strong association between microalbuminuria and CAD. However, microalbuminuria could not be established as an independent risk factor for

CAD since the study evaluated a lesser number of subjects.

- Microalbuminuria may therefore add value together with traditional risk indicators in diagnostic strategies.^[3,10-14]

CONCLUSION

This study recommends estimating urinary albumin excretion for 24 h to identify high-risk individuals for CAD and to add this laboratory workup as a tool for primary prevention of CAD.

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How to cite this article: Rao BS, Rao AG. Clinical Cross-sectional Study to identify the Prevalence of Asymptomatic Bacteriuria in Type II Diabetic Patients at Rajiv Gandhi Institute of Medical Sciences, Srikakulam. *Int J Sci Stud* 2017;5(9):135-137.

Source of Support: Nil, **Conflict of Interest:** None declared.