

Microalbuminuria As Predictor Of Severity Of Coronary Artery Disease In Non-Diabetic Patients:

F Aziz, S Penupolu, S Doddi, A Alok, S Pervaiz, S Kallu, D Mohapatra, M Benz

Citation

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Abstract

Background: Prospective studies confirm that microalbuminuria is predictive of cardiovascular diseases, independently of classical risk factors within groups of patients with diabetes or hypertension and in the general population. However, there is not enough data available relating angiographic severity of coronary artery disease (CAD) to microalbuminuria (MA). We examined coronary angiograms for extent of severe CAD (luminal narrowing >70%) in patients without Diabetes Mellitus (DM) and general population.

Patients and Methods: Our study consisted of 120 patients undergoing coronary angiography in Jersey City Medical Centre, NJ. (M/F 72/48, mean age 61 ± 11 yrs). MA was measured by calculating albumin-creatinine ratio in the urine sample of the patients. Age-gender distribution of coronary risk factors and MA was compared between patient with and without coronary artery disease.

Results: 76.6% (92) of patients had coronary artery disease and 23.3% (28) had no coronary lesion. MA was detected in 56.5% in patients with CAD and 14.2% in those without coronary artery lesion. The presence of 1 or 2 vessel CAD showed a linear increase between the groups with MA.

Conclusion: Thus, patients with MA have more severe angiographically detected coronary artery disease than those without MA, a relationship independent of other risk factors.

INTRODUCTION

The risk of cardiovascular diseases (CVD) in cohort studies is predicted by traditional risk factors including age, sex, smoking, diabetes mellitus, hypertension and dyslipidemia. However, these factors don't entirely explain the variation of CVD incidence and mortality in individuals and populations.¹ This fact has led to studies on non-traditional cardiovascular risk factors, microalbuminuria (MA) being one of the important risk factors. MA is independently associated with all cardiovascular causes of mortality and morbidity and also mortality in patients with Diabetes,^{2,3} hypertension^{4,5} and in the general population.⁶⁻¹⁰ In diabetic patients, MA is a predictive of nephropathy.¹¹ However, there is not much data available relating angiographic severity of coronary artery disease (CAD) to microalbuminuria (MA) in non-diabetic population. The purpose of this study is to investigate that whether urinary albumin excretion is a sign of atherosclerotic involvement of

coronary arteries in general population.

MATERIALS AND METHODS

In the present study, we investigated the relation between extent of atherosclerosis and MA by comparing the angiographic severity of coronary artery disease (CAD) in non-diabetic patients. The purpose of the study is to document the association of MA and severity of CAD in non-diabetic patients.

We studied 120 Patients (72 men and 48 women: mean age 61 ± 11 years) who underwent Coronary angiography in Jersey City Medical Center between August 2009 and February 2010. Collected data included well-recognized cardiovascular risk factors such as age, hypertension, hypercholesterolemia, DM, and smoking as well as MA and fasting glucose levels in all patients.

MA was measured by calculating albumin-creatinine ratio in the urine sample of the patients. Patients with urinary

albumin levels less than 30 mg/g of creatinine were defined as having normo-albuminuria, those with albumin levels > 300 mg/g were defined as having macro-albuminuria. The group in between them was taken as micro-albuminuric group.

CAD was defined significant if a diameter of stenosis was $\geq 70\%$ in ≥ 1 major coronary arteries. Diagnosis of DM was based on abnormal fasting blood glucose ≥ 126 mg/dl on more than two occasions or the use of hypoglycemic agent.

Patients who received medication for hypertension or those with systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg and not on concurrent antihypertensive therapy were classified as having hypertension.

Hypertension diabetic patients were defined as systolic ≥ 130 mmHg. Patients who had smoked within a year before entry to the study were deemed current smokers. Patients who used cholesterol-lowering medication or had a total serum cholesterol level ≥ 200 mg/dl were classified as having hypercholesterolemia.

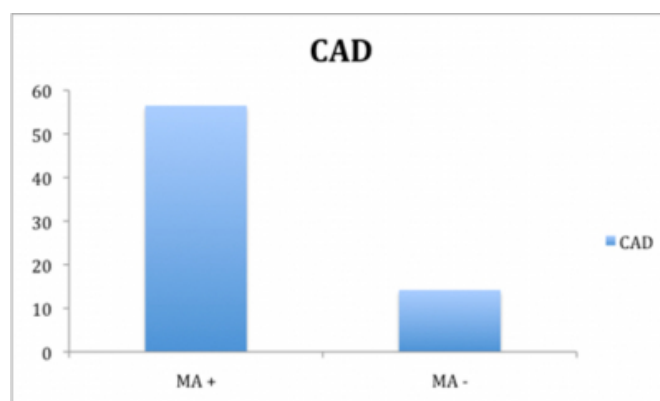
Statistical analysis was performed using the SPSS (version 13). Chi-square or tailed test was used to examine the baseline difference between proportions or means, and $P \leq 0.05$ was considered statistically significant. Because the prevalence of conventional CAD risk factors such as hypertension, hypercholesterolemia and smoking were not significantly different across groups, we did not perform multivariate analysis.

RESULTS

Out of all the patients 76.6 % (92) of patients had coronary artery disease and 23.3% (28) were found to have no coronary lesion. MA was detected in 56.5% in patients with CAD and 14.2% in those without coronary artery lesion. The presence of 1 or 2 vessel CAD showed a linear increase between the groups without MA.

Figure 1

Fig 1: CAD association with MA



We found that patients with MA had much greater atherosclerotic burden in the form of multi-vessel CAD than those without MA, especially in patients without diabetes. The mean age was similar between the two groups of patients. CAD occurred more frequently in males than females and in smokers than non-smokers. Also MA was high in the patients with CAD. Triple-vessel CAD was present in 8 of 12 patients (66.6%) with MA and in 4 of 12 patients without MA (33.3%). Double-vessel CAD was found in 36 of 48 patients (75%) in the group with MA and in 12 of 48 Patients (25%) without MA.

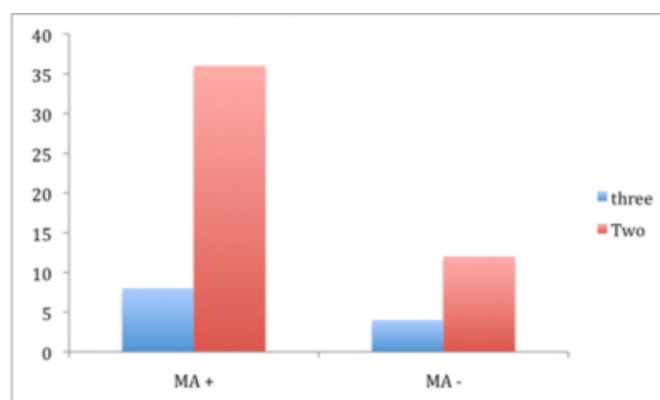
Figure 2

Table 1: Prevalence of Three & Two vessel CAD in different patient groups

No of Arteries Involved	MA +	MA-
Three	8 (66%)	4 (44%)
Two	36 (75%)	12 (25%)

Figure 3

Fig 2: prevalence of Three & Two Vessel CAD in Different patient groups



DISCUSSION

Despite extensive data linking MA to coronary atherosclerosis,^{5, 6,10,13,14} few studies have examined the correlation between angiographic severity of coronary artery diseases and MA. The aim of this study was to find whether MA is associated with more extensive coronary atherosclerosis in non-diabetic patients. We found that patients with MA had much greater atherosclerotic burden in the form of multi-vessel CAD compared to patients without MA especially in non-diabetics.

Many studies showed that a strong correlation between angiographic severity and MA exists in diabetics.¹⁵ The mechanism of accelerated atherosclerosis in MA is uncertain, but abnormal vasodilatation, endothelial dysfunction, inflammation, insulin resistance or abnormal coagulation may be involved.¹⁶⁻²⁰

Aggressive treatment of MA in CAD patients may have salutary effects. Some studies showed that decrease in baseline albuminuria, which was more pronounced with losartan than with atenolol, was associated with cardiovascular benefits.^{21, 22}

Another study was performed in 846 normotensive patients with normal serum cholesterol level and MA. They were randomly assigned to fosinopril or placebo and to pravastatin or placebo. At a follow-up of almost 4 years, Fosinopril was associated with a significant trend in lowering the rate of cardiovascular mortality and hospitalization.²³

We used spot albumin to creatinine ratio to detect microalbuminuria. Although a 24h urine collection is the gold standard for the detection of microalbuminuria, several studies have found that a urinary albumin to creatinine ratio is equally sensitive and specific.²⁷

CONCLUSION

This study showed significant correlation between MA and severity of CAD, so aggressive treatment of MA is highly recommended to prevent CAD in non-diabetic patients.

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Author Information

Fahad Aziz

Jersey City Medical Center/Mount Sinai School of Medicine

Sudheer Penupolu

Jersey City Medical Center/Mount Sinai School of Medicine

Sujatha Doddi

Jersey City Medical Center/Mount Sinai School of Medicine

Anshu Alok

Jersey City Medical Center/Mount Sinai School of Medicine

Saira Pervaiz

Jersey City Medical Center/Mount Sinai School of Medicine

Swapna Kallu

Jersey City Medical Center/Mount Sinai School of Medicine

Debesmita Mohapatra

Jersey City Medical Center/Mount Sinai School of Medicine

Michael Benz

Jersey City Medical Center/Mount Sinai School of Medicine