Relationship Between Microalbuminuria and Severity of Coronary Artery Disease in Non-Diabetic Patients

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Background: Prospective studies confirm that microalbuminuria is predictive, independently of classical risk factor of cardiovascular diseases and all causes of mortality within groups of patients with diabetes or hypertension and in the general population. However, there are few data relating angiographic severity of coronary artery disease (CAD) to microalbuninuria (MA). We examined coronary angiograms for extent of severe CAD (luminal narrowing 50%) in patients without Diabetes Mellitus (DM) and general population.

Patients and Methods: Our study consisted of 153 patients undergoing coronary angiography in Hazrat Fatemeh hospital in Iran. (M/F 80/73, mean age 57±11yrs). Urine albumin excretion was measured in 24.h urine samples by immune precipitation technique. Age-gender distribution of coronary risk factors and microalbuninuria was compared between patient with and without coronary artery disease.

Results: 70.5%(108) of patient had coronary artery disease and 29.4% (45) had no coronary lesion. Microalbuninuria was detected in 62.9% in patients with CAD and 8.8% in those without coronary artery lesion (P<0.001). The presence of 1 or 2 vessel CAD showed a linear increase between the groups without microalbuninuria.

Conclusion: Thus, patients with microalbuninuria have more severe angiographicaly detected coronary artery disease than those without microalbuninuria, a relationship independent of other risk factor.

Keywords: Coronary Artery Disease, Diabetes Mellitus, Microalbuminuria

Introduction

The risk of cardiovascular diseases (CVD) in cohort studies is predicted by traditional risk factors including age, gender, smoking, diabetes mellitus, hypertension and dyslipidemia. However, these do not entirely explain the variation in CVD incidence and mortality between individuals and among populations,[1] which has led to studies aimed at nontraditional cardiovascular risk factors. Presence and concentration of urinary albumin is one such factor. Microalbuminuria (MA) is independently associated with all causes of mortality and cardiovascular morbidity and mortality in patients with Diabetes,[2,3] hypertension [4,5] and in the general population.[6-10] In diabetic patients, it is predictive of nephropathy.[11] As the association between proteinuria and cardiovascular events is well described,[12] the purpose of this study was to investigate whether urinary albumin excretion was a sign of atherosclerotic involvement of coronary artery in general population.

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Patients and Methods

In this study, we investigated the relationship between the extent of atherosclerosis and MA by comparing the angiographic severity of coronary artery disease (CAD) in patient with MA. The purpose of the present study was to document the association between MA and severity of coronary disease. We studied 153 Patients (79men and74 women: mean age 57±11years) who underwent coronary angiography in the University of Mazandaran medical science hospitals between January 2007 and June 2007.we collected data on well-recognized cardiovascular risk factors such as age, hypertension, hypercholesterolemia, DM, and smoking. We also collected data on MA, fasting glucose levels in all patients. Microalbumin was measured by rate nephelomety using the Behring protein analyzer. Urine creatinine was determined by a Behring analyzer. Patients with albumin levels less than 30 mg/g of creatinine were defined as having normoalbuminuria, those with albumin levels >30-300 mg/g as having macroalbuminuria.CAD was defined significant if there was ≥50% diameter stenosis in≥1 major coronary artery. Diagnosis of DM was based on abnormal fasting blood glucose ≥126 mg/dl on more than 2 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.

Hypertensive diabetic patients were defined as systolic ≥ 130/80 mmHg. Patients who had smoked within the previous 1 year of entry into 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. We used a ratio of spot trinity albumin to creatinine to detect MA

A statistical analysis was performed using SPSS (version 13). Chi-square or tailed test was used to examine baseline difference between two proportions or means, and p ≤ 0.05 was considered statistically significant. Multivariate analysis was not performed because the prevalence of conventional CAD risk factors, such as hypertension, hypercholesterolemia, and smoking, were not statistically different across groups.

Results

The prevalence of different CAD risk factors (age, hypertension, and hypercholesterolemia) was also similar across group (Table 1). MA was more frequent in CAD patients (62.9% vs. 8.8%). Severity of CAD in different subgroups of patients is presented in Table 2. 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 patient

Table 1: Patients' demographics and prevalence of coronary artery disease risk factor.

Variables	CAD+	CAD-	P value
N	108	45	
Age (years mean±SD)	58 ± 11	58 ± 9.8	0.950
Sex (male/female)	62/46	18/27	0.053
Smokers	12 (11.1%)	2 (4.5%)	0.235
Hypertension	42 (38.8%)	16 (35.6%)	0.699
Hypercholesterolemia	38 (35.1%)	15 (33.3%)	0.826
MA	68 (62.9%)	4 (8.8%)	<0.001

CAD: coronary artery disease; MA: microalbuninuria

Table 2: Prevalence of three, two and one vessel CAD in different patient groups.

No. of coronary arteries narrowed	MA+	MA-	P value
Three	21	16	
Two	36	18	0.622
One	11	6	

CAD: coronary artery disease; MA: microalbuninuria

with CAD. Three-vessel CAD was presented in 21 of 37 patients (56.7%) in patients with MA, in 16 of 37 patients without MA (43.2%). Two vessel CAD was found in 36 of 54, patients (66.6%) in group with MA and in18 of 54 Patients (33.3%) without MA (P=0.622) (Table 2).

Discussion

Despite extensive data linking MA to coronary atherosclerosis[13-17] few studies have examined the correlation of angiographic severity of coronary artery disease with MA. In non-diabetic patients, the aim of our study was to demonstrate the MA in association with more extensive coronary atherosclerosis. Study in diabetic patients showed significant correlation between angiographic severity of CAD and MA.[18] The mechanism of accelerated atherosclerosis in regard to MA is uncertain. Abnormal vasodilatation, endothelial dysfunction, inflammation, insulin resistance or abnormal coagulation maybe involved.[19-23] It seems aggressive treatment of MA in CAD patients is benefit. Another study showed decrease in baseline al buminuria, which was more significant with lozartan than with atenolol, and associated with cardiovascular benefits.[24, 25] Another study was performed on 846 normotensive patients with normal serum cholesterol level and MA was randomly assigned to fosinopril or placebo and to pravastatin or placebo. In a follow-up of almost 4 years, fosinopril was associated with a significant trend toward a lower rate of cardiovascular mortality and hospitalization (26).Although a 24 h urine collection is the gold standard for detection of MA ,several studies have found a ratio of untimed urinary albumin to creatinin equally sensitive and specific (27). However this study showed nonsignificant correlation between MA and severity of CAD, but the relation of MA and CAD is still unknown, so the treatment of MA is also recommended.

Acknowledgements

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