

Correlation of Severity of Coronary Artery Disease with Urine Microalbumin in Indian subjects using Gensini score

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Abstract

Background: Microalbuminuria is one of the simple and independent risk factor for Coronary artery disease. The study was aimed to study the severity of Coronary artery disease with degree of Microalbuminuria using Gensini scoring. **Methodology:** Our study consisted of 233 subjects admitted for coronary angiography .All subjects were asked detailed medical history mainly concentrating on important risk factors like Diabetes, Hypertension and physical examination was thoroughly carried out; detection of urine Microalbumin and Coronary angiography was carried on. Gensini scoring was used to assess the severity of CAD. **Results:** Out of 233 subjects which were studied, 140 were diabetics (60.1%). 95% of Diabetics had abnormal Gensini score, which is statistically significant ($p=0.004<0.01$), 84% of Non diabetic subjects had abnormal Gensini score (suggests CAD), with odds ratio 3.6 (CI 1.4 to 9.3). Diabetics had a mean age of 60years and Non Diabetics is 58years in our study. There was good correlation between Microalbuminuria and Gensini score with $r=+0.510$ ($p=0.0001$) and also good correlation between Diabetes duration and Gensini score with $r=+0.626$ ($p=0.0001$). **Conclusion:** Severity of CAD as assessed by Gensini score was higher in patients with higher microalbuminuria.

Introduction

Although mortality from Coronary Artery Disease (CAD) has declined since the late 1960 and 1970's in most industrialised countries, CAD is still the leading cause of death [1]. To reduce the burden of cardiovascular disease (CVD), management strategies are increasingly focussing on preventive measures following early detection of markers of atherosclerosis. This article focuses on Microalbuminuria, which is gaining recognition as a simple marker of an atherogenic milieu. Microalbuminuria is a marker of endothelial dysfunction and vascular damage which could be a predictor for coronary artery atherosclerosis [2, 3] and early mortality in patients with DM type 2, independent of renal function [4]. Microalbuminuria seems to correlate with various cardiac abnormalities and disease including left ventricular (LV) dysfunction and hypertrophy, electrocardiographic abnormalities, and Ischemic heart disease IHD [5]. 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. The study was aimed at correlating the severity of CAD with urine microalbumin.

Subjects and Methods: The objectives of the study was explained to the subjects in their preferred language and they were approached individually also. Those subjects who were willing to participate in study only were included and they were well informed regarding the study and a written consent was taken from them. From the Institutional Ethics Committee of KMC (Kasturba Medical College), Mangalore (affiliated to Manipal University), India ethical (ethics committee) approval was taken prior to the commencement of study.

The study which was conducted was a cross-sectional study and it was carried out between December 2011 and December 2012, 233 subjects admitted to the department of cardiology, KMC Mangalore, for elective coronary angiography were enrolled in the study. A semi-structured proforma, was used to collect information regarding study variables like age, sex, presenting complaints, family and past history of angina or ischemic heart disease, duration of Diabetes, duration

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of HTN (hypertension), and subjects were divided into Diabetic & Non-Diabetics. KMC, Managlore was the place chosen for recruitment of all subjects. Urine Microalbumin was done in KMC hospital lab, Mangalore.

Urine spot sample was sent to NABL accredited K.M.C. Hospital lab, where quantitative estimation of urine albumin was done by an auto analyser.

On the basis of urine albumin excretion, patients were graded as: 0 – 20 mg/L: Normal and >20mg/L: Microalbuminuria (abnormal).

Coronary Angiogram: Coronary angiogram was performed in a well equipped catheterization lab by a well trained Cardiologist and all images were recorded digitally in a computer. Seldenger's technique was used to perform coronary angiogram. Gensini scoring system was used to assess the severity of coronary artery disease [6].

Gensini score	Degree of narrowing of lumen of coronary artery
Score 1	1- 25%
Score 2	26 – 50 %
Score 4	51 – 75%
Score 8	76 – 90%
Score 16	91 – 99%
Score 32	Completely occluded artery

Gensini score grades the lumen of the coronary artery narrowing and scores it with numerical values with the above mentioned method. The above score is then multiplied by a factor that represents the importance of the lesion's location in the coronary artery system. For the location scores, as below:

5 POINTS	LEFT MAIN Coronary artery lesion
2.5 POINTS	Proximal LAD or LCX
1.5 POINTS	Mid segment LAD and LCX
1 POINT	Distal segment of LAD and LCX, 1 ST Diagonal branch, First obtuse marginal branch, RCA, Posterior descending artery and Intermediate artery
0.5 POINT	2 ND Diagonal AND 2 ND Obtuse marginal branches

Statistical methods: Using Student 't' test numerical variables were compared between the study groups for independent samples. For comparing categorical data, Chi square (x2) test was performed. Correlation between various variables was done using Karl Pearson correlation. p values less than 0.05 was considered statistically significant

Results

233 subjects took part in the study, 58years was the mean age of the subjects with nearly 2/3rd of them were between 50 to 70 years, 168 male and 65 female were in the study. 140 were Diabetics out of 233 subjects.

And 118 (50.6%) subjects were Hypertensive's, family history of Diabetes was present in 177 (76%). 53.83 was the average Gensini score of our studied population. Gensini score of Zero (Normal Gensini score means no coronary artery disease), was found in around 21 subjects

105subjects (approximately 99%) had abnormal Gensini score with urine Microalbumin > 20 (suggests CAD) and 106 subjects (approximately 83%) had abnormal Gensini score with urine Microalbumin<20, which is shown in table 1. Since the odds ratio is 21 (confidence interval of 2.748 to 157.485), there is a strong probability of developing CAD in subjects with high urine Microalbumin levels and the above association is statistically significant (p=0.000).

We observed in our study that Urine Microalbumin had a Karl Pearson Coefficient Of, r=+0.510, which has strong positive correlation with Gensini score. DM duration had a r value of r= +0.626 indicating strong positive correlation with Gensini score.

Table 1: Comparison of Urine Microalbumin with Gensini score

Urine Microalbumin(microgram/min)	Gensini score No. of subjects(percentage)		TOTAL
	Abnormal	Normal	
>20	105(99%)	1(1%)	106
<20	106(83%)	21(17%)	127
Total	211(95%)	12(5%)	233(100%)

Age ($r=+0.161$) and HTN duration ($r=+0.161$) have positive correlation with Gensini score.

The correlation of urine Microalbumin with Gensini score is statistically significant so as Age and Diabetes duration.

Gensini score increases with increasing urine Microalbumin levels and DM duration that means Urine Microalbumin and Diabetes duration is directly proportional to severity of CAD and the association between them is strong.

Discussion

Numerous prospective studies were earlier showed Microalbuminuria as an independent and simple predictor of Coronary artery disease. In a prospective study that involved individuals who were aged 50 to 75yrs, Microalbuminuria was associated with an increased risk for cardiovascular death after adjustment for other risk factors [7]. In present study the degree of Microalbuminuria was accompanied with higher Gensini score which was statically significant ($P < 0.001$). Study of Deveci et al [8] Who found a positive correlation between Microalbuminuria and extent of CAD both in Diabetic and NonDiabetic subjects among 402 subjects he studied and concluded that Microalbuminuria is an independent predictor for the presence ($P < .001$) and severity of CAD ($P < .001$, $\beta = .563$). Also our result matches with the study by Sukhija et al [9] who concluded that Microalbuminuria is a independent predictor of severity of CAD both in Diabetic and Non diabetic subjects. The prognostic significance of Microalbuminuria for early mortality after acute myocardial infarction in clinic based patients has been demonstrated [10]. Investigators in the HOPE study made a similar observation in the general population [11]. This above findings clearly states that Microalbuminuria is a predictor and prognostic marker for CAD which matches with our study. The presence of Microalbuminuria also seems to predict all cause mortality in the general population [12, 13, 14, 15] this was initially shown in the prevention of renal and vascular end stage disease (PREVEND) study [12]. The study published by Defilippis et al [16]in 2010 who conducted the MESA study (multi ethnic study of atherosclerosis) also matches with our study. There was a positive correlation between severity of CAD and Microalbuminuria as shown by Guo Lixin et al which matches with our study [17].

Conclusion

Severity of CAD as assessed by Gensini score was higher in patients with higher Microalbuminuria. Microalbuminuria is an important predictor of coronary artery disease. We can consider it as a cheap and easily available tool to asses cardiac morbidity. This become more important in resource limited countries like India.

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