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Assessment of Coronary Artery Morphology in Diabetic Patients With And without Microalbuminuria

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Abstract: *Diabetes Mellitus is a major independent risk factor of Coronary artery disease. The increase in coronary artery disease in diabetes mellitus is due to accelerated atherosclerosis, that starts at an early age. The damage to coronaries is more in people with microalbuminuria than those with normoalbuminuria.*
Keywords: *coronary artery morphology, SYNTAX Score, Microalbuminuria*

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I. Introduction

Diabetes mellitus is a chronic metabolic disease present throughout the world leading to increased morbidity and mortality. Inspite of vast advances in diabetes management there is an increased prevalence of its complications. Cardiovascular disease is the major cause of increased mortality in diabetic patients. Many diabetic patients may not have other risk factors except diabetes which led to the search for additional risk markers for coronary artery disease in diabetics. Microalbuminuria is nowadays taken as risk factor for coronary artery disease in diabetics and nondiabetics. Microalbuminuria is a marker of endothelial and vascular damage. Among the elderly microalbuminuria leads to coronary artery disease most frequently than other established risk factors of CAD.

II. Aim Of The Study

To assess the coronary artery morphology in diabetic microalbuminuric patients with Ischemic heart disease.

III. Methods And Materials

This is a cross sectional prospective study done during the period January 2017 to August 2017. Consecutive diabetic patients having features suggestive of Ischemic heart disease attending the OPD of Government Tiruvannamalai Medical College were referred to various places of their choice where cardiac catheterization laboratory was available and coronary angiography was done. Patients who were not willing for angiography, elevated renal parameters, prior myocardial infarction, malignancy, urinary tract infection and presence of macroalbuminuria were excluded from the study. Clinical charcteristics of patients such as age, gender,body mass index, systolic and diastolic blood pressure, vital parameters, smoking status were recorded. Overnight or spot early morning urine samples were analysed for urine albumin creatinine ratio.blood samples were taken for analysis of sugar, lipid profile, serum creatinine. Statistical analysis was done with Microsoft Excel 2010 QI Mcros software. Data analysed in terms of average, standard deviation for quantitative variables. Comparison of groups were done with Chi square test. P Values less than 0.05 was taken to be statistically significant.

IV. Results

In this study 77 patients with Type2 diabetes mellitus suspected of Ischemic heart disease underwent coronary angiography during the study period. Of the 34 were females and 43 were males. Among the 77 patients 16 had microalbuminuria and others were normoalbuminuric.

Among the 16 microalbuminuric patients 12 were men and 4 were women.

Age	Normoalbuminuric patients	Microalbuminuric patients
41-50yrs	6	0
51-60yrs	27	6
61-70yrs	26	10
>70yrs	2	0

Among the normoalbuminuria group 30 of the 61 patients were hypertensive and among the microalbuminuric group 11 of the 16 were hypertensive patients.

Characteristics	Normoalbuminuria n=61	Microalbuminuria n=16	Std deviation	P value
Gender	Male 39; female 22	Male 12; female 4		
Age (avge)	59.4 yrs	60.4 yrs	0.707	<0.04
Systemic hypertension	30	11		
Inadequate glycemic control	27	8		
HDL	38.2mg/dl	36.12mg/dl		0.025
LDL	148mg/dl	157mg/dl		0.5
TGL	161mg/dl	165mg/dl		0.5
Smokers	30	8		
Normal coronary	6	0		
One vessel disease	12	0		
Two vessel disease	24	4		
Three vessel disase	19	12		0.05

8 patients with normoalbuminuria and 6 patients with microalbuminuria had diffuse disease with thin vessels not suitable for CABG. Syntax score is a scoring system used in the SYNTAX Study to assess the severity and complexity of coronary morphology. The more the score , the more is t he complexity and severity of the coronary lesion.

Syntax Score assessment of Severity

Score	Severity	Normoalbuminuria	Microalbuminuria
< 22	Less	10 (16%)	0
22-32	Intermediate	26 (42%)	4 (25%)
>32	Severe	19 (31%)	12 (75%)

Syntax score	Chi square	P value
22-32	3.38	0.05
>32	10.13	0.001

Among the smokers the Syntax score

	No. of smokers	Syntax score	Chi square	P value
Normoalbuminuria n=30	16	>32	5.96	0.01
Microalbuminuria N=7	7	>32	4.14	0.04

In this study , 5 patients with microalbuminuria and 4 patients with normoalbuminuria had thin vessels not suitable for CABG ; the difference was statistically significant – Chi square 5.16 ; P value 0.02.

V. Discussion

In this study the microalbuminuria was higher in male than in female which was significant. This finding correlated with the studies done by Guo et al (2) and Luo et al (3) and Amar farhang et al (1).

In this study , increased aging was associated with microalbuminuria and complex coronary artery morphology. This was consistent with the studies of El Sherif et al (4) and Guo et al were elderly were associated with severe coronary morphology. This study also showed the correlation of smoking to increased complexity and severe coronary morphology. This was in concordance with the studies of Gou et al , Nakaishi et al(2) but differed with that of Amir farhang study. Smoking leads to platelet dysfunction , alteration of antithrombotic and prothrombotic factors , alteration in the tissue factor pathway inhibitor leading to increased thrombogenic potential (7). Further there is decreased release of tPA which leads to decreased natural fibrinolysis.the oxidative stress of free radicals is important in the acceleration of atherosclerosis. The interaction of free radicals with nitrous oxide leads to decrease in nitrous oxide which further increases the proatherogencity and prothrombogenecity.

The severity of coronary morphology did not find relationship to HDL,LDL cholesterol levels, BMI, Systolic, Diastolic BP. This observation differed with the findings of the study of Guo et al but correlated with that of Amir Farhang. This could be due to smaller sample size, ethnicity, drugs. This study showed a statistical correlation between microalbuminuria and severe and complex coronary lesion. This correlated with the studies of Devici et al (6 , Sukhija et al (5), Sherif et al (4), Guo et al. This study also showed a statistically significant result of microalbuminuric patients having thin vessels not suitable for CABG.

VI. Conclusion

In type 2 Diabetes mellitus presence of microalbuminuria signifies a severe and complex form of coronary lesion morphology. Smokers with diabetes also showed a severe complex coronary lesions. Patients with microalbuminuria had more of thin vessels not suitable for coronary bypass graft surgery.

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