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Cardiology

KEY WORDS:

ANGIOGRAPHIC PROFILE OF CORONARY ARTERY DISEASE IN PATIENTS OF NON ST ELEVATION MI WITH PRE DIABETES: DOES THE CLOCK START TICKING BEFORE THE ONSET OF DIABETES?

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ABSTRACT

The prevalnce of coronary artery diease (CAD) has progressively increased during the latters half of the last century with an estimated adult prevalence of around 10% in urban setting and 3-4% in rural areas. Diabeties are prone to have a diffuse And severe atherosclerotic disease when matched for the sex and age . Natali showed that of the diabetics. Undergoing coronary angiography , a significant number (p<0.001) had triple,vessels disease and left main disease associated with double or triple vessels disease was significantly more in diabetis.

Multivessels disease was more common in the diabetes (62%) as compared to prediabetis (14%) and normal subjets 46% (p<0.05), while single vessels disease (SVD) was significantly . Prevent in the non-diabetics (64%)as compared to pre-diabetics (46%) and diabetics 38% (p<0.05) CAD was involved in 806% of diabetic patient asa compared to 70% of pre-diabetics and 60% of normal patient . Nine diabetics patient had left main disease as compared to two pre-diabetic patient. Type C lesions were signigicantly more common in diabetics and pre-diabetics as compared to normal subjects .

Mean syntaxs case was significantly highly in diabetics as compared to pre-diabetics and normal subjets. The difference was also significant between pre-diabetics and normal subjets.

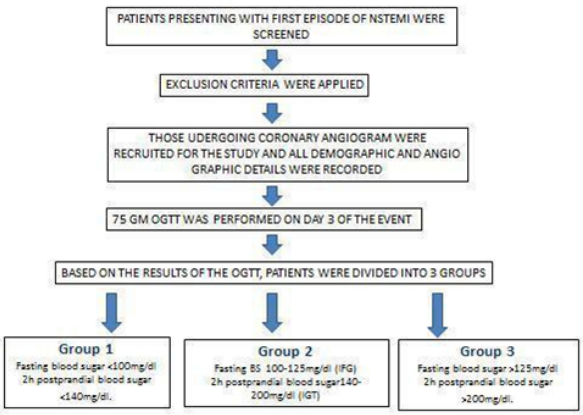
INTRODUCTION

The prevalence of coronary artery disease (CAD) has progressively increased in India during the latter half of the last century with an estimated adult prevalence of around 10% in urban settings and 3–4% in rural areas .[1-5] Driving this rampant growth of CAD is the ever increasing burden of diabetes in particular the type II diabetes.Diabetes who have been considered as a 'CAD equivalent' finds the maximum prevalence in India which has been unfortunately but truly termed as the 'diabetic capital of the world'.According to the World Health Organization report of 2011 a total of 41 million Indians were diabetics and the International Diabetic Federation estimates that this will further increase to 62.4 million by the year 2025.Similarly the number of pre diabetes patients are also ever increasing and this number is expected to reach upto 77 million by the year 2025.[6-9]These patients with intermediate hyperglycemia have been proposed to have an increased CHD risk compared with that of normoglycemic individuals Patients of diabetes have a different angiographic profile vis a visnormoglycemic patients.

Studies have shown that diabetics are prone to have a more diffuse and severe atherosclerotic disease when matched for the sex and age. Natali showed that of the diabetics undergoing coronary angiography, a significant number (p < 0.001) had triple vessel diseaseand left main disease associated with double or triple vessel disease was significantly more in diabetics .Not only the diabetics had more diffuse coronary atherosclerotic lesions, they also showed a higher mean number of lesions and average stenosis Other studies have also shown diabetes to be associated with higher rates of total oclusion and lower grades of collateralsThe same cannot be said about patients with pre diabetes as not many studies have analyzed the angiographic profile of patients with pre diabetes .It is also not clear whether the severity of coronary artery disease has a linear correlation with serum glucose levels even in the pre diabetes range. Even though it has been established that patients of pre diabetes are at ahigher cardiovascular risk as compared to age and sex matched normo-glycemic patients, the reason is not entirely clear.Worldwide, the number of people with prediabetesis estimated to be 314 million and is projected to be 418 million in 2025. As the prevalence of and progression to diabetes continues to increase, diabetes- related morbidity and mortality have emergedas major public health care issues [10]. Diabetes is expensive, associated with direct costs related to diabetes, diabetes complications, and general medical care and indirect costs are from illness, disability, and premature mortality [10]. Prediabetes raises short-term absolute risk of type 2 diabetes by 3–10-fold, with some populations exhibiting greater risk than others [11,12]. Early identification and treatment of persons with prediabetes have the potential to reduce or delay the progression to diabetes [13,14] and related CVD [15,16] and microvascular disease [17]. Despite the clear origins of diabetes-related complications early in the pre-diabetic state, few recommend dations have been made for the diagnosis and management of patients with prediabetes[18]. There are differences in opinion among health care professionals regarding the therapeutic approach to treating people with prediabetes. Many of these people already have diabetes-related complications, yet there are no defined goals and targets of treatment in prediabetes for the many risk factors, which include glucose levels, weight,blood pressure, and lipid levels [19]

PATIENTS AND METHOD

Patients admitted to coronary care unit of the Dept. of Cardiology, SMS Medical College, Jaipur with first episode of NSTEMI and undergoing coronary angiogram will be recruited for the study.Informed consent was taken from the patients. All patients were made to undergo a standard OGTT with 75 gm of glucose on day 3. Based on the results of the OGTT, patients were divided into three groups. Group 1 Patients with normal fasting blood sugar <100mg/dl and 2h postprandial blood sugar <140mg/dl Group 2Prediabetic patients with fasting blood sugar 100–125mg/dl (IFG)and/or 2h postprandial blood sugar 140– 199mg/dl (IGT)Group 3 Type II diabetes mellitus patients with fasting blood sugar 126mg/dl and 2h postprandial blood sugar 200mg/dl and/or are receiving oral hypoglycemic medications orinsulin Exclusion criteria:type 1diabetes\ mellitus, Patients> 70yearsold, Sepsis,PreviousMI



STATICAL ANALYSIS

Data will be collected and edited on a personal computer. This will then be statistically analyzed using SPSS statistical package version (22):

The following tests will be applied-Mean and standard deviation (SD).T-test for independent samples.Chi square test

(*X*2).ANOVA test.Pearson correlation coefficient (r).Multiple regression analysis.ANGIOGRAPHIC ANALYSIS was done on the basic of type of lesion A B C,number of vessels involved,LM disease and syntax score.

RESULT

Demographic Profile and Clinical Presentation

Demographic data is shown in Table 1. All patients were age and sex matched

Table 1.Showing age and gender distribution in the different study groups.

	Diabetics (50)	Prediabetics (50)	Non diabetics (50)	p-value
Age (years)	57 ± 7.5	55 ± 9	53 ± 10	>0.05
Females (%)	16 (32%)	14 (28%)	22 (44%)	>0.05
Males (%)	34 (68%)	36 (72%)	28 (56%)	>0.05

There was no significant difference between different groups regarding family history for ischemic heart disease, hypertension and dyslipidemia. There was significant difference regarding family history for diabetes mellitus with more affectation of diabetic patients group but there was no statistical difference between them for the other risk factors.

Diabetics (50) Prediabetics (50) Non diabetics (50) p-value

Smoking

-Never smoked	19 (38%)	15 (30%)	14 (27%)	
-Current smoker	23 (46%)	30 (60%)	26 (53%)	>0.05
HTN	37 (74%)	25 (50%)	19(37%)	>0.05
Dyslipidemia	34 (68%)	29 (57%)	22 (45%)	>0.05
Positive family history for ischemia	22 (45%)	19 (37%)	12 (23%)	>0.05
Positive family history for diabetes mellitus	20 (40%)	12 (23%)	10 (20%)	<0.05
Renal impairment	5 (10%)	3 (6%)	4 (7%)	>0.05

Table 3.Shows the mean ± standard deviation of systolic, diastolic blood pressure, heart rate, waist circumference, height, weight, body mass index, serum creatinine, and different echocardiographic findings in the different groups.

	Diabetics (50)	Prediabetics (50)	Non diabetics (50)	p-value
Systolic BP (mmHG)	135 ± 15	135 ± 20	123 ± 15	>0.05
Diastolic BP (mmHG)	86 ± 11	84 ± 11	80 ± 11	>0.05
HR bpm)	74 ± 8	76 ± 9	73 ± 6	>0.05
Waist circumference (cm)				>0.05
Males	106 ± 6	104 ± 6	105 ± 5	>0.05
Females	94 ± 5	93± 3	92± 4	>0.05
Height (cm)	166 ± 8	169 ± 7	170± 9	>0.05
Weight (kg)	85± 11	80± 12	85± 10	>0.05
BMI (kg/cm2)	30± 5	28± 4	29± 3	>0.05
Serum creatinine (mg/dl)	1.1 ± 0.4	1.05 ± 0.3	1.01 ± 0.3	>0.05
Ejection fraction (%)	53± 5	52± 8	51.5 ± 5	>0.05

Table 4.Showing distribution of lesions number, type of lesions, number of affected vessels in the different study groups.

	Diabetics (50)	Prediabetics (50)	Non diabetics (50)	p-value
LAD	43 (86%)	35 (70%)	30 (60%)	<0.05
Diagonal branch	3 (6%)	4 (7%)	9 (17%)	>0.05
LCX	21 (42%)	10(20%)	10 (20%)	>0.05
OM	10 (19%)	4 (7%)	4 (7%)	>0.05
RCA	25 (50%)	25 (50%)	25 (50%)	>0.05
PDA	3 (6%)	0 (0%)	0 (0%)	>0.05
PL	2 (4%)	2 (3%)	0 (0%)	>0.05
Type (A)	6 (12.5%)	5(10%)	5 (10%)	>0.05
Type (B)	32 (65%)	29 (57%)	37 (73%)	>0.05
Type (C)	21 (42%)	17 (33%)	9(17%)	<0.05
1 Vessel	19 (38%)	23 (46%)	32 (64%)	<0.05
2 Vessel	19 (38%)	14 (28%)	7 (14%)	<0.05
3 Vessel	12 (24%)	9 (18%)	5 (10%)	<0.05
LM	9 (18%)	2 (4%)	0	<0.05
SYNTAX	31.6	23.5	16.8	<0.05

There was no statistical difference between the groups regarding heart rate, waist circumference, height, weight and body mass index, systolic and diastolic blood pressureand the values of serum creatinine.

When the coronary angiography of the three groups were analyzed, it revealed significant differences groups regarding LAD lesions, type of lesions and number of affected vessels, involvement of Left main and Syntax score.

Multivessel disease (MVD) was more common in the diabetics(62%) as compared to pre-diabetics(54%) and normal subjects (46%, p <0.05) while single vessel disease (SVD) was significantly prevalent in the non-diabetics(64%) as compared to pre-diabetics(46%) and diabetics(38%p <0.05). LAD was involved in 86% of Diabetic patients as compared to 70% of pre-diabetics and 60% of normal patients. Nine diabetic patients had Left main disease as compared to two pre-diabetic patients.

Type C lesions were significantly more common in diabetics and pre-diabetics as compared to normal subjects. . Mean Syntax score was significantly higher in diabetics as compared to pre-diabetics and normal subjects. The difference was also significant between pre-diabetic and normal subjects.

Discussion

Diabetes mellitus is a well-recognized disease that is associated with a poor outcome after surgical or percutaneous revascularization in patients with coronary artery disease. The reasons for higher mortality rates, greater incidence of MI and the need for additional revascularization procedures in diabetics treated with percutaneous or surgical revascularization are multi factorial. It is well known that people with pre-diabetes have an increased risk of progression to type 2 diabetes mellitus as stated in ACE/AACE consensus statement, 2008. Survival analysis concluded that IGT was a risk factor for CVD. In 2010, Finnish

Study , IGT at baseline was an independent risk predictor of incident CVD and premature all-cause and cardiovascular mortality, a finding not confounded by the development of clinically diagnosed diabetes during follow-up.

Our study group who were matched for diagnosis, age, and sex were subjected to a demographic, echocardiographic, and angiographic analysis.

Most of the patients in our group were males constituting 67 % of the total while females constituted 33%. Demographic distribution of patients similar to our study had been observed in some studies on prematureCAD in Indians Single vessel disease was more common in the nondiabetic and pre-diabetic groups while MVD waspredominant in the diabetics. Similarresults were reported in many studies.,Natali et all showed that of the diabetics detected in his study group of 2253 patientsundergoing coronary angiography, a significant number had triple vessel disease, this significant differencewas also seen by Carlton27 and Cariou.28 In our study, significantleft main disease disease were significantly more in diabetics and prediabetics when compared to non-diabetics . Cariou28 had also more left main CAD though he didnot find at any time a statistical difference for LAD. Whenindividual vessels were compared, significant difference was seen only with respect to LAD involvement ($p < 0.01$) thoughsimilar study by Wu29 showed that a significant difference existedwith respect to left circumflex only. Type Clesion were more common in diabetics and prediabetics when compared to nondiabetics. Average Syntax score was also higher in diabetics and pre-diabetics when compared to non-diabetics.

Conclusion

Pre-diabetes, though not a disease entity by itself, is associated with risk for both macrovascular and increasingly, microvascular pathology. It is important to identify these conditions to prevent incident diabetes and to take measures to stop the vascular complications. Our study findings revealed that complications of diabetes may begin as early as patients are suffering impaired glucose homeostasis, which warrants further evaluation in larger studies, and may change our perception of the management including the way of revascularization

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