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Original Research Paper

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RELATION BETWEEN COMMON CAROTID ARTERY INTIMA MEDIA THICKNESS AND MICROALBUMINURIA IN T2 DM PATIENTS

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ABSTRACT

Aims and objectives : To Ascertain the relationship between the temporal occurance of microalbuminuria and common carotid artery-intima media thickness(CCA-IMT) in patientts with T2DM.

Material and methods : The study included patients suffering from T2DM (n=20) and age & sex matched control subjects (n=10). Patients and control subjects were examined for intima media thickness by B mode ultrasound. CCA-IMT was calculated 1 cm before bifurcation by the average of the left and the rights CCA-IMT. Microalbuminuria was measured in two overnight sterile urine samples.

Results : A statistically significant Correlation was observed between microalbuminuria and CCA- IMT in female patients with T2DM and in all patients with T2DM. A statistically significant Cor relation was observed between the duration of DM and microalbuminuria. Also A statistically significent Correlation observed between duration of DM and CCA-IMT.

Conclusion: There was a statistically significant Correlation was observed between presence of microalbuminuria and CCA-IMT in T2DM patients. In T2DM patientsmicroalbuminuria was associated with increased CCA-IMT.

KEYWORDS :

INTRODUCTION:

Microalbuminuriais associated with cardiovascular mortality in T2 DM patients long before CV events occur. Atherosclerosis has manifested as intimal thickening of the arterial beds and recent studies using ultrasound has been shown that carotid atherosclerosis expressed as increased intima-media thickness (IMT) correlates with coronary disease. Microalbuminuria is a sign of generalised vascular disease and increased vascular permeability, it could be related to carotid artery IMT. In one study by Willey K A et al, T2 DM patients with an increased albumin excretion rate had increased IMT of CCA, independent of BP levels.

The aim of this study was to investigate the relationship between microalbuminuria and CCA-IMT in T2DM patients and their statistical comparison with control non-diabetic subject.

MATERIAL AND METHODS:

It is a hospital based observational cum case control study, conduced at medical OPD & wards at SMS Hospital Jaipur over a period of 1 year. Cases were selected an age & sex matched Pts of T 2 DM between age of 30 to 70 year.Controls were selected as age and sex matched person without T2 DM.

Group A :- Subjects with T 2 DM n=20
Group B :- Age & Sex matched control group n=10.

Exclusion Criteria :-

1. Age :- < 30 or > 70 Year.
2. Patients of COPD, CVA, Hepaticand renal disease, Anemia, Pregnancy, Malignancies, Hypothyroidism, Fever.

IMT was measured by B mode ultrasound is Supine position and each Carotid wall and segment scanned independently from continuous angles to identify the thickest intima media site. Estimation of IMT was done 1 cm before the bifurcation of both CCA. For each subject IMT-CCA was calculated to be the average of the Left and right CCA-IMT.

Albuminuria :-

Persistent microalbuminuria(>20-200 g per minute) was estimated by ELISA in two of three consecutive sterile overnight urine samples.

DATA ANALYSIS :

The students unpaired "t" test was used to establish significance when the groups were compared with each other. Pearson product moment correlation coefficient (r) was used for variable performance between the study groups.

TABLE 1

AGE & SEX AND MEAN IMCROALBUMINURIA LEVELS OF STUDY SUBJECTS

Mean Microalbuminuria (mg /day)

Age Group (Years)	Control		NIDOM	
	Male	Female	Male	Female
31-40	0	0	135	0
41-50	0	20.7	210	130
51-60	23	24	250	277.5
61-70	0	0	165	120

Table 2

DURATION OF DIABETES, CCA-IMT AND MICROALBUMINURIA OF ALL NIDDM PATIENTS

Duration of Diabetes (Years)	N	Microabluminuria (mg/day)	CCA-IMT (mm)
0-1	5	154	0.80
1.1-2	1	200	0.98
2.1-3	2	190	0.90
3.1-4	6	220.8	1.05
4.1-5	4	225	0.95
5.1-6	1	250	0.85
6.1-7	1	280	0.89

Table 3

MICROALBUMINURIA AND MEAN CCA-IMT OF STUDY SUBJECTS

Microalbuminuria (mg/day)	Control		NIDDM	
	Male	Female	Male	Female
0-30	0.90 (n=5)	0.83 (n=5)	-	-
100-130	-	-	0.77 (n=1)	0.79 (n=2)

131-160	-	-	0.96 (n=2)	-
161-190	-	-	0.95 (n=1)	0.71 (n=1)
191-220	-	-	1.03 (n=2)	0.93 (n=1)
221-250	-	-	0.95 (n=2)	0.85 (n=1)
151-280	-	-	0.97 (n=2)	1.06 (n=2)

This study was undertaken to study diabetic patients for the occurrence of microalbuminuria and to document the accelerated changes of atherogenesis by measuring intima-media thickness of common carotid arteries. These two parameters have now been established as occurring in diabetic patients as its sequalae and represent the beginning of end organ damage. These early changes eventually contributes to end stage renal disease (ESRD), cerebral strokes, ischaemic heart disease and peripheral vascular disease. Estimating the presence of microalbuminuria and increase in CCA-lMT would help in undertaking measures to decelerate its progression to catastrophic events and also to predict prognosis of individual patients of T2DM.

Microalbuminuria represents microangiopathy and increase in CCA-IMT represents macroangiapathic complication of T2DM. Numerous studies have documented that these two parameters predict initiation ofcomplication occurrence of diabetes mellitus.

The correlation coefficient (r) between microalbuminuria and CCAIMT in our study revealed that in the female T2DM patient group and combined male and female T2DM patient group, the correlation was statistically significant ($p < 0.05$).

Its association with carotid plaque and/or stenosis might be of importance to detect early atherosclerotic lesions in the carotid arteries.

ln our study, on determining the significance of the correlation coefficient (r) between duration of diabetes and CCA-IMT, we found that there was a statistically significant positive correlation in female T2DM group and it was absent in the male T2DM and all cases of T2DM groups.

The vascular permeability which permits glomerular leakage of albunin may also be found in other vessels thereby permitting the escape of lipoproteins into the arterial walls. Microalbuminuria is a manifestation of widespread atherosclerosis. Microalbuminuria reflects disruption of the integrity of endothelial junctions and not only albumin but other components of circulating blood like lipoproteins etc. may also leak. When this leak occurs in the arterial intima and media, the atherogenic process is hastened and the consequences of atherogenesis are preponed. These sequence of events are well corroborated in our study where we observed that levels of microalbuminuria increase berore the increase in CCA-IMT.

CONCLUSIONS AND SUMMARY:

A statistically significant correlation was observed between microarbuminuria and CCA-IMT in female T2DM patient group and also in all T2DM patient group. No such correlation was observed in the male T2DM patient group.It is concluded from this study that increase in urinary albumin excretion occurs earlier in patients of T2DM than the increase in CCA-IMT. Both these variables are statistically significantly related to age and duration ofdiabetes.Microarbuminuria is a microangiopathic complication ofT2DM and represents a manifestation of widespreadatherosclerosis. Preventive measures have a definite rolein reducing microatbuminuria and decelerating the progressof macroangiopath iccom plica tions of T2DM.

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