

Original article:

Study of influence of the duration of NIDDM on CCA-IMT

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Abstract:

Introduction: The unprecedented increase in diabetes and cardiovascular disease (CVD) prevalence is evident from the report of WHO which shows that India tops the world with the largest number of subjects. All these data suggest that the epidemic of type 2 DM and CAD has already assumed alarming proportions and urgent measures are needed to stem it. With this view present work was planned to study of influence of the duration of NIDDM on CCA-IMT.

Materials and Methods : From the diabetics who underwent coronary angiography in our institution, 20 patients having CAD and 20 patients having normal coronaries were selected. Each patient was subjected for carotid dopper to measure CCA-IMT during the same hospital stay. The sample size was estimated with the help of expert.

Observations & results : There is highly significant difference in mean IMT between type II DM and non-diabetics.

Conclusion: Present study shows greater the duration of NIDDM, greater the IMT in NIDDM.

Introduction:

The unprecedented increase in diabetes and cardiovascular disease (CVD) prevalence is evident from the report of WHO which shows that India tops the world with the largest number of subjects.

¹According to recent WHO reports presently India has 32 million i.e. a rise by 250 % by the year 2035. Type 2 DM represents more than 90 % of the diabetic population. There is evidence from Indian data as well that coronary artery disease (CAD) is more common in diabetic subject. ² Studies conducted in south India by Mohan et al and Ramchandran et al in Chennai showed a prevalence of diabetic varying from 12-16%. In a study done at MV Diabetes Centre, Madras the prevalence of CAD was assessed in a large cohort of 6597 NIDDM patients. Overall 17.8% of patients have CAD. Its prevalence was not significantly different in males and females.³

The Chennai Urban Population Study (CUPS) reported that overall CAD prevalence was 11%. 12% of this population was diabetic. Among these 21.4% had CAD, more than the double that of non-diabetics. ⁴ All these data suggest that the epidemic of type 2 DM and CAD has already assumed alarming proportions and urgent measures are needed to stem it. With this view present work was planned to study of influence of the duration of NIDDM on CCA-IMT.

Materials and Methods

Study design

From the diabetics who underwent coronary angiography in our institution, 20 patients having CAD and 20 patients having normal coronaries were selected. Each patient was subjected for carotid dopper to measure CCA-IMT during the same

hospital stay. The sample size was estimated with the help of expert.

Similarly, from the non-diabetics who underwent coronary angiography, 20 patients having CAD and 20 patients having normal coronaries were selected. Each patient was subjected for carotid doppler during the same hospital stay.

Criteria for inclusion :

Patients in the age group of 45-65 yrs. Irrespective of sex, duration of DM, lipid profile, normotensive or hypertensive.

CAD (Coronary Artery Diseases) is defined as more than 50% stenosis in one or more arteries on angiography.

CCA (Common Carotid Artery) is defined as the 1 cm segment proximal to the dilatation of the carotid bulb.

IMT (Intima-Media Thickness)

The intimal plus medial thickness was measured as the distance from the leading edge of the first echogenic line to the second echogenic line. The first line represents the lumen intimal interface and the second line is produced by the collagen-containing upper layer of the intimal adventitia.

Measurement of common carotid artery IMT

Positions of the patient – Patient in supine position with pillow between the shoulder blades were kept to achieve extension of the neck. Tilting and rotating the head away from the side being examined enhanced neck exposure.

Site – The Common carotid artery was defined as the 1 cm segment proximal to the dilatation of the carotid bulb.

For each patient three measurements for intima-media thickness (as defined above) on both sides on the anterior, lateral and Posterolateral projection of far wall readings were obtained. The mean of the six readings was used as the representative value for each subject. The mean IMT values on the left side were found to be higher as compared to the mean IMT value on the right side in the same patient. All the scanning was done by a single trained ultrasonologist who was unaware of the clinical status of the study subjects. Plaque is defined as an echogenic structure, having an IMT of more than 50% greater than that of surrounding sites and encroaching into the vessel lumen.

Morphologically plaque classified as

- a. Predominantly echo lucent plaque with a thin echogenic cap.
- b. Substantially echo lucent with small areas of echogenicity.
- c. Predominantly echogenic with small areas of echogenicity.
- d. Uniformly echogenic

I & II – Seen in symptomatic patients > 70% stenosis.

III & IV – Benign plaques common in old people.

Criteria for exclusion

- 1) Age < 45 yrs and > 65 yrs.
- 2) IDDM
- 3) Pregnant women
- 4) Patients on OCPs & long term steroids.
- 5) Renal / Liver disease.

Diabetic patients were also studied for CCA-IMT in relation to duration of NIDDM. According to duration of diabetes patients divided into 2 groups.

Groups	Duration of NIDDM
Groups I	< 5yrs.
Groups II	>5yrs.

CCA-IMT assessed in each group.

The angiographic profile (i.e. the pattern of coronary affection) correlated with CCA-IMT in both diabetics and non diabetics.

Observations & results

Table I Mean IMT in NIDDM and Non diabetics.

IMT (mm)	NIDDM	Non-diabetics
Observed value (Min-Max)	0.71-1.30	0.58-0.78
Mean	0.862	0.671
SD	0.146	0.057

Test – unpaired ‘t’ test

t = 7.66

p < 0.001

Result – highly significant

Comment – There is highly significant difference in mean IMT between type II DM and non-diabetics.

Table II

Co-relation of age on IMT in Type II DM

Age group	No.	Mean IMT	SD
<55 yrs	23	0.794	0.078
>55yrs	17	0.954	0.168

Test unpaired ‘t’ test

‘t’ value = 4.0

P < 0.001

Result – highly significant

Comment – Statistically significant influence of age is seen on mean IMT in type II DM. Significance increases with increasing age.

Discussion:

Atherosclerosis is a disease manifesting at older age groups but starts as a fatty streaks on the media of vessels in its earliest form, at younger age groups. As the age advances, atherosclerosis increases along with rise in IMT. Diabetes is an atherogenic state leading to early increase in IMT. Influence of age on IMT was observed by Yamasaki et al, Kawamari et al, Mohan et al.^{5,6,7} Influence of age is also seen in non-diabetic group & it reached statistically significant after the age of 55yrs. A parallel observation with the present study was also observed by Mohan et al among diabetics & controls.

Statistical significance was observed after the age of 50 yrs by Mohan et al in CUP study.⁸

In favor of present study, Geroulakos et al and Kanters et al observed influence of age of IMT in diabetics as compared to controls.⁹

This table shows greater the duration of NIDDM, greater the IMT in NIDDM. Patients having duration of NIDDM <5 yrs. Have mean IMT of 0.818 + 0.123. Patients of diabetes duration > 5yrs. Have mean IMT of 0.935 + 0.157.

Sudhir Bhandari, D.S. Mathur et al. (SMS Medical College Hospital Jaipur), they divided DM into three groups according to duration of DM.

Group I	<5yrs
Group II	5-10yrs
Group III	>10yrs

In their study, they have shown the following analysis

Groups	CCA-IMT (mm)
Control	0.76+0.03
Groups I	0.88+0.02
Groups II	0.92+0.25
Groups III	1.08+0.28

Cardiac risk in type 2 diabetes mellitus can be evaluated by measuring CCA-IMT which is well correlated with coronary angiographic findings. Hence, CCA-IMT should be a regular tool of investigation in cardio-diabetology. Long standing diabetes has an adverse influence on mean IMT values in present study. [Table V]. Patients with DM more than 5 years had mean IMT 0.935+0.157 as compared to mean IMT of 0.818+0.123 in less than 5 years.

These findings were confirmed by the previous studies by Yamasaki et al, Mohan et-al, Kawamori et-al and Hiromichi Taniwaki MD et-al, found

duration of diabetes as an independent atherosclerotic risk factor in diabetes against age matched controls.^{10,11,12} Longer duration of diabetes was even associated with higher incidence of CAD due to longer duration of uncontrolled diabetic status associated with higher mean IMT values. [Table VII]. This was also observed by Ramchandran et al that the higher IMT in long standing NIDDM had a higher chance of CAD.¹³

Conclusion:

Present study shows greater the duration of NIDDM, greater the IMT in NIDDM.

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