Original article:

Evaluation of common carotid artery intima media thickness as an ideal, non-invasive marker for Coronary artery diseases in type II Diabetes Mellitus

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Abstract:

Introduction: The twin epidemics of diabetes mellitus and heart disease are a major threat to the well being as well as the economic development of India. With this view present work was planned to evaluate common carotid artery intimamedia thickness as an ideal, non-invasive marker for Coronary artery diseases in type II Diabetes Mellitus.

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 confirmed with the help of expert from PSM department.

Observations & results: This table also shows that the four above mentioned study groups do not have statistically significant difference in confounding factors like Age, Sex, and Smokers etc. Diabetics were found to have significantly higher mean IMT, BMI, WHR. Significant derangement of Lipid Profile in the form of high LDL & low HDL was also found in the diabetics than controls.

Conclusion: NIDDM Patients have highly significantly increased mean IMT as compared to the age and sex matched controls. Statistically signigicant influence on IMT of age is particularly found above the age of 55 yrs in NIDDM as well as non-diabetics i.e. aging has a definite adverse effect on CCA-IMT.

Keywords: diabetes mellitus , carotid intima thickness

Introduction:

The twin epidemics of diabetes mellitus and heart disease are a major threat to the well being as well as the economic development of India.[1]The unprecedented increase in diabetes and cardiovasular disease (CVD) prevalence is evident from the report of WHO which shows that India tops the world with the largest number of subjects. Early identification of atherosclerotic injury before the emergence of devastating disease is still far from satisfactory. Hence, several investigators have been looking for markers of ongoing atherosclerosis have been looking for markers of ongoing atherosclerotic coronary artery disease are not present.[2] Hence there is a new area of investigation in medicine called cardio-diabetology.[3] With this view present work was planned to evaluate common carotid artery intimamedia thickness as an ideal, non-invasive marker for Coronary artery diseases in type II Diabetes Mellitus.

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 confirmed with the help of expert from PSM department.

Similarly, from the non-diabetics who underwent coronary angioraphy, 20 patients having CAD and 20 patients having normal coronaries were selected. Each patient was subjected for carotied dopper 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.

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.

Observations & results

Table I A : Clinical, biochemical and carotid Doppler characteristics of the four study groups.

	DM+CAD	DM-CAD	CAD-DM	No DM NO CAD
No	20	20	20	20
Sex (M/F)	14/6	15/5	14/6	16/4
Age(yrs)	54.0+4.7	52.7+3.7	54.2+3.7	54.8+3.4
BMI	24.6+1.6	23.4+2.0	24.6+1.3	23.8+1.2
WHR	0.883+0.046	0.827+0.038	0.846+0.023	0.813+0.051
DM duration	5.22+2.75	4.45+2.45	--	--
BSL(F)	145+50	138+52	--	--
BSL(PP)	165+65	160+55	--	--
HTN	6	5	5	2
S.Chol	222.7+17.9	206.7+15.1	196.6+14.3	192.3+14.4
S.TG	234.9+38.6	242.3+47.9	202.4+20.6	225.0+15.4
HDL	27.2+3.8	33.1+2.8	34.3+4.0	40.7+3.8
LDL	147.4+14.6	126.4+8.1	124.0+14.4	106.6+14.5
IMT	0.948+0.159	0.776+0.055	0.712+0.042	0.631+0.036
Smoking	6	6	7	8

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Table I B : Clinical, biochemical and carotid doppler characteristics in NIDDM and non Diabetic groups.

	NIDDM	Non DM	P Value	't' Value
Age	53.3+4.2	54.5+3.5	1.33	NS
BMI	24.0+1.8	24.2+1.3	0.55	NS
WHR	0.85+0.05	0.83+0.04	2.43	P<0.05
Sex	Male 29 Female 11	30 10	X^2= 0.065	NS
HTN	Yes 11 No 29	7 33	X^2= 1.14	NS
Smoker	Yes 12 No 28	15 25	X^2= 0.503	NS
S.Chol	214.7+18.2	194.4+14.3	**	5.51
S.TG	238.6+43.0	213.7+21.2	*	3.27
S.LDL	136.9+15.7	115.3+16.7	**	5.93
S.HDL	30.1+4.5	37.5+5.0	**	6.88

*= Significant

**= Highly Signigicant

Discussion

Table 1 suggests the summary of the whole study, which shows the distribution of various important clinical, biochemical & Doppler parameters around the mean in for study groups.

Four study groups are :-

Group A - DM + CAD

Group B - DM – CAD

Group C - CAD – DM

Group D - No CAD & No DM

This table also shows that the four above mentioned study groups do not have statistically significant difference in confounding factors like Age, Sex, and Smokers etc. Diabetics were found to have significantly higher mean IMT, BMI, WHR. Significant derangement of Lipid Profile in the form of high LDL & low HDL was also found in the diabetics than controls.

Sudhir Bhandari, G.N. Saxena et al found al parallel association.[4] Mohan et al also found a similar association in his CUPS 15 study in the South Indian Population.[5] Higher mean IMT values were observed as compared to present study in NIDDM by

1. Yamasaki et al
2. Kanters et al
3. Mohan et al [6,7,8]

Insignificant variations observed in different studies conducted at different geographical locations can be explanined on the basis of different ethnic groups, group sizes, individual variation, and variation in the instrumental settings, & last but not least is the observer errors. The measurement of IMT can be

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justifiably used as an atherosclerostic marker in DM. Carotid Artery Atherosclerosis in type II DM and non diabetic subjects with & without symptomatic coronary artery disease.

(The Insulin Resistance Atherosclerosis Study). AMJ Cardiol (2000);85:1395-1400.[9]

Conclusion:

NIDDM Patients have highly significantly increased mean IMT as compared to the age and sex matched controls. Statistically signigicant influence on IMT of age is particularly found above the age of 55 yrs in NIDDM as well as non-diabetics i.e. aging has a definite adverse effect on CCA-IMT.

References:

1. Pignoli P, Tremoli E, Poli A et-al. Intimal plus medial thickness of the arterial wall, a direct measurement with ultrasound imaging Circulation, (1986),74.1399-1406.
2. Crouse, III, J.R.Goldbourt, U., Evans, G., Pinsky, J.,Sharret, A.R., Sorlie, W., Heiss G for the ARIC inivestigators; Arterial enlargement in the Atheroxclerosis Risk in Communities (ARIC) cohort. Stroke (1994)25, 1354-59.
3. Kamul, WB McGee DL. Diabetes and cardiovascular disease. The Framingham Study. JAMA (1979), 241, 2035-2038.
4. Wei Ming. Haffner Steven M, Gaskill Sharon P, Stetrn ichael P Effects of diabetes and level of glycemia in all cause and cardiovascular mortality. Diabetes Catre, (1998):21,1167-1172.
5. Fuller JH, Shiplely MJ, Rose G, Jarett RJ, Keen M: Mortality from coronary heart disease and stroke in relation to degree of glycemia : The Whitehall Study. Br Med J (1983), 287,867-870,
6. Steven M. Haffner, MD, Ralph D' Agostina JH, PHD, Mohammed F, Saad MD, Daniel H, O'Leary, MD, Peter J. Savage, MD, Matrian Rewers, MD, Carotid artery atherosclerosis in type II DM and non diabetic subjects with & without symptomatic coronary artery disease (The Insulin Resistance Atherosclerosis Study). AMJ Cardiol (2000);85:1395-1400.
7. Yamasaki, Y. Kawamori R. Matsushima H et at Atherosclerosis in carotid artery of young. IDDM patients monitored by ultrasound high resolution B-mode imaging. Diabetes (1994);43:634-639.
8. Kanters SDJM, Algra A Banga JD (1997) Carotid intima media thickness in hyperlipidemic type I & II diabetic patients. Diabetes Care (1997);20,276-280
9. Kawamori R, Yamasaki Y, Mastsushima H et al (1992) Prevalence of carotid atherosclerosis in diabetic patients. Diabetes Care (1997) 15:1290-1294.

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