

Original Article: Correlation of Carotid Intima-Media Thickness with the Severity of Coronary Artery Disease.



Medical Science

KEYWORDS : Carotid intimal thickness, coronary artery disease, colour Doppler.

M. GUPTA	(MD) department of medicine G M C Bhopal(m.p)
V.K. SHARMA	(MD) department of medicine G M C Bhopal(m.p)
N. RAO	(MD) department of medicine G M C Bhopal(m.p)

ABSTRACT

To study intima media thickness in patient with coronary artery disease and its correlation with severity of the disease (CAD).METHODS: It was a case control study. Patients with diagnosis of Myocardial infarction or Unstable/ stable Angina, admitted for coronary angiography, were taken as cases. Patients without any angiographic abnormality of coronary arteries were designated as control subjects. No. of cases-were 102 and No. of controls-35.RESULTS:In the case group, 88 patients had IMT greater than 0.8mm while in control group, only 5 patients had more than 0.8mm. IMT was significantly increased in patients who had acute coronary syndrome. CONCLUSION :Study shows that carotid IMT is marker of atherosclerosis, which is strongly associated with traditional risk factors. It can be used as a surrogate marker in prediction of coronary events.

Introduction

Coronary artery disease (CAD) is a complex atherosclerotic disease and that compromises blood supply to the heart .Based on data from the Framingham Heart Study, the lifetime risk of developing symptomatic coronary artery disease after age 40 is 49% for men and 32% for women¹. Ischemic Heart Disease is now the leading cause of death worldwide. The atherosclerosis is a generalized inflammatory process, simultaneous affection of various arterial beds is seen. An early sign is hypertrophy of the arterial wall. Measurement of intima-media thickness [IMT] in carotid arteries has been proved as a surrogate marker for atherosclerosis⁷. IMT of the carotid arteries is influenced by the same risk factors as of coronary artery disease. The demonstration of a correlation between intima-media thickness and cardiovascular events in clinical events in clinical studies have led to accepting 2D ultrasound as a valid technique in measuring atherosclerosis. This technique is non-invasive, cost-effective, simple, safe and reproducible.

The rate of change of intimal medial thickness with age in previous studies has been calculated to be 0.01mm/year in the general population and 0.03-0.06mm/year in patients with coronary artery disease². The present study is undertaken in order to correlate the role of intimal medial thickness in patients with coronary artery disease.

MATERIAL & METHODS

In a case control study done in Department of Medicine, Gandhi Medical College, Bhopal.No. of cases selected were 102 and control cases were 35. Consent and ethical clearance was done for all participants. Each patient was subjected to a detailed history and clinical examination. History of hypertension, diabetes mellitus, chronic kidney disease, dyslipidemia were noted.

INCLUSION CRITERION

All patients presenting with acute coronary syndrome or patients admitted for coronary angiography.

EXCLUSION CRITERION

Patients with carotid artery stenosis already confirmed by Doppler or angiography. Patients on long term oral hypolipidemic drugs. One hundred and two(102) patients with acute coronary syndrome were studied based on the history, electrocardiography changes and estimation of cardiac markers if indicated.

carotid artery Doppler

Ultrasonographic scanning of the carotid arteries was performed in the supine position with the neck extended, using a high frequency; imaging probe(7.5-12.0megahertz) with Logic alpha ultrasound, at a depth of 2 cm, as the carotid vessels are relatively superficial. The carotid vessels were followed from the clavicular head cephalad to their bifurcation and 3-4 cm of

the proximal internal and external carotid arteries were studied. The intima medial thickness was measured at different points on both sides in the far wall of carotid arteries. Maximum carotid intima medial thickness was taken into consideration. Plaques were not included in calculating IMT, but their presence was noted. Intima medial thickness values more than 0.8mm were considered significant for correlating the association between intima medial thickness and coronary artery disease. Plaque was defined as localized thickening>1.2mm that does not involve whole common carotid artery or bulb [IND J Rad Imag 1998]. STATISTICS ANALYSIS:The statistical analyses were performed with the SPSS statistical software package. Data were presented as mean+SD.Clinical parameters in patients with and without coronary artery disease were compared by univariate analysis using student's t test for continuous variables and Chi-square test for categorical variables. The variables that were significantly different between coronary artery disease and non- coronary artery disease patients in multiple univariate analysis were subjected to multivariate analysis using a step-wise logistic regression. For all analysis, a p value less than 0.05 was considered significant.

Results

In the case group, 88 patients had intima medial thickness greater than 0.8mm while in control group, only 5 patients had more than 0.8mm. intima medial thickness was significantly increased in patients who had acute coronary syndrome(Table 1). The Yates corrected chi square test: 45.03 The Risk ratio in the study was (95% CI): 0.14 and Odds ratio were (95% CI): 0.02 and p value was; 0.000001 i.e., p value<0.01 which is statistically significant in study. Mean IMT was significantly increased in the cases than the controls and the difference was statistically significant(table 2).

DISCUSSION

In the present study, intima medial thickness in patients with significant coronary stenosis (>50%) was studied and compared with controls, who have normal coronaries or less than 50% stenosis. Out of the 102 cases, 88 patients had intima medial thickness >0.8mm which was taken as significant intima medial thickness based on previous studies. Among 35 controls, only 5 had intima medial thickness >0.8mm and 30 had intima medial thickness <0.8mm. On applying Chi-square test, the odds ratio (95% CI) is 0.02 and Risk ratio (95% CI) is 0.14 and p value is highly significant (p <0.001). This means that intima medial thickness was significantly increased in patients who had acute coronary syndrome and had significant coronary stenosis. The mean intima medial thickness in cases was 0.85 + 0.12mm and in controls was 0.65 + 0.08mm. The difference was statistically significant (p<0.001). Rosa et al³ showed that intima medial thickness in cases was 0.81 ± 0.25 and in controls, 0.62 ± 0.18mm.Rotterdam study^{4,5} showed that higher the baseline intima medial thickness, greater is the risk of cardiovascular events.

In Jadhav et al study, intima medial thickness was >0.8mm in cases. They observed 59.2% of CAD patients had significant intima medial thickness as against 40.8% in those without coronary artery disease. IN Cardiovascular health study⁷, the mean intima medial thickness was 1.03 + 0.2mm which is comparable to our study. In the present study, we found that mean intima medial thickness in patients with single vessel disease was 0.76 + 0.08mm, in Double vessel disease was 0.87 + 0.05mm and in Triple vessel disease was 1.03 + 0.04mm. The difference between these 3 subgroups of acute coronary syndrome patients is statistically significant. It means that more the number of vessels involved, more is the risk of development of atherosclerosis, and its complications. Jadhav et al⁶ demonstrated a higher incidence of intima medial thickness of >0.8mm was observed in all subgroups of patients with coronary artery disease i.e. with one or more risk factors. Kablak, Ziembicka et al⁸ (2002, Acta cardiol. 57) demonstrated that hypertension, hyperlipidemia and diabetes mellitus are related to greater intima medial thickness. Kablak⁸, Ziembicka et al also demonstrated that hypertension is related to greater intima medial thickness. Rotterdam study, Cardiovascular health study, ARIC study^{4,7} and Craven et al showed that intima medial thickness is significantly higher in hypertensive patients.

CONCLUSION

The carotid intima media thickness was found to be higher in patients with significant coronary artery stenosis (>50%), as compared to controls. The difference between cases and controls was statistically significant. The odds ratio for intima medial thickness exceeding 0.8mm in cases showed that it is an important marker of coronary artery disease.

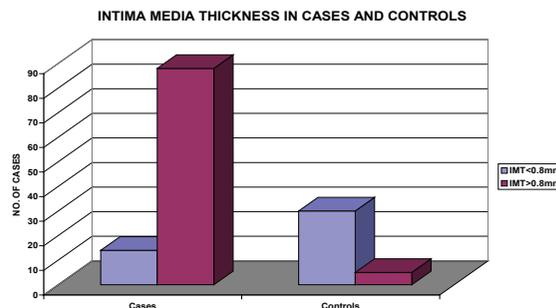
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Table -1
Intima media thickness in cases and controls

	Cases	Controls [Normal Angiography]
IMT<0.8mm	14	30
IMT>0.8mm	88	05

TABLE -2



Mean IMT (mm) in cases and controls

Cases	Controls
0.85 ± 0.12	0.65 ± 0.08
P value<0.01 (p value=0.000001)	

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