ORIGINAL RESEARCH PAPER

Cardiology

KEY WORDS:

# CAROTID DOPPLER STUDY IN PATIENTS WITH ACUTE CORONARY SYNDROME IN A TERTIARY CARE HOSPITAL

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## INTRODUCTION

Acute coronary syndrome remains the leading cause of death in developing countries like India. It includes Unstable Angina, Non ST Elevation MI and ST Elevation MI. Diabetes mellitus, systemic hypertension, dyslipidemia, smoking, obesity and alcoholism are the traditional risk factors for acute coronary syndrome. Non traditional risk factors like homocysteinemia, elevated Lp(a) levels, increased carotid intimal thickness also contribute to coronary artery disease. Increased Carotid Intimal Medial Thickness (CIMT) has been associated with coronary artery disease as well as traditional cardiovascular risk factors in various observational studies. CIMT is considered as a surrogate marker of atherosclerotic burden in coronary arteries and also a strong predictor of adverse coronary events.

## AIM OF THE STUDY:

Our aim was to assess the Carotid Intimal Medial Thickness (CIMT) by Doppler USG in patients admitted with Acute coronary syndrome and its correlation with cardiovascular traditional risk factors.

## METHODOLOGY:

Our study was a single center cross sectional study done on 60 consecutive patients admitted with acute coronary syndrome in the Department of Cardiology, Rajiv Gandhi Government General Hospital, Chennai during the period between May 2019 to October 2019 over a period of 6 months. Institutional ethical committee clearance was obtained. Inclusion criteria included all patients admitted with acute coronary syndrome between the age group of 45 to 60 years. Exclusion criteria included stable coronary artery disease patients, patients on prior antiplatelet or statin therapy and patients with prior PCI or CABG. All patients were subjected to focused clinical examination, serial ECG, Echocardiography and Biomarker evaluation. After stabilization, CIMT of both common carotid arteries were measured using B – Mode Doppler ultrasonography and the mean values were noted. Statistical analysis was done with SPSS Software Version 21. No financial support or conflict of interest for our study.

## RESULTS:

**Table 1 showing the Age and Sex distribution of the study population**

| Age Group | Males | Females | Total | Percentage |
|---|---|---|---|---|
| 45 – 50 Yrs | 7 | 1 | 8 | 13% |
| 50 -55 Yrs | 20 | 10 | 30 | 50% |
| 55 – 60 Yrs | 7 | 15 | 22 | 37% |

**Table 2 showing the gender distribution of the study population**

| GENDER | NUMBER | PERCENTAGE |
|---|---|---|
| Male | 34 | 57% |
| Female | 26 | 43% |
| Total | 60 | |

**Table 3 showing the correlation between CIMT and Age**

| AGE | CIMT <0.88 | CIMT>0.88 | TOTAL |
|---|---|---|---|
| < 50 YRS | 4 | 4 | 8 |
| >50 YRS | 28 | 24 | 52 |
| Total | 32 | 28 | 60 |

p=0.83

**Table 4 showing correlation between Gender and CIMT**

| GENDER | CIMT<0.88 | CIMT>0.88 | TOTAL |
|---|---|---|---|
| MALE | 21 | 13 | 34 |
| FEMALE | 11 | 15 | 26 |
| Total | 32 | 28 | 60 |

P=0.21

**Table 5 showing correlation between CIMT and ACS**

| ACS | CIMT<0.88 | CIMT>0.88 | TOTAL |
|---|---|---|---|
| UA / NSTEMI | 22 | 9 | 31 |
| STEMI | 10 | 19 | 29 |
| Total | 32 | 28 | 60 |

p=0.01

**Table 6 showing the correlation between CIMT and Hypertension**

| HYPERTENSION | CIMT<0.88 | CIMT>0.88 | TOTAL |
|---|---|---|---|
| Yes | 20 | 15 | 35 |
| No | 12 | 13 | 25 |

P=0.66

**Table 7 showing the correlation between CIMT and Diabetes**

| DIABETES | CIMT<0.88 | CIMT>0.88 | TOTAL |
|---|---|---|---|
| Yes | 20 | 20 | 40 |
| No | 12 | 8 | 20 |

p=0.64

**Table 8 showing the correlation between CIMT and smoking**

| Smoking | CIMT<0.88 | CIMT>0.88 | Total |
|---|---|---|---|
| Yes | 13 | 10 | 23 |
| No | 19 | 18 | 37 |

p=0.90

**Table 9 showing the correlation between CIMT and Body Mass Index**

| BMI | CIMT<0.88 | CIMT>0.88 | TOTAL |
|---|---|---|---|
| <25 | 24 | 22 | 46 |
| >25 | 8 | 6 | 14 |

p=0.98

**Table 10 showing the correlation between CIMT and Dyslipidemia**

| Dyslipidemia | CIMT<0.88 | CIMT>0.88 | TOTAL |
|---|---|---|---|
| Yes | 13 | 23 | 36 |
| No | 19 | 5 | 24 |

p=0.002

**DISCUSSION:**

In this study, 60 consecutive patients admitted with acute coronary syndrome were selected after getting informed written consent and subjected to CIMT measurement of both common carotid arteries by using carotid Doppler USG. The mean CIMT value of both common carotid arteries was found to be 0.88 with a standard deviation of 0.04. Among 60 patients, 87% of the study population were above 50 years and only 13% were below 50 years. 40% of those above 50 years had CIMT > 0.88 which was not statistically significant with a p value of 0.83. Males constituted 57% of the study group in which 38% had CIMT>0.88 with a p value of 0.21 which was not statistically significant.

Among the study population, 52% were admitted with unstable angina / NSTEMI and 48% with STEMI. In STEMI patients, 65% had CIMT>0.88 when compared to UA/NSTEMI in which only 29% had CIMT > 0.88 with a p value of 0.01 which was statistically significant. Demircan et al [(1)] study showed that ACS patients had increased CIMT values when compared to stable CAD patients. Similarly, Lorenz et al [(2)] conducted a study on CIMT and proved that absolute CIMT difference of 0.1 mm increased the risk of MI by 10 – 15% . In Rotterdam study, Bots et al [(3)] followed up patients > 55 years of age and reported 194 incident myocardial infarction in a mean period of 4.6 years. CIMT was significantly higher in the MI group when compared to stable CAD.

Chan et al [(4)] prospectively followed 152 CAD patients for 12 months by carotid Doppler and found 22 new adverse coronary events in those with increased CIMT values. Majority of the studies showed modest positive correlation with CIMT and ACS which was similar to the findings in autopsy studies [(5)]

Among hypertensives in our study population, 43% had CIMT>0.88 with a p value of 0.66 which was not statistically significant. 50% of the diabetics in the study had CIMT>0.88 with a p value of 0.64 which was not statistically significant. 38% of the patients had smoking and all of them were males. 43% of them had CIMT>0.88 with a p value of 0.90 which was not statistically significant. The study population had a mean BMI of 23.4 with a standard deviation of 1.4. In patients with BMI>25, 43% had CIMT>0.88 which was not significant with a p value of 0.98. 60% of the study group had dyslipidemia in which 64% had CIMT>0.88 which was statistically very significant with a p value of 0.002. Hence, in our study, we found a statistically significant correlation between CIMT and STEMI when compared to UA/NSTEMI. Among the traditional risk factors, only dyslipidemia showed statistically significant correlation with CIMT.

**LIMITATION:**

Our study population was too small involving only 60 patients as sample size and all sample population were selected from a single center tertiary care hospital in South India. Hence, large scale studies involving multiple centers across various parts of the country should be done to assess the actual correlation. Coronary angiogram was not performed to assess the degree of atherosclerosis in the coronary arteries in these patients.

**CONCLUSION:**

Acute coronary syndrome particularly STEMI had a significant correlation with CIMT. STEMI patients had higher prevalence of increased CIMT values when compared to UA/NSTEMI. Among the traditional risk factors, only dyslipidemia was found to have significant correlation with CIMT. Hence, CIMT can be used as a non-invasive screening test in risk stratification in intermediate and high risk groups for coronary artery disease.

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