Carotid Intima Media Thickness in the Prediction of ST Elevation Myocardial Infarction

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Background:

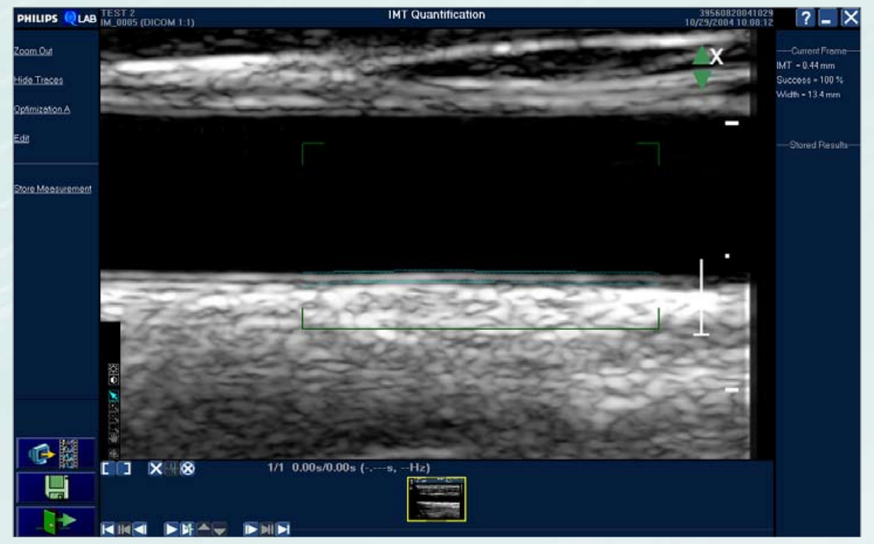
Patients who present with ST elevation myocardial infarction (STEMI) typically have fewer traditional risk factors versus patients with other forms of acute coronary syndrome (ACS).

Measurement of Carotid Intima Media Thickness by B mode ultrasonography has been deemed a non invasive, sensitive and reproducible technique for identifying and quantifying subclinical vascular risk and cardiovascular disease, according to the most recent guidelines produced by the American Society of Echocardiography1

We examined the utility of carotid intima media thickness assessment (CIMT) on refining the ability of the Framingham Risk Score (FRS) to predict patients at risk of a first STEMI.

Purpose and Hypothesis:

Using a vascular age algorithm to re-define the Framingham risk score will lead to better assessment of cardiovascular risk in patients destined to suffer STEMI as their first cardiac event.



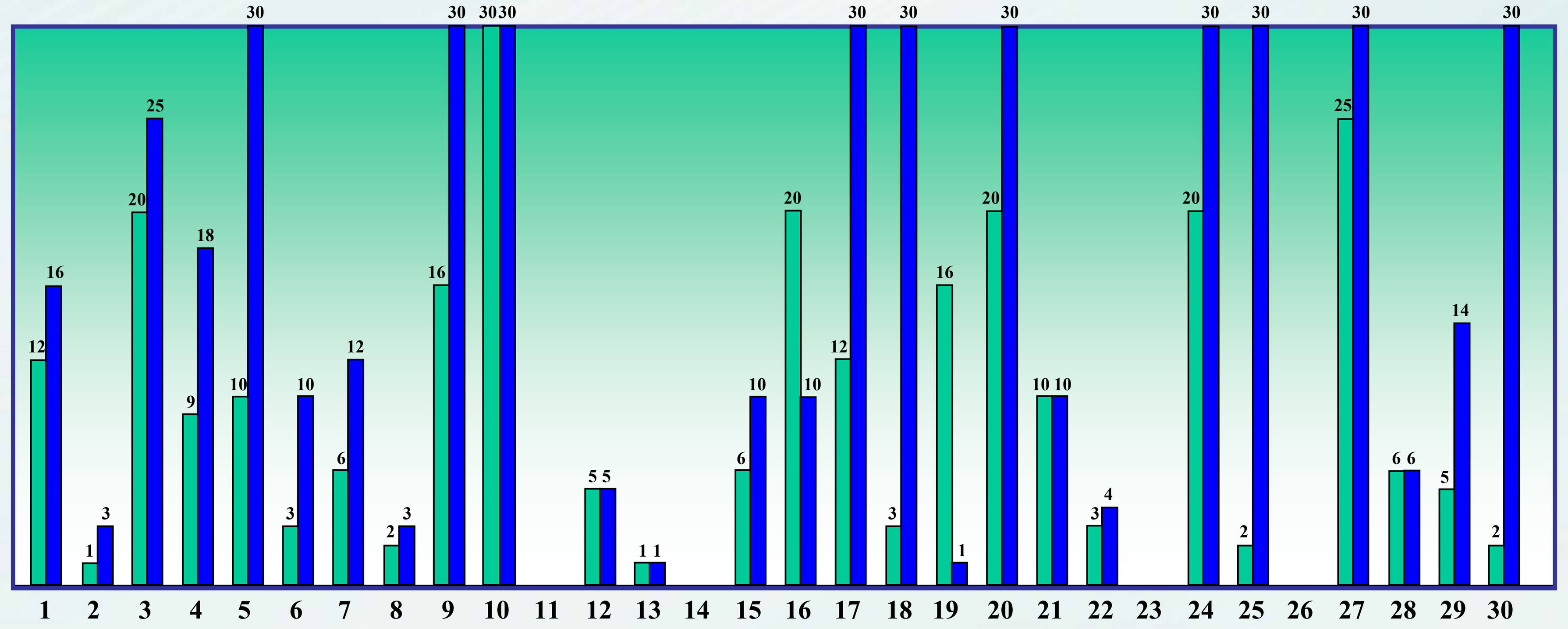
Methods:

- Pro-retrospective study design
- All first time STEMI patients without presence of CAD equivalent
- Demographic data and CIMT measurement within 30 days of STEMI
- Calculation of 'vascular age' based on addition of CIMT measurement to 'chronological age' by use of the well validated atherosclerosis in communities database
- Student's t-test statistical analysis for acquired variables

Table 1. Table to Show Mean Values and Standard Deviation for Baseline Demographic and Acquired Data

	Mean (n=26)	SD
Chronological Age	52.85	12.63
% Male	66.66	n/a
% HTN	59.23	n/a
% Smoker	66.66	n/a
Total Cholesterol mg/dl	207.38	78.75
LDL-C, mg/dl	125.77	34.38
HDL-C, mg/dl	41.3	10.27
SBP mmHg	119.37	18.78
DBP mmHg	66.96	13.12
TG mg/dl	192.21	260.179
CIMT (mm)	0.86	0.22
Vascular Age	79.51	26.8
Chronological FRS	12.11	4.25
Chronological 10 yr risk	10.19	8.42
Vascular FRS	16.61	5.57
Vascular 10 yr risk	17.23	11.16

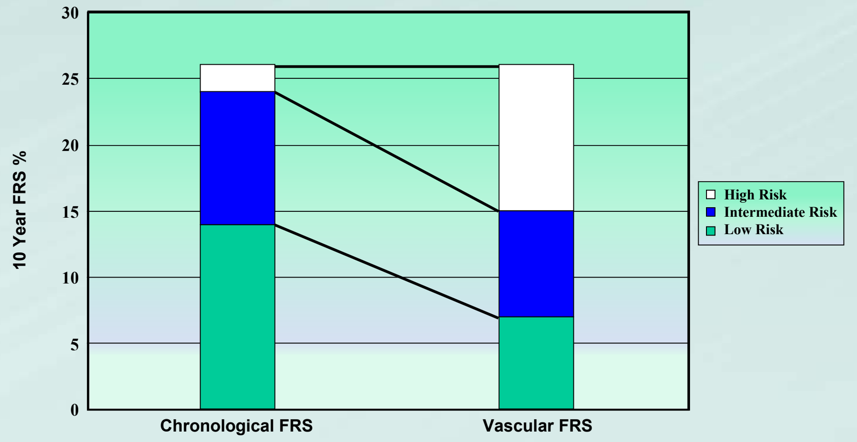
Figure 1. Bar Graph Showing Change in FRS % Risk by Addition of Vascular Age Derived from CIMT



Results:

- Total patients recruited n=30, 4 with incomplete datasets resulting in final number n=26
- The mean CIMT-adjusted "vascular age" was significantly higher than the mean chronologic age for the cohort as a whole (52.8yrs vs. 79.5yrs, p<0.001)
- CIMT-adjustment of FRS led to a significant increase in 10yr risk assessment for the cohort as a whole (10.1% vs. 17.2%, p=0.015)
- When calculated using chronologic age, 2/26 patients (7.7%) had high risk FRS 10yr event rates (defined as event rate >20%) compared to 11/26 patients (42.3%) when calculated using CIMT-adjusted age (p=0.018)

Figure 2. Overall Change in FRS Strata Using Vascular Age



Conclusion:

- The use of CIMT to calculate FRS using a CIMT-adjusted 'vascular age' in a STEMI population led to significant improvement in our ability to define high risk for CAD among this patient population.
- Given that STEMI patients usually represent a younger population with fewer traditional risk factors vs. other ACS patients, this data suggests that CIMT may be helpful in identifying and modifying risk factors and behaviors of patients who are at risk of STEMI.

References:

1. Use of carotid ultrasound to identify subclinical vascular disease and evaluate cardiovascular disease risk: A consensus statement by the American Society of Echocardiography carotid intima media thickness task force- endorsed by the Society of Vascular Medicine. February 2008.
2. A comparison of Assessment of Coronary Calcium versus Carotid Intima Media Thickness for determination of Vascular Age and Adjustment of the Framingham Risk Score. Khalil Y, Matsumura M et al . Prev Cardiol. 2010;13:117-121