Abstract presented on 20th May 2019 at

**Scientific Abstract Poster Session**

at the Society for Cardiovascular Anesthesiologists (SCA) 41st Annual Meeting & Workshops at the Hyatt Regency Chicago in Chicago, IL. (18-21 May, 2019)

Authors:
Srinivas Mantha, Main Author
Sudha Lakshmi Dr. Tripuraneni, MD DM, Co-Author
Lee A A. Fleisher, MD, Co-Author
Michael F. Roizen, MD, Co-Author

Category:
Scientific Program

**Title:**
Use of Common Carotid Intima-Media Thickness measured by Ultrasound Echo-tracking in Cardiovascular Risk Stratification before Non-cardiac Surgery in Low-risk Category: A Research Idea

**Topic:**
Perioperative Medicine

**Abstract Text:**

**Background:**
Preoperative cardiac risk stratification algorithms aim to reduce postoperative morbidity and mortality. They typically use a Bayesian approach to identify a low-risk category group who can go for surgery without further testing. A recent study found that three popular prediction models disagreed 29% of the time by which patients were categorized as low risk (<1%) [1]. Hence, an approach to strengthen and optimize the Bayesian risk indices is needed [2]. Common Carotid Intima-Media Thickness (CCIMT) measured by Ultrasound is a surrogate marker for atherosclerosis and quantifies atherosclerotic burden in entire vascular tree. Two variables of particular interest i.e. CCIMT-z score and vascular age help in such quantification [3]. From a clinical series in an outpatient cardiology clinic, information obtained from CCIMT was explored for feasibility in risk stratification.
Methods:

As a part of clinical or wellness care, CCIMT was measured by B-mode ultrasonography using 3-13 MHz linear probe. An accurate method called ‘echo-tracking’ that relies on automated edge detection by radiofrequency signal processing of ultrasound was used (Figure). From a series of 44 cases, 22 were segregated who would otherwise qualify for low-risk category should they present for preoperative evaluation for noncardiac surgery. CCIMT z scores and percentiles for vascular age were computed based on population-based normal values at different ages in either gender. A multivariate linear regression analysis was done with CCIMT z score as dependent variable and following as independent variables: body mass index (BMI), waist-to-height ratio (WHR), total cholesterol HDL ratio (TC-HDL ratio) and serum vitamin D3 levels. According to American Society of Echocardiography, a CCIMT z score of ≥1.96 equivalent to ≥97.5 percentile is defined as highly abnormal that requires immediate attention and further evaluation.

Results: Mean (SD) for age were 48 years (12) and there were equal number of men and women. Of the independent variables tested, TC-HDL ratio was significantly associated with increased CCIMT z score (p=0.0134). A simple linear regression analysis using only the TC-HDL ratio yielded the model: IMT_Zscore = -0.1149 + (0.3400 x TC-HDL_Ratio ) The p value for the slope was 0.0033 and correlation coefficient was 0.5976 and R square was 0.3571. There were four cases in this low-risk group who had z score ≥1.96.

Discussion:

CCIMT appears to be useful as part of shared decision making to determine if long-term survival is important with respect to the decision to operate. Preoperative statin therapy and close monitoring with troponin may be considered to reduce immediate perioperative risk. Hence, potential application of CCIMT in cardiac risk stratification appears promising. A suitable model to predict the CCIMT z score using readily available clinical and laboratory variables could be developed in the research setting. In addition, scope of substituting vascular age for chronological age and/or categorizing individuals with Z score ≥1.96 as having severe systemic disease in existing risk stratification algorithms may be explored. We believe that the suggested approach would provide better insights for future research in the area.
References:


**USE OF COMMON CAROTID INTIMA-MEDIA THICKNESS MEASURED BY ULTRASOUND ECHO-TRACKING IN CARDIOVASCULAR RISK STRATIFICATION BEFORE NON-CARDIAC SURGERY IN LOW-RISK CATEGORY: A RESEARCH IDEA**

Srinivas Mantha, MD*, Sudha Lakshmi Tripuraranji, MD‡, Lee A Fleisher, MD§, Michael F. Roizen, MD¶, CONTRIBUTING ANESTHESIOLOGIST & Pain Physician, Mantha’s Pain Clinic, Hyderabad, India; †Consulting Cardiologist, Mantha’s Heart Clinic, Hyderabad, India; ¶Department of Anesthesiology and Critical Care, University of Pennsylvania, Philadelphia, USA; ‡Chief Wellness Officer, Roizen Family Chair, The Wellness Institute of Cleveland Clinic, Cleveland, Ohio, USA

**INTRODUCTION**

**METHODS and RESULTS**

**Scanning for CCIMT**
- **Longitudinal view of CCA**
- **Tuning Fork Appearance**
- **Double line sign in far wall of CCA**

**METHODS**
- As a part of clinical or cardiac care, CCIMT was measured by ultrasound echotracking and categorized as low (≤1 mm), intermediate (1.01-1.25 mm), or high risk (>1.25 mm). A novel method called ‘echo-tracking’ that relies on automated edge detection by radiofrequency signal processing of ultrasound was used. From a series of 44 patients, 22 were segregated who were otherwise qualified for low-risk category and should they present for preoperative evaluation for noncardiac surgery. CCIMT z score and percentiles for vascular age were computed based on population-based normal values at different ages in both genders. CCIMT measurement can be performed by anesthesiologist during preoperative evaluation and used as a simple method for risk stratification.

**REFERENCES**


**DISCUSSION**

- As a part of clinical or cardiac care, CCIMT was measured by ultrasound echotracking and categorized as low (≤1 mm), intermediate (1.01-1.25 mm), or high risk (>1.25 mm). A novel method called ‘echo-tracking’ that relies on automated edge detection by radiofrequency signal processing of ultrasound was used. From a series of 44 patients, 22 were segregated who were otherwise qualified for low-risk category and should they present for preoperative evaluation for noncardiac surgery. CCIMT z score and percentiles for vascular age were computed based on population-based normal values at different ages in both genders. CCIMT measurement can be performed by anesthesiologist during preoperative evaluation and used as a simple method for risk stratification.

**CONCLUSION**

- CCIMT measurement can be performed by anesthesiologist during preoperative evaluation and used as a simple method for risk stratification.

**CONCLUSION**

- CCIMT measurement can be performed by anesthesiologist during preoperative evaluation and used as a simple method for risk stratification.