

ORAL PRESENTATION

Open Access

Trabeculated (non-compacted) and compact myocardium in adults: the multi-ethnic study of atherosclerosis

Nadine Kawel^{1*}, Marcelo Nacif¹, Andrew E Arai³, Antoinette S Gomes⁴, William Hundley⁵, Craig Johnson⁶, Martin R Prince⁷, Brandon Stacey⁵, Joao A Lima⁸, David A Bluemke^{1,2}

From 15th Annual SCMR Scientific Sessions
Orlando, FL, USA. 2-5 February 2012

Background

A high degree of non-compacted (trabeculated) myocardium in relationship to compact myocardium (T/M ratio >2.3) has been associated with a diagnosis of left ventricular non-compaction (LVNC). The Multi-Ethnic Study of Atherosclerosis (MESA) is a population-based longitudinal study initiated in July 2000; with 6814 participants (45-84 years, 3601 women) free of recognized cardiovascular disease at enrollment. The purpose of this study was to determine the normal range of the T/M ratio in MESA and to examine the relationship to demographic and clinical parameters.

Methods

The thickness of trabeculation and the compact myocardium were measured in eight regions of the left ventricle on long axis cardiac magnetic resonance (CMR) steady-state free precession cine images in 1000 randomly chosen participants of the "MESA 5" follow-up cohort (551 women; 68.1±8.9 years) and T/M ratios were calculated.

Results

In a subset of 323 participants free of cardiac disease and without known LVNC, 140 (43%) had a T/M ratio >2.3 in at least one region (Figure 1) while 20/323 (6.2%) participants had a T/M ratio >2.3 in more than two regions (Figure 2). 62/323 (19%) had a T/M ratio >2.9 in one region. Multivariate linear regression model revealed no association of age, height and weight with the maximum T/M ratio and trabeculation thickness in

participants free of cardiac disease ($p>0.05$). Maximum trabeculation thickness was associated with Chinese and African American ethnicities and male gender ($p<0.05$; $\beta=1.5\text{mm}$, 1.3mm and 1.1mm , respectively). In participants free of cardiac disease, maximum trabeculation thickness and T/M ratio were associated with LV end-diastolic volume ($p<0.0001$; $\beta=0.03\text{mm/ml}$ and $\beta=0.01/\text{ml}$, respectively) and end-systolic volume ($p<0.001$; $\beta=0.06\text{mm/ml}$ and $\beta=0.03/\text{ml}$, respectively) in adjusted models. Further, there was a negative association of LV ejection fraction with maximum T/M ratio ($p=0.044$; $\beta=-0.02/\%$). There was no association of maximum T/M ratio with hypertension or myocardial infarction ($p>0.05$) in adjusted models of the entire cohort ($n=1000$). Values for T/M ratio depend on measurement technique: At the apical level median T/M ratios derived from measurements of short axis images were significantly less than the values obtained on long axis images ($p=0.017$).

Conclusions

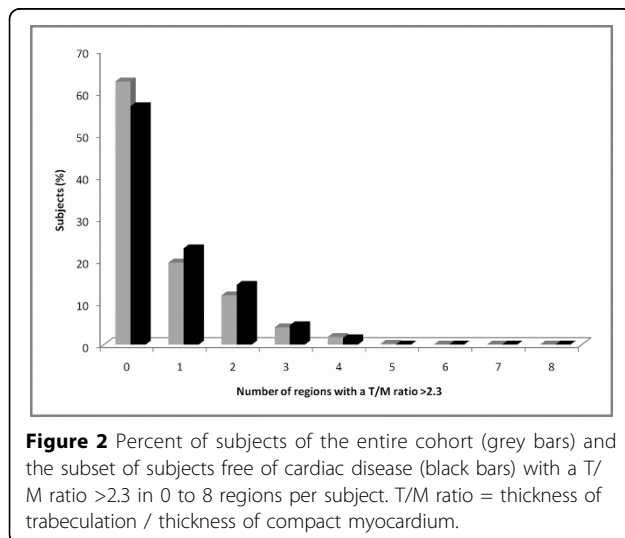
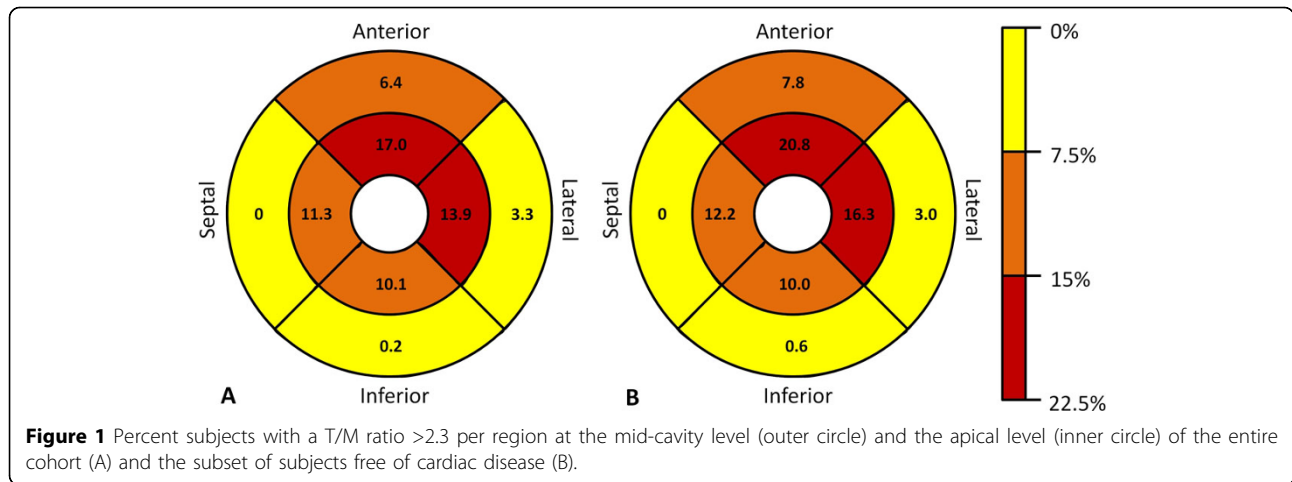
Results of the current study suggest a reevaluation of the current CMR criteria for LVNC using a higher cut-off for T/M ratio and including the number of affected regions. A uniform definition of measurement technique is necessary.

Funding

This research was supported by contracts N01-HC-95159 through N01-HC-95169 from the National Heart, Lung, and Blood Institute.

¹Radiology and Imaging Sciences, National Institutes of Health, Bethesda, MD, USA

Full list of author information is available at the end of the article



Author details

¹Radiology and Imaging Sciences, National Institutes of Health, Bethesda, MD, USA. ²National Institute of Biomedical Imaging and Bioengineering, National Institutes of Health, Bethesda, MD, USA. ³National Heart, Lung and Blood Institute, National Institutes of Health, Bethesda, MD, USA. ⁴Department of Radiology, UCLA School for Medicine, Los Angeles, CA, USA. ⁵Department of Internal Medicine / Cardiology, Wake Forest University, Winston-Salem, NC, USA. ⁶Collaborative Health Studies Coordinating Center, University of Washington, Seattle, WA, USA. ⁷Cornell and Columbia Universities, New York, NY, USA. ⁸Division of Cardiology, Johns Hopkins University, Baltimore, MD, USA.

Published: 1 February 2012

doi:10.1186/1532-429X-14-S1-O86

Cite this article as: Kawel et al.: Trabeculated (non-compacted) and compact myocardium in adults: the multi-ethnic study of atherosclerosis. *Journal of Cardiovascular Magnetic Resonance* 2012 **14** (Suppl 1):O86.

Submit your next manuscript to BioMed Central and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit

