

MODERATED POSTER PRESENTATION

Open Access

Evolution of aortic wall thickness: long-term follow up from the Multi-Ethnic Study of Atherosclerosis (MESA)

Chia-Ying Liu^{1*}, Doris Chen¹, Gisela Teixido-Tura³, Colin O Wu², Atul R Chugh⁴, David A Bluemke^{5,1}, Joao A Lima¹, W Gregory Hundley⁶

From 16th Annual SCMR Scientific Sessions
San Francisco, CA, USA. 31 January - 3 February 2013

Background

A number of studies have been published over the years concerning the relationship between the thickened intima of human arteries and atherogenesis. Increased arterial wall thickness is associated with the prevalence and incidence of cardiovascular disease. Age-related increases of aortic wall thickness have been reported in several cross-sectional community-based studies. However, longitudinal changes of these measurements have not yet been documented. The purpose of this study is to characterize age- and sex-specific aortic wall thickness (AWT) distributions and yearly rates of change in older adults.

Methods

371 longitudinal and 426 cross sectional studies with AWT images by MRI were analyzed. MRI was performed at first in MESA1 (baseline, 2000-2001), and then in MESA5 (ten-year follow-up, 2010-2011). Both exams used 1.5-T whole-body MRI systems. Images were obtained using a double inversion recovery black-blood fast spin-echo sequence with ECG gating. Axial images of the descending thoracic aorta were obtained at the level of the right pulmonary artery. The thickness of the midthoracic descending aortic wall was measured using electronic calipers at 4 standard positions: 12, 3, 6,

Table 1 Mean characteristics of the MESA5 participants

| At MESA5 (2010-2011), mean±SD | GLOBAL (N=426) | Women (N=245) | Men (N=181) | p-value |
|---|----------------|---------------|-------------|---------|
| Age (years) | 70.8±8.7 | 70.9±8.9 | 70.5±8.5 | 0.64 |
| Race (N of white/black) | 259/167 | 144/101 | 115/66 | 0.27 |
| Body mass index (kg/m ²) | 28.7±5.3 | 28.7±5.9 | 28.3±5.3 | 0.45 |
| Systolic blood pressure (mmHg) | 125±21 | 125±21 | 124±21 | 0.68 |
| Diastolic blood pressure (mmHg) | 68±10 | 65±10 | 71±10 | < 0.001 |
| Metabolic Syndrome, N (%) [*] | 146(34.3) | 96(39.2) | 50(27.6) | 0.02 |
| LV End diastolic volume (ml) | 120±31 | 106.2±23 | 138.4±31 | < 0.001 |
| LV End systolic volume (ml) | 47±18 | 38.5±12 | 57.5±20 | < 0.001 |
| LV End diastolic mass (g) | 125±35 | 105.4±22 | 152.2±32 | < 0.001 |
| LV Stroke volume (ml) | 73.2±18 | 67.7±16 | 80.9±18 | < 0.001 |
| LV Ejection Fraction (%) | 61.8±7.2 | 63.9±6.7 | 58.9±7 | < 0.001 |
| Aortic wall thickness (mm) | 2.67±0.27 | 2.61±0.26 | 2.75±0.26 | < 0.001 |
| Wall thickness difference in ten years (mm) | 0.32±0.46 | 0.30±0.44 | 0.35±0.48 | 0.26 |

* Metabolic Syndrome was defined by NCEP guidelines (Circ 2004;109:433-438)

¹Department of Radiology, Johns Hopkins University, Baltimore, MD, USA
Full list of author information is available at the end of the article

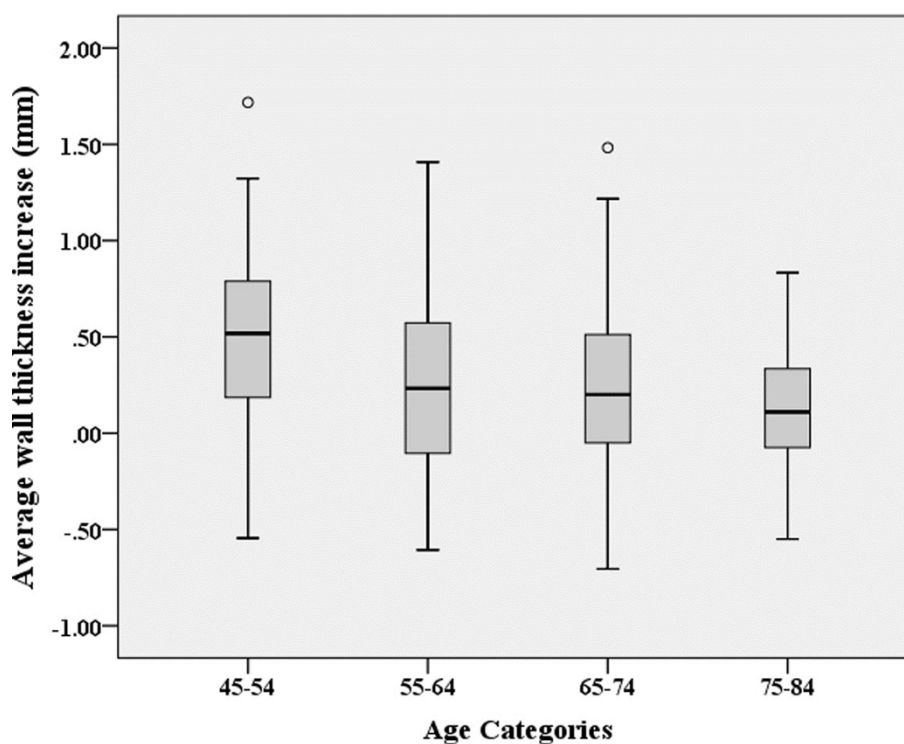


Figure 1 Average aortic wall thickness increase in ten years by age categories (in the baseline age).

and 9 o'clock (QMASS 7.2). The average value of these 4 measurements was calculated.

Results

Table 1 lists demographics and AWT in MESA5 (2010-2011), and changes of AWT in ten years stratified by gender. AWT and cardiac function were significantly different between men and women. Changes of AWT were greater for men than women, but not significant. The average yearly rate of AWT change was 0.032mm. Figure 1 displays the average AWT increase in ten years by age categories (in the baseline age). AWT increased more markedly in mid-adulthood, and was plateaued over time into late-adulthood (p -trend < 0.001). Framingham global CVD risk score assessed at the baseline was positively correlated with the AWT measured in MESA5 ($R=0.261$, $p < 0.001$).

Conclusions

We report aortic wall thickness changes over mid to late adulthood in longitudinal comparisons. Further analyses will reveal the correlates of these alterations with clinical variables.

Funding

N01-HC-95168 from the National Heart, Lung, and Blood Institute.

Author details

¹Department of Radiology, Johns Hopkins University, Baltimore, MD, USA. ²Office of Biostatistics Research, National Institutes of Health, Bethesda, MD, USA. ³Department of Cardiology, Hospital General Universitari Vall d'Hebron, Barcelona, Spain. ⁴Division of cardiovascular medicine, University of Louisville School of Medicine, Louisville, KY, USA. ⁵Radiology and Imaging Sciences, National Institutes of Health, Bethesda, MD, USA. ⁶Division of Cardiology, Department of Internal Medicine, Wake Forest University, Winston-Salem, NC, USA.

Published: 30 January 2013

doi:10.1186/1532-429X-15-S1-M14

Cite this article as: Liu et al.: Evolution of aortic wall thickness: long-term follow up from the Multi-Ethnic Study of Atherosclerosis (MESA). *Journal of Cardiovascular Magnetic Resonance* 2013 15(Suppl 1):M14.

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

 BioMed Central