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May 16th, 1:45 PM

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Gona PN, Lee JJ, Oyama-Manabe N, Salton CJ, Manning WJ, Chuang ML, O'Donnell CJ. (2017). Pericardial Fat Thickness Increases with Greater Burden of Adverse Metabolic Factors Among Adults with Normal-Range Body Mass Index: The Framingham Heart Study. UMass Center for Clinical and Translational Science Research Retreat. Retrieved from https://escholarship.umassmed.edu/cts_retreat/2017/posters/29

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PERICARDIAL FAT THICKNESS INCREASES WITH GREATER BURDEN OF ADVERSE METABOLIC FACTORS AMONG ADULTS WITH NORMAL-RANGE BODY MASS INDEX: THE FRAMINGHAM HEART STUDY

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Introduction: Greater burden of pericardial fat is associated with increased body mass index (BMI). Obesity is associated with unfavorable metabolic characteristics such as hypertension, dyslipidemia, and glucose intolerance. We sought to determine whether unfavorable metabolic profile alone, in the absence of excess BMI, was itself associated with increased pericardial fat thickness (PFT).

Methods: From the 1,794 Framingham Offspring cohort adults who underwent cardiac magnetic resonance (CMR), we identified 446 free of non-skin cancer and prevalent clinical cardiovascular disease (CVD) who had $18.5 \leq \text{BMI} < 25.0 \text{ kg/m}^2$ and complete covariates. We calculated a metabolic score (MS) based on ATPIII criteria where 1 point was assigned for each of: a) fasting glucose $\geq 100 \text{ mg/dL}$ or diabetes; b) SBP ≥ 130 or DBP $\geq 85 \text{ mmHg}$ or antihypertensive treatment; c) triglycerides $\geq 150 \text{ mg/dL}$; d) HDL cholesterol $< 40(\text{M}) / < 50(\text{W}) \text{ mg/dL}$ or lipid-lowering treatment; e) HOMA-IR ≥ 2.5 ; f) waist circumference $\geq 102(\text{M}) / \geq 88(\text{W}) \text{ cm}$. Participants were stratified as MS0 (no points), MS1 (1point), MS2 (2points) or MS3+ (≥ 3 points). PFT over the right ventricle (RV) was measured at the RV apex, at mid-ventricle and at maximal thickness from breathhold cine SSFP CMR in the 4-chamber view at end-diastole. The RV was selected because pericardial fat is commonly and well visualized over the RV. Analysis of covariance adjusted for sex, age, and BMI, was used to compare MS1, MS2 and MS3+ groups to the MS0 group. We further tested for linear trend across MS groups.

Results: PFT increased with worsening metabolic score at the fixed locations of the apical and mid-level RV, as well as at maximal PFT. On pairwise comparisons, only the MS3+ group had PFT that was consistently significantly greater than that of MS0.

Conclusions: In a community-dwelling cohort, among participants who were free of cancer and clinical CVD and had normal-range or BMI, worsening metabolic profile was associated with increased pericardial fat thickness.

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