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Association of epicardial adipose tissue with cardiovascular risk factors in subjects free from clinical symptoms of coronary artery disease


Purpose: Epicardial fat is a metabolically active adipose tissue depot and may be an independent pathogenic factor for coronary artery disease (CAD). We sought to examine the association between epicardial fat volume (EFV) and traditional cardiovascular risk factors in an asymptomatic Hungarian population.

Methods: Subjects free from clinical symptoms of CAD were investigated (n=96, 41% male, mean age 63.5±9.1 years). The participants underwent 256-slice computed tomography examination (120 kV, 80 mAs) for the quantification of EFV. EFV was examined in relation to age, gender, waist circumference (WC), type 2 diabetes mellitus (T2DM), hypertension (HT), hyperlipoproteinemia (HLP) and high-sensitivity C-reactive protein (hsCRP).

Results: The EFV was 108.1±43.1 cm^3 (range: 27.9-289.9 cm^3). The EFV showed a strong correlation with the WC (r=0.63, P<0.0001). There was a significant difference in EFV between males vs. females (124.2±51.2 vs. 97.0±32.7 cm^3, P=0.002), between participants with vs. without hypertension (107.0±27.1 vs. 92.4±40.3 cm^3, P=0.006) and between subjects with vs. without T2DM (137.5±56.7 vs. 103.2±41.8 cm^3, P=0.015). No difference was found in EFV between participants with vs. without HLP (112.5±43.4 vs. 102.6±48.4 cm^3, P=0.34) or high vs. low hsCRP levels (hsCRP levels <3 mg/l vs. ≥3 mg/l: 107.8±47.1 vs. 108.3±40.4 cm^3, P=0.96). After multivariate adjustment WC was found to be an independent predictor of EFV in both male (P=0.0012) and female (P=0.016) subjects and age was an independent predictor of EFV (P=0.0008) among the female participants.

Conclusions: Waist circumference was found to be correlated with the epicardial fat volume, independently of other traditional cardiovascular risk factors. Therefore, the measurement of WC holds valuable information regarding the quantity of the epicardial fat depot.

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Lean mass, fat mass and eccentric left ventricular remodelling in obesity


Background: The relationship between obesity and left ventricular (LV) structure remains unclear. Body-mass index (BMI) combines influences from both lean mass and fat mass, limiting its use for studying the relationship between adiposity and LV morphology. Lean mass is known to have a strong influence on LV mass and volume in the general population, but it is less clear whether this is also the case for individuals with high body fat. Therefore, we aimed to examine the interaction between lean mass and fat mass on LV mass and volume using cardiovascular magnetic resonance (CMR).

Methods: 221 adult volunteers (127 female, age range 18-72 years) were recruited via advertisement. In order to study the effects of uncomplicated adiposity, volunteers were excluded if they gave a history of cardiovascular-related disease. Lean mass and fat mass were measured using biostatistical impedance analysis. The association between measures of body composition with LV structure was assessed in multiple linear regression models, adjusted for age, blood pressure, gender and height.

Results: Overall, lean mass had a strong positive association with LV mass (β=0.57, p=0.001) and LV EDV (β=0.60, p=0.001), whereas fat mass did not (β=0.04, p=0.37 for LV mass; β=0.06, p=0.24 for LV EDV). We then assessed the interaction between lean mass and fat mass in predicting LV structure. For LV EDV, there was a strongly significant negative lean mass x fat mass interaction (β=-0.14, p=0.001), suggesting that lean mass has less influence on LV EDV at higher levels of fat mass. Splitting our sample into standard BMI categories we found that for normal weight individuals, LV EDV is almost entirely predicted by lean mass (β=0.99, p=0.001), with no significant contribution by fat mass (β=0.10, p=0.23). However, for obese individuals the opposite is true: lean mass had no significant association with LV EDV (β=0.08, p=0.37) whereas fat mass significantly predicted LV EDV (β=0.50, p=0.003). We found a similar pattern of results for LV mass, but this did not reach significance (β for lean mass X fat mass interaction = -0.08, p=0.056).