Association of epicardial adipose tissue on magnetic resonance imaging with cardiovascular outcomes: Quality over quantity?

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Background: Quantity of epicardial adipose tissue (EAT) has been associated with poor cardiovascular outcomes. As suggested by computed tomography (CT) studies the quality of EAT may be of incremental prognostic value.

Cardiac magnetic resonance (CMR) is the gold-standard for tissue characterization, however, has never been applied for EAT quality assessment.

Objectives: To investigate EAT quality measured on CMR T1 mapping as predictor of outcome in an all-comer cohort.

Methods: We measured EAT area (EATA) and T1 time (EAT-T1) in a four-chamber views (Figure 1) and tested for association with clinical, demographic, and laboratory parameters using linear regression models. We used Cox-regression analyses to test the association between EATA and EAT-T1 with a composite endpoint of non-fatal myocardial infarction, heart failure hospitalization, and all-cause death.

Results: A total of 966 participants were included (47.2% female, mean age: 58.4years). Mean EATA was 7.3cm² and mean EAT-T1 was 268ms. On linear regression EAT-T1 was not associated with markers obesity, dyslipidemia or co-morbidities such as diabetes (p>0.05 for all).

During a follow-up of 57.7 months, a total of 280 (29.0%) events occurred. EAT-T1 was independently associated (adj. HR: 1.003, 95%-CI: 1.000 – 1.005, p=0.029, Figure 2) with the composite endpoint when adjusted for established clinical risk factors including age, sex, natriuretic peptide levels, left and right ventricular function, arterial hypertension, body mass index, and coronary artery disease.

Conclusion: In an all-comer CMR cohort, EAT quality, as measured on CMR T1-times, but not EAT quantity is independently associated with a composite endpoint of non-fatal myocardial infarction, heart failure hospitalization, and all-cause death.

Figure 1. Regions of interest
Figure 2. Kaplan Meier Curves

- **Log rank test:** $P < 0.001$
- **Number at risk:**
  - Tertile 1 ($< 240$ ms): 236
  - Tertile 2 (240-291 ms): 236
  - Tertile 3 ($> 291$ ms): 239

**Number at risk vs. Time (months):**
- 0 months: 236, 198, 239
- 24 months: 198, 195, 178
- 48 months: 152, 156, 134
- 72 months: 50, 71, 84
- 96 months: 2, 1, 2