Relationship between epicardial fat and left atrium fibrosis in patients with atrial fibrillation

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Introduction

- Epicardial adipose tissue (EAT) has recently been shown to be associated with the presence, severity, and recurrence of atrial fibrillation (AF).
- Several hypotheses have been put forward, including direct adipocyte infiltration, oxidative stress, and the secretion of adipokines causing inflammation and fibrosis of atrial tissue.

Purpose

- To analyse if the the volume of EAT and the amount of left atrium (LA) fibrosis assessed by non-invasive imaging would be significantly correlated in patients with AF.
- To assess if EAT and LA fibrosis would predict time to relapse after pulmonary vein isolation (PVI).

Methods

- Sixty-eight patients with AF being studied for a first PVI procedure underwent both cardiac computerized tomography (CT) and cardiac magnetic resonance (CMR)..
- LA fibrosis was quantified on isotropic 1.5mm 3D delayed enhancement CMR for image intensity ratio values >1.20.
- Radiofrequency PVI was performed using an irrigated contact force-sensing ablation catheter, guided by electroanatomical mapping.
- Pearson's correlation coefficient was used for gauging the correlation between EATLM volume and LA fibrosis.
- The relationship between these two variables and time to AF recurrence was assessed by Cox regression.

Results

- Most of the 68 patients (46 men, mean age 61±12 years) had paroxysmal AF (71%, n=48). The mean body mass index (BMI) was 28.0±4.0 Kg/m2.
- Patients had a median EATLM volume of 2.4 cm3/m2 [interquartile range (IQR) 1.6-3.2 cm3/m2], and a median estimated amount of LA fibrosis of 8.9 g (IQR 5-15 g), corresponding to 8% (IQR 5-11%) of the total LA wall mass.
- The correlation between EATLM and LA fibrosis was statistically significant but weak (Pearson's R = 0.38, P = 0.001) – Figure 1.
- During a median follow-up of 22 months (IQR 12-31), 31 patients (46%) suffered AF recurrence.

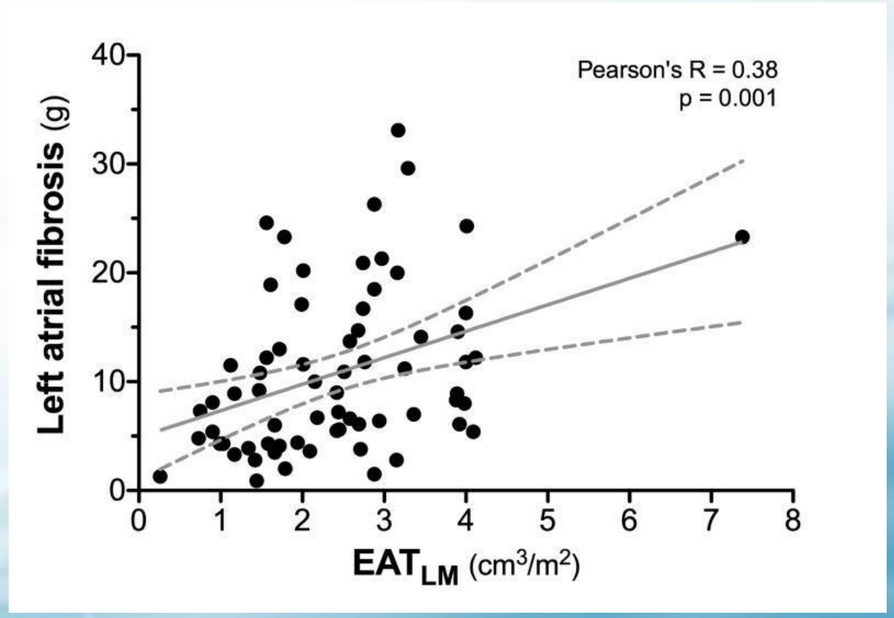
Four predictors of relapse were identified in univariate Cox regression:

- ***EATLM*** (HR 2.19, 95%CI 1.65-2.91, P < 0.001)
- ***LA fibrosis*** (HR 1.05, 95%CI 1.01-1.09, P = 0.033),
- ***non-paroxysmal AF*** (HR 3.36, 95%CI 1.64-6.87, P = 0.001)
- ***LA volume*** (HR 1.03, 95%CI 1.01-1.06, P = 0.006).

Multivariate analysis yielded two independent predictors of time to AF relapse:

- ***EATLM*** (HR 2.05, 95%CI 1.51-2.79, P < 0.001)
- ***non-paroxysmal AF*** (HR 2.36, 95%CI 1.08-5.16, P = 0.031).

Results II



Conclusions

- **The weak correlation between EAT and LA suggests that LA fibrosis is not the main mechanism by which EAT and AF are linked.**
- **EAT was more strongly associated with AF recurrence than LA fibrosis, which supports the existence of other, more important mediators between EAT and this arrhythmia.**