

Epicardial fat volume outperforms classic clinical scores for predicting atrial fibrillation relapse after pulmonary vein isolation

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Background: Epicardial adipose tissue has been implicated in the pathophysiology of atrial fibrillation (AF), but its relevance to clinical practice remains uncertain. The aim of this study was to compare the performance of the amount of epicardial fat with previously published clinical scores of AF-relapse risk after pulmonary vein isolation (PVI).

Methods: We assessed 575 patients (354 men, age 61 ± 11 years, 449 paroxysmal AF) with symptomatic AF undergoing cardiac CT prior to a PVI procedure. Epicardial fat was quantified on contrast-enhanced images using a new simplified semi-automated method. The study endpoint was symptomatic and/or documented AF recurrence at 12 months. Epicardial fat was compared against the following scores: MB-LATER, APPLE, DR-FLASH, and ATLAS.

Results: Median follow-up was of 22 months (IQR 12–35), 232 patients relapsed, 130 patients (27%) within the first 12 months. After adjustment for BMI and other univariate predictors of relapse, three variables emerged

independently associated with time to AF recurrence: non-paroxysmal AF (HR 2.03, 95% CI: 1.53–2.69, $p < 0.001$), indexed left atrial (LA) volume (HR 1.02 per mL/m^2 , 95% CI: 1.01–1.02, $p < 0.001$), and indexed pericardial fat volume (HR 1.55 per mL/m^2 , 95% CI: 1.43–1.67, $p < 0.001$). Based on the ROC curve analysis, the epicardial fat showed greater discriminative power, with a C-statistic of 0.76 (95% CI: 0.71–0.81) against 0.67 ($p = 0.007$ for pairwise comparison of ROC curves), 0.67 ($p = 0.01$), 0.63 ($p < 0.001$) and 0.57 ($p < 0.001$) for the MBLATER, APPLE, DR-FLASH and ATLAS scores, respectively. The C-statistic for indexed LA volume and non-paroxysmal AF AUC were of 0.63 ($p < 0.001$) and 0.61 ($p < 0.001$), respectively.

Conclusion: Pericardial fat volume is a strong independent predictor of AF relapse after PVI, outperforming clinical scores of post-PVI AF. The underlying mechanisms of this association deserve further study.

