Epicardial fat volume is associated with the risk of atrial fibrillation recurrence following pulmonary vein isolation

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Background: Atrial fibrillation (AF) is the most common supraventricular rhythm disturbance and pulmonary vein (PV) isolation has an important role in rhythm control treatment strategies of this disease. Various anatomical and clinical characteristics have been well established as predictors of the risk of recurrence following ablation procedures, but the role of epicardial fat tissue (EFT) in the recurrence of AF has not been elucidated so far.

Purpose: To investigate the influence of left atrial size and EFT volume in the recurrence of AF after pulmonary vein ablation, during a 6-month follow-up.

Methods: A total of 40 patients, 52.5% with paroxysmal and 47.5% with chronic AF underwent PV isolation using radiofrequency and cryoablation techniques. EFT was determined using cardiac computed tomography angiography (CCTA) associated with advanced image post-processing techniques.

Results: In patients who developed AF recurrence at 6 months after AF ablation, the volume of EFT and of left atrium were significantly larger than in the group who maintained sinus rhythm (202.5 ± 64.56 ml vs. 138 ± 55.74 ml, p = 0.01 for EFT, and 149.3 ± 4.66 ml vs. 90.63 ± 5.19 ml, p <0.0001 for left atrial volume, respectively). The left ventricular ejection fraction was significantly lower in patients with AF recurrence (50.25 ± 6.54% vs. 54.22 ± 3.95%, p = 0.04). The analysis of AF recurrence between the two different ablation techniques did not show any difference in recurrence rates between radiofrequency and cryoablation methods (29% vs. 23%, respectively p = 0.73). At the same time, recurrence rates after AF ablation were not influenced by the main cardiovascular risk factors (age, hypertension, dyslipidemia and smoking) and was not associated with different risk scores (CHA2DS2-VASc and HAS-BLED).

Conclusion: Patients with AF recurrence after pulmonary vein ablation present significantly higher EFT or left atrial volumes compared to patients who maintained sinus rhythm. This indicates the inflammatory mediated response, usually accompanied by an increased amount of EFT, could be associated with the risk of AF recurrence following catheter ablation of the pulmonary veins.