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Epicardial Adipose Tissue Thickness as a Predictor of Early Arrhythmia Recurrence After Electrical Cardioversion

Fabio Kadum*, **Koraljka Benko**, **Ana Petretić**

University Hospital Centre Rijeka, Rijeka, Croatia

KEYWORDS: arrhythmia recurrence, atrial fibrillation, electrical cardioversion, epicardial adipose tissue, heart failure.

CITATION: Cardiol Croat. 2026;21(11-12):225-6. | https://doi.org/10.15836/ccar2026.225

***ADDRESS FOR CORRESPONDENCE:** Fabio Kadum, Klinički bolnički centar Rijeka, Tome Strižića 3, HR-51000 Rijeka, Croatia. / Phone: +385-91-9365-971 / E-mail: kadum.fabio@gmail.com

ORCID: Fabio Kadum, https://orcid.org/0009-0007-4525-9103 • Koraljka Benko, https://orcid.org/0000-0001-7556-0860 Ana Petretić, https://orcid.org/0000-0002-5767-1206

Introduction: Despite the established effectiveness of electrical cardioversion (ECV) in restoring sinus rhythm, early recurrence of atrial fibrillation (AF) or atrial flutter remains a relevant clinical concern.[1,2] Epicardial adipose tissue (EAT) has been implicated in atrial remodeling and arrhythmogenesis, prompting interest in its potential value as a marker of arrhythmia recurrence.[3,4] Building upon previously reported findings, this study sought to further explore the relationship between echocardiographically assessed EAT thickness and early rhythm outcomes after ECV, with particular attention to patients with heart failure (HF).[5]

Patients and Methods: This single-center observational analysis included 124 patients who underwent successful elective ECV for AF or atrial flutter, representing an extension of the previously reported study population.[5] HF was present in 54 patients. Before ECV, transesophageal echocardiography was performed to exclude intracardiac thrombi, while EAT thickness was assessed using transthoracic echocardiography (TTE). Arrhythmia recurrence was evaluated by electrocardiography at the one-month follow-up. Associations with recurrence were investigated using univariable and multivariable logistic regression and receiver operating characteristic (ROC) analysis. The multivariable model included EAT thickness, body mass index (BMI), left atrial (LA) size, and HF status. A separate subgroup analysis was performed in patients with HF.

Results: Early arrhythmia recurrence was documented in 29 of 124 patients (23.4%) at one month. Mean EAT thickness was nearly identical in patients with and without recurrence (3.62 ± 1.74 vs. 3.64 ± 1.76 mm, respectively; p = 0.973). Among patients with HF, 14 of 54 (25.9%) experienced recurrence, with no significant difference in EAT thickness between those with and without recurrence (3.64 ± 1.45 vs. 4.13 ± 1.86 mm, respectively; p = 0.456) (**Table 1**). EAT thickness showed no meaningful discriminatory ability for recurrence in either the overall cohort (area under the curve [AUC] = 0.502) or the HF subgroup (AUC = 0.433). Conversely, greater LA size was independently associated with recurrence (adjusted odds ratio [OR] = 2.35; p = 0.015). Although EAT thickness was associated with BMI, HF, and hypertension, these relationships did not translate into predictive value for early rhythm outcomes.

TABLE 1. Epicardial adipose tissue thickness according to early arrhythmia recurrence in the overall cohort and heart failure subgroup.

Study population	No recurrence, n	EAT thickness (mm)	Recurrence, n	EAT thickness (mm)	p-value
Overall cohort	95	3.64 ± 1.76	29	3.62 ± 1.74	0.973
HF subgroup	40	4.13 ± 1.86	14	3.64 ± 1.45	0.456

EAT, epicardial adipose tissue; HF, heart failure

RECEIVED:
October 4, 2026
UPDATED:
November 4, 2026

Conclusion: Our findings indicate that EAT thickness assessed via TTE offers limited value in predicting early atrial arrhythmia recurrence after successful ECV, including in patients with HF. Conversely,

LA enlargement remained independently associated with recurrence, highlighting the relevance of atrial structural remodeling in short-term rhythm outcomes. These results suggest that conventional echocardiographic measurement of EAT thickness may not adequately capture the complex relationship between epicardial adiposity and atrial arrhythmogenesis, warranting further investigation using volumetric imaging techniques.

LITERATURE

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