

Relationship between Total Atrial Conduction Time and Recurrence of Atrial Fibrillation after Complex Fractionated Atrial Electrogram Ablation of Paroxysmal Atrial Fibrillation

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Abstract

Purpose: Recently, it has been reported that an index of the total atrial conduction time derived by tissue Doppler imaging (PA-TDI duration) has a superior accuracy for prediction of atrial fibrillation (AF) recurrence compared with the left atrial volume index (LAVI) after pulmonary vein isolation (PVI). We performed catheter ablation targeting complex fractionated atrial electrograms (CFAE ablation) on patients with AF and explored the independent predictor of AF recurrence after CFAE ablation.

Subjects and methods: Our study included 160 patients with paroxysmal AF who underwent AF ablation (CFAE ablation or CFAE ablation+PVI) for the first time. Of these, 107 patients in whom a measurement of PA-TDI duration was possible were divided into no recurrence and recurrence groups. Univariable and multivariable Cox proportional hazards analyses were performed to investigate predictors of AF recurrence after AF ablation. The receiver operator characteristics (ROC) curve was calculated to evaluate the performance of possible independent predictors of AF recurrence after AF ablation was obtained by multivariate analysis. The time-dependent changes of PA-TDI duration and LAVI were observed to investigate the predictors of AF recurrence after AF ablation.

Results: The left atrial dimension (LAD) was significantly larger in the recurrence group than in the no recurrence group (41.1 ± 5.4 mm to 38.1 ± 5.1 mm, $p < 0.01$). In the multivariate analysis, the left atrial volume (LAV) and LAD were suggested as independent predictors of AF recurrence after AF ablation. However, the ROC curve analyses demonstrated that LAV and LAD had low accuracy of predicting AF recurrence after AF ablation (area under the curve: LAV, 0.609; LAD, 0.659). There were no significant differences in PA-TDI duration or LAVI in both strategies before ablation between the recurrence and the no recurrence groups. Six months after the ablation, the PA-TDI duration in the recurrence group was significantly longer than before ablation with both strategies (CFAE ablation: 142.9 ± 18.5 ms to 155.4 ± 17.6 ms, $p < 0.01$; CFAE ablation+PVI: 135.6 ± 20.3 ms to 155.1 ± 21.8 ms, $p < 0.01$), and PA-TDI duration in the no recurrence group with CFAE ablation was significantly shorter than before ablation (141.8 ± 23.3 ms to 131.1 ± 23.9 ms, $p = 0.011$). However, there was no significant difference in LAVI between the recurrence and no recurrence groups for both strategies.

Conclusion: The data obtained before ablation could not predict AF recurrence after CFAE ablation for patients with paroxysmal AF. However, longer PA-TDI duration at the 6-month followup may predict AF recurrence after CFAE ablation for paroxysmal AF.

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