

2. Lower Pulmonary Vein-to-Left Atrium Volume Ratio Predicts Poor Rhythm Outcome After Atrial Fibrillation Catheter Ablation

Jae-Hyuk Lee, Inseok Hwang, Hee Tae Yu, Tae-Hoon Kim, Jae-Sun Uhm, Boyoung Joung, Moon-Hyoung Lee, Hui-Nam Pak, Yonsei University Health System, Seoul, Republic of Korea

Body

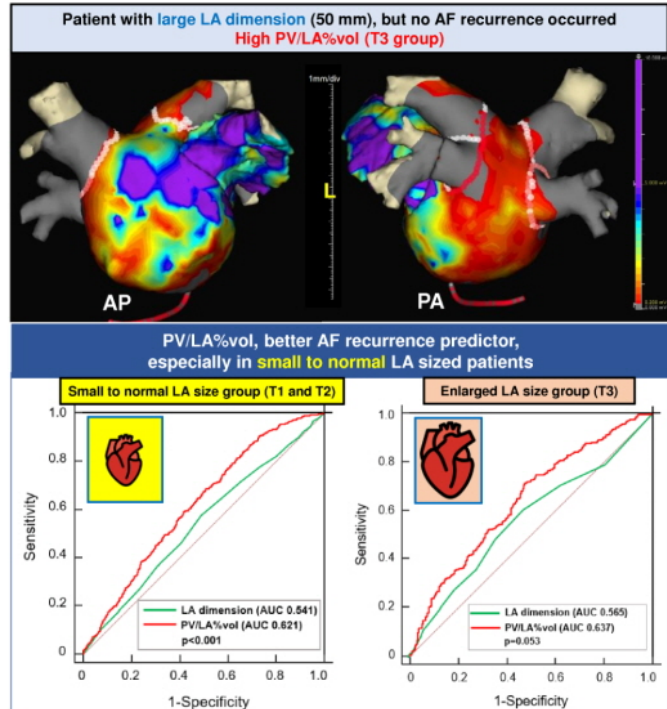
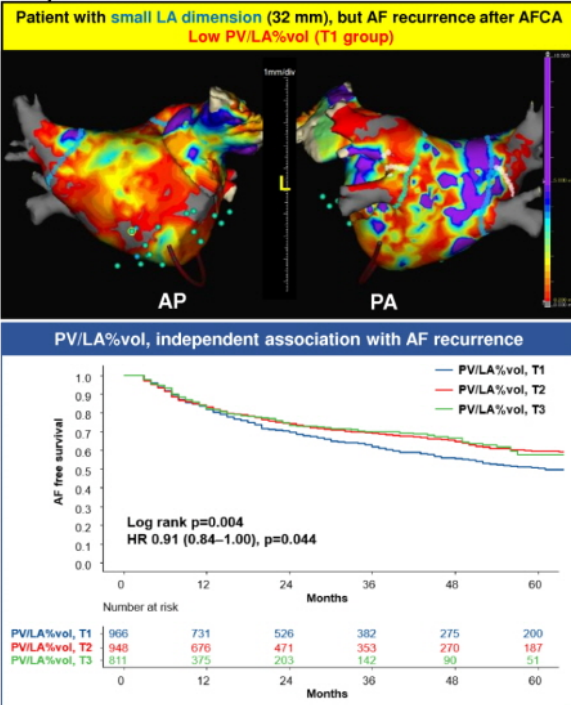
Background: Although left atrial (LA) dimension (LAD) is one of the predictors of atrial fibrillation (AF) recurrence after catheter ablation, repetitive recurrences still occur in patients without enlarged LAD. We explored the predictive value of the pulmonary vein (PV) to LA volume percent ratio (PV/LA%vol) for rhythm outcomes of AF catheter ablation (AFCA) and its genetic background.

Methods: We included 2913 patients (73.5% male, 60.0 [52.0–67.0] years old, 60.6% paroxysmal AF) who underwent AFCA. We additionally investigated the association between PV/LA%vol and PITX2 gene in 2051 patients using a genome-wide association study.

Results: LAD affected 1-year recurrence only in the highest tertile group (T3, $p=0.046$), but PV/LA%vol determined 1-year recurrence in all T1–T3 LAD groups (T1, $p=0.044$; T2, $p=0.021$; and T3, $p=0.045$). During 20.0 (8.0–45.0) months of follow-up, the clinical recurrence rate was significantly higher in patients with lower PV/LA%vol (T1–T3, Log-rank $p=0.004$, HR 0.91 [0.84–1.00], $p=0.044$). In the T1 and T2 LAD groups, predicting AF recurrences was better with PV/LA%vol than with LAD (AUC 0.63 vs. 0.51, $p<0.001$ at T1; AUC 0.61 vs. 0.50, $p=0.007$ at T2). We replicated a PITX2-related rs12646447, which was independently associated with PV/LA%vol ($b=0.15$ [0–0.30], $p=0.047$) but not the risk of AF recurrence after AFCA.

Conclusion: Smaller PV volumes after LA volume adjustments have genetic background of PITX2 gene and predictive value for poorer rhythm outcomes after AFCA, especially in patients without significant LA enlargement.

Graphic Abstract



Clinical Implications: Lower PV to LA volume percent ratio (PV/LA%vol) was independently associated with poorer rhythm outcomes after AFCA, especially in patients without significant LA enlargement.

There was a genetic association between the PITX2 gene and PV/LA%vol, but this genetic predisposition was not associated with the rhythm outcomes after AFCA.