Value of left atrial systolic and diastolic volume measured by computed tomography for the prediction of post-ablation recurrence of atrial fibrillation

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Introduction: Atrial contraction yields dynamic left atrial volume (LAV) according to atrial diastolic and systolic phase. We sought to evaluate the prognostic value of different LAV parameters for the prediction of post-catheter ablation recurrence of atrial fibrillation (AF).

Methods: A total of 478 patients who underwent catheter ablation for AF and pre-procedural cardiac computed tomography (CCT) were enrolled. Four different LAV parameters (systolic/diastolic, with or without left atrial appendage [LAA]) were obtained using CCT and left atrial antero-posterior diameter (LAAPD) was measured in transthoracic echocardiogram. Discrimination value of different LAV parameters for two-year atrial tachyarrhythmia recurrence was analyzed.

Result: During a mean follow-up of 22.0 months, AF was recurred in 156 (32.6%) patients. All of each LAV parameter (diastolic/systolic volume, with or without LAA) were significantly associated with AF recurrence. C-statistics of diastolic/systolic LAV were 0.580/0.595, and 0.579/0.597 when LAA was excluded. However, LAAPD showed non-significantly higher prediction performance (C-statistic 0.620). C-statistic of systolic LAV was higher among patients with high LAAPD (>45mm) (C-statistic 0.698), compared to those with low LAAPD (C-statistic 0.531). Discrimination performance of systolic LAV was more favorable in the subgroup of persistent AF (C-statistic 0.612) than paroxysmal AF (C-statistic 0.556).

Conclusion: Overall performance of LAV in the prediction of AF recurrence was not superior to LAAPD, and non-significant trend favored systolic than diastolic LAV. Systolic LAV provided more accurate prediction among patients with high LAAPD.