Impact of Persistent Left Superior Vena Cava on Radiofrequency Catheter Ablation in Patients with Atrial Fibrillation

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Introduction: The impact of persistent left superior vena cava (PLSVC) in atrial fibrillation (AF) patients undergoing radiofrequency catheter ablation (RFCA) is not well known. We performed this analysis to evaluate electrophysiological characteristics of PLSVC and its role in triggering and maintaining AF.

Methods: Patients with AF referred to two tertiary hospitals were screened and patients with PLSVC in pre-RFCA imaging studies were enrolled.

Result: Among 3,967 patients, PLSVC was present in 36 patients (0.9%). There were four morphological types of PLSVC: type 1, atresia of the right superior vena cava (SVC) (n=2); type 2A, dual SVCs with an anastomosis between right and left SVCs (n=15); type 2B, dual SVCs without an anastomosis (n=16); type 3, PLSVC draining into the left atrium (LA) (n=2); and unclassified in one patient. Thirty-two patients underwent RFCA and electrophysiology study focusing on PLSVC: PLSVC was the trigger of AF in 48.4% of patients and the driver of AF in 46.9% of patients. Cumulatively, PLSVC was a trigger or driver of AF in 22 patients (68.8%). Whether to ablate PLSVC was determined by the results of electrophysiology study, and no significant difference in late recurrence rate was observed between patients who did and did not have either trigger or driver from PLSVC.

Conclusion: Pre-RFCA cardiac imaging revealed PLSVC in 0.9% of AF patients. This study demonstrated that PLSVC have an important role in initiating and maintaining AF in substantial proportion of patients. Electrophysiology study focusing on PLSVC can help to decide whether to ablate PLSVC.