Atrial Tachycardia after Pulmonary Vein Isolation in Patients with Persistent Left Superior Vena Cava

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Introduction: A persistent left superior vena cava (PLSVC) is the embryological precursor of the ligament of Marshall, which has been implicated in the initiation and maintenance of atrial fibrillation (AF). We report 3 cases with PLSVC which became sources of tachyarrhythmias after pulmonary vein isolation of AF.

Methods: We experienced 3 AF patients with PLSVC which were sources of tachyarrhythmias after PV isolation (all men; 66, 71, and 63 years old).

Result: One patient had frequent ectopic beats originated from the bottom of the ostial coronary sinus (CS) and the remaining two patients had uncommon AFL involving PLSVC as a part of the mechanism. The frequent ectopic beats disappeared after RF deliver at the earliest excitation site in the PLSVC. The electrical connections between PLSVC and LA were recognized as parts of the tachycardia circuits in the two AFLs. The activation pattern in one AFL seemed that the excitation invaded from LA into the distal PLSVC site and went down to the RA without other connections between PLSVC and LA. The other AFL had multiple connections between PLSVC and LA, and the AFL circuit turned around through them. The former case was unsucess of ablation though we ablated the connection site. On the other hand, we were able to terminate the latter AFL by ablating the critical connection site. After half a year, the 2 patients who had successful ablation have been keeping sinus rhythm without drugs and the failure case have developed AF.

Conclusion: The PLSVC can be not only the arrhythmogenic source of AF, but also be associated with AT after PV isolation. The electrical characteristics is complicated and challenging to ablation.