A rare variant of pulmonary vein drainage

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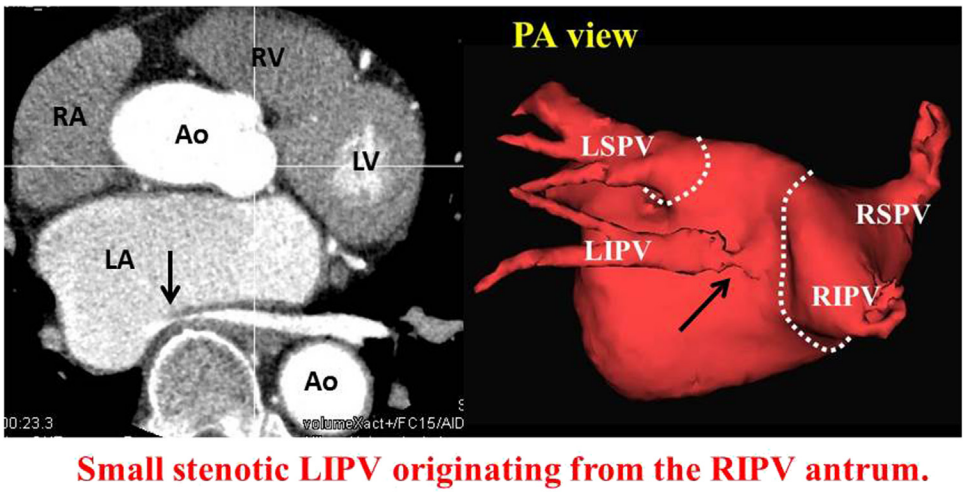

Figure 1 Small stenotic LIPV originating from the RIPV antrum. Ao = aorta; LA = left atrium; LIPV = left interior pulmonary vein; LSPV = left superior pulmonary vein; LV = left ventricle; PA = pulmonary artery; RA = right atrium; RIPV = right interior pulmonary vein; RSPV = right superior pulmonary vein; RV = right ventricle.

Introduction

A common left trunk is a well-known anomaly, but a common inferior pulmonary vein (CIPV) is rare. Here, we present a very unique case of CIPV with a stenostic immature left inferior PV (LIPV) originating from the right inferior pulmonary vein (PV) antrum.

Case report

A 76-year-old man with a history of paroxysmal symptomatic atrial fibrillation (AF) was referred for an initial ablation of AF. He had no history of a thoracic surgical procedure or lung disease. Preprocedural multidetector row computed tomography showed an unusual CIPV, demonstrating a tiny LIPV originating from the right side of the left atrium (LA) near the right inferior PV antrum (Figure 1). Computed tomography also revealed that the LIPV had no evidence of extrinsic compression. Although we attempted to insert the catheter into the LIPV to map the PV potential, it was impossible because the stenotic PV orifice diameter was only 1.7 mm. Intracardiac cardioversion converted him to sinus rhythm without any immediate recurrence of AF or PV/non-PV foci. We performed a segmental PV isolation of the left superior PV and extended it to ipsilateral right PVs (Figure 1, right panel). We did not create encircling lesions around the stenotic LIPV orifice because the unmappable LIPV made the exact location of the LIPV unclear, and an inaccurate isolation of that site would have yielded the potential risk of PV stenosis or cardiac tamponade. Since AF was sustained after PV isolation, we also performed a linear ablation of the LA, that is, the endocardial LA above the coronary sinus, roof and septal LA sites, and the LA appendage ridge. AF terminated after the administration of nifekalant (0.3 mg/kg/min), and AF was noninducible thereafter. The session was completed without any complications. During the 6-month follow-up, the patient has been free of any arrhythmias without any antiarrhythmic drugs.

A common ostium of the left PVs is a well-known anomaly, but a CIPV is rare. In previous reports,[1,2] the incidence of a common inferior trunk ranges from 0% to 0.9% in patients undergoing AF ablation. Furthermore, 57% of focal triggers were inside the CIPV, and most of the

KEYWORDS Catheter ablation; Atrial fibrillation; Common inferior pulmonary vein; Computed tomography

ABBREVIATIONS **AF** = atrial fibrillation; **CIPV** = common ostium of the inferior pulmonary vein; **LA** = left atrium/atrial; **LIPV** = left interior pulmonary vein; **PV** = pulmonary vein

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KEY TEACHING POINTS

- This case is an extremely rare variant of common ostium of the inferior pulmonary veins.
- This case shows an anomaly that electrophysiology physicians should know for the safety of atrial fibrillation ablation.
- Preprocedural multidetector row computed tomography helps to guide atrial fibrillation ablation for such a rare PV anatomy.

isolating sites were near the CIPV.[2,3] Unfortunately, it remains unclear whether the CIPV acted as an AF trigger in this case because of the unmappable tiny LIPV orifice. However, at least, PV or extra-PV foci were absent after intracardiac cardioversion, and no AF initiation or subsequent AF recurrence was evident despite no LIPV isolation, which suggests that the LIPV might not function as an AF trigger. The etiology of the LIPV stenosis was unclear. The lack of a history of any thoracic surgical procedures or lung disease and no evidence of any extrinsic compression of the vein suggested that the etiology was a congenital anomaly rather than any changes secondary to aging or extrinsic compression. Nonetheless, this is a rare PV anatomy that electrophysiology physicians should be aware of clinically for the safety and efficacy of ablation. Multidetector row computed tomography provided a valuable road map for such a rare PV anatomy, and the computed tomography data were used to determine the ablation strategy and guide the catheters during catheter ablation.

References

1. Pfaffenberger S, Gwechenberger M, Richter B, Goessinger HD. A common inferior pulmonary trunk detected by computed tomography affects atrial fibrillation. Europace 2008;10:1349–1350.
2. Yu R, Dong J, Zhang Z, Liu X, Kang J, Long D, Fang D, Tang R, Guo X, Hu F, Ma C. Characteristics in image integration system guiding catheter ablation of atrial fibrillation with a common ostium of inferior pulmonary veins. Pacing Clin Electrophysiol 2008;31:93–98.
3. Schwartzman D, Bazaz R, Nosbisch J. Common left pulmonary vein: a consistent source of arrhythmogenic atrial ectopy. J Cardiovasc Electrophysiol 2004;15:560–566.