IMAGE

Severe pulmonary vein stenosis requiring angioplasty after hot balloon ablation for pulmonary vein isolation

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Introduction

Pulmonary vein (PV) stenosis is 1 of the crucial complications of PV isolation. Although several cases of severe PV stenosis requiring angioplasty after cryoballoon ablation have been reported, no cases have been reported with hot balloon (HB) ablation.

Case report

A 49-year-old man with drug-refractory paroxysmal atrial fibrillation was referred for catheter ablation. He had no structural heart disease, with normal left ventricular ejection fraction (65%) and mild left atrial dilatation (45 mm). After transseptal puncture, PV isolation using the SATAKE HB system (Toray Industries, Inc, Tokyo, Japan) was performed. HB ablation was applied twice to the left superior PV (LSPV) antrum for 4 and 3 minutes of application time with 73°C target temperature[1,2] and 12 mL (≅ φ28 mm) and 10 mL (≅ φ26 mm) balloon size, respectively (Figure 1A). Then a single application to the left inferior PV for 2 minutes, right superior PV for 4 minute. and right inferior PV for 2 minutes was subsequently applied.[1,2] Touch-up ablation by irrigated catheter was added twice for 2 gaps in the LSPV (radiofrequency time: 58 seconds at top and 30 seconds at bottom, respectively) with a maximum output of 35 W with the NavX system (St. Jude Medical, St. Paul, MN) (Figure 1A). After the procedure atrial fibrillation did not recur; however, he had left chest pain and hemoptysis 6 months after the procedure. Computed tomography demonstrated severe LSPV stenosis (almost occlusion) (Figure 1B) with consolidation and alveolar hemorrhage in the left upper lobe. We confirmed no evidence of thrombosis in the LSPV using intravascular ultrasound, then emergently performed balloon angioplasty (BA) (balloon size: 8 × 20 mm), and LSPV was successfully dilated. Although symptom and consolidation disappeared, LSPV showed restenosis (occlusion) 4 months after the BA (Figure 1B). We performed BA again with stenting (bare metal stent: 6 × 18 mm) for LSPV restenosis. Thereafter, follow-up computed tomography at 9 months after stenting confirmed absence of restenosis (Figure 1B).

This is, to our knowledge, the first report that demonstrated severe stenosis requiring angioplasty after HB ablation. The incidence of severe stenosis (>70%) after HB ablation has been reported to be about 5%, but no case needed intervention therapy.[1,2] The cause of severe PV stenosis was unclear in this case, but anatomical characteristics (small PV angle) might be associated with the incidence of PV stenosis.[3] We should recognize a potential risk of severe PV stenosis or occlusion even though using the HB system, which is applied at the PV antrum with a size-adjustable balloon (26–33 mm), and BA without stenting for PV stenosis may be insufficient to avoid restenosis.

KEY TEACHING POINTS

- The SATAKE hot balloon (Toray Industries, Inc, Tokyo, Japan), 1 of the single-shot devices for pulmonary vein (PV) isolation, is characterized as a size-adjustable balloon (26–33 mm) according to the PV size.
- PV stenosis is 1 of the crucial complications of PV isolation. Although several cases of severe PV stenosis requiring angioplasty after cryoballoon ablation have been reported, no cases have been reported with hot balloon ablation.
- In this image, we report for the first time a case of severe PV stenosis requiring angioplasty after hot balloon ablation. We have to recognize a potential risk of severe PV stenosis after hot balloon ablation even with the size-adjustable balloon.

KEYWORDS Atrial fibrillation; Catheter ablation; Complication; Hot balloon; Pulmonary vein stenosis
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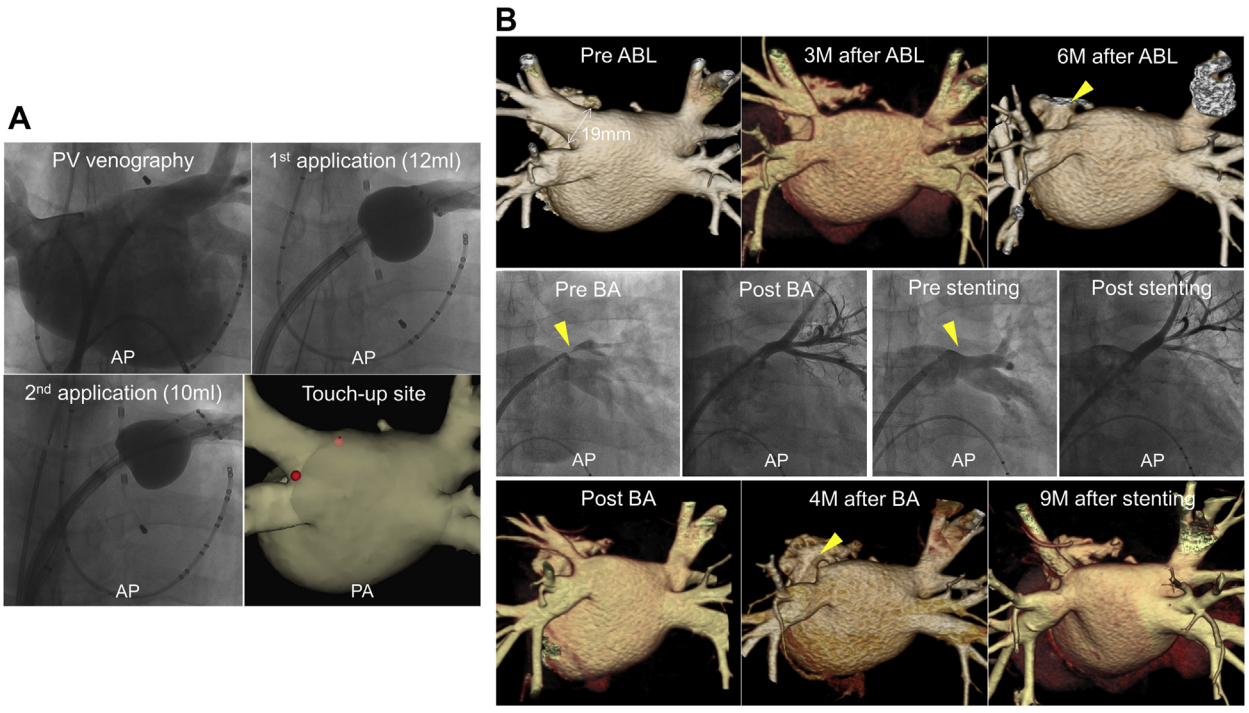

Figure 1 **A:** Position of hot balloon applications and touch-up ablation sites in LSPV. **B:** Computed tomography and angiography pre and post LSPV angioplasty. ABL = ablation; AP = anterior-posterior view; BA = balloon angioplasty; PA = posterior-anterior view; PV = pulmonary vein.

References

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