

Pulmonary vein perforation into bronchi: a rare but life-threatening complication of cryoballoon ablation

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Cryoballoon ablation (CBA) has been widely accepted as a treatment of paroxysmal atrial fibrillation (PAF),¹ however, serious procedural complications can occur, including oesophageal ulcer, atrio-oesophageal fistula, bronchial injury, and phrenic nerve injury.²

A 71-year-old man with PAF underwent catheter ablation using the CBA system. Cryoballoon ablation was performed under conscious sedation going on dabigatran 220 mg (pre-procedural activated partial thromboplastin time: 28.6 s). A circular mapping catheter

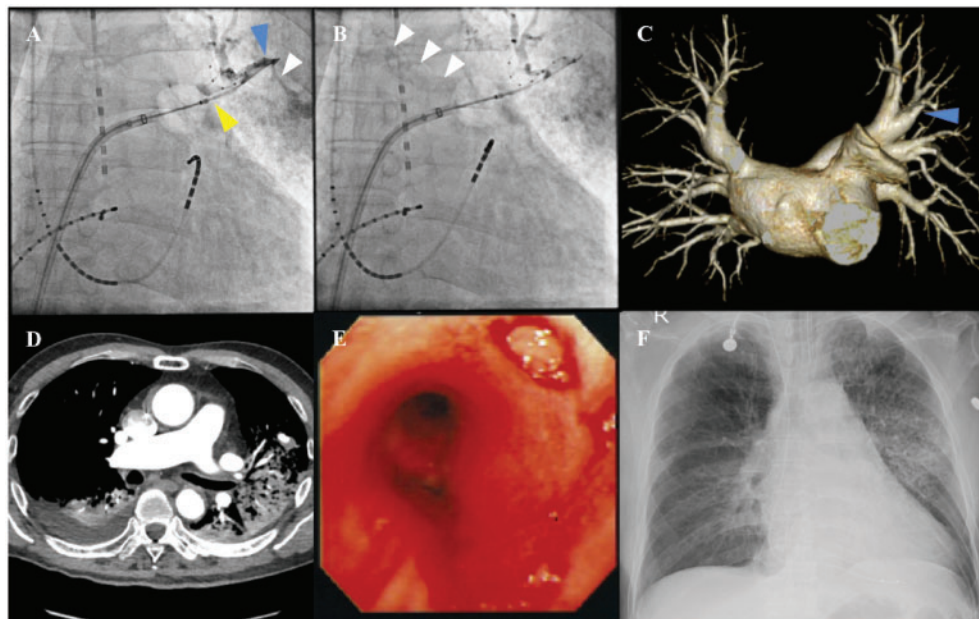


Figure 1 (A, B) Perforation of left superior pulmonary vein into bronchi (white arrowheads: extravasation from pulmonary vein; yellow arrowhead: the tip of cryoballoon catheter; and blue arrowhead: the tip of mapping catheter). (C) Computed tomography image of pulmonary vein (blue arrowhead: left superior pulmonary vein). (D) Pulmonary haemorrhage caused by pulmonary vein perforation. (E) Haemorrhage in left upper branch on bronchoscopy. (F) Post-procedural chemical pneumonitis.

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(a 20-mm Achieve, Medtronic, Minneapolis, MN, USA) and a cryoballoon catheter (a 28-mm Arctic Front Advance, Medtronic) were advanced into the left atrium via a steerable sheath. First, we targeted the left superior pulmonary vein (LSPV). A circular mapping catheter was advanced in the superior branch of the LSPV, and a cryoballoon catheter was positioned at the antrum of the LSPV. Following the first application to the LSPV, the patient developed nose bleeding, and his blood pressure gradually dropped. The venography of the LSPV revealed bleeding from the small branch of the LSPV, perforating into the bronchi (Figure 1A–D; Supplementary material online, Video S1). We intubated the patient to protect his airway (Figure 1E), and neutralized the anticoagulants using idarucizumab and protamine sulfate. We confirmed haemostasis of the perforated pulmonary vein. The patient recovered from a complicated chemical pneumonitis (Figure 1F) and was discharged without a sequela.

Similar to the transcatheter closure of atrial septal defects and transcatheter mitral valve repair, stiff guidewires, or catheters can injure the pulmonary vein in CBA.

A bronchial injury could occur during or after CBA especially in case of low nadir balloon temperature.^{2,3} In our case, the stiff part of the mapping catheter probably damaged the LSPV, which had not previously been reported. Adequate countertraction of a mapping catheter is necessary when a cryoballoon catheter is advanced. Careful handling of the guidewires and catheters is important during CBA, and a specific neutralizing anticoagulant is essential to control bleeding complications.

Supplementary material

Supplementary material is available at *European Heart Journal - Case Reports* online.

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Consent: The author/s confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

Conflict of interest: none declared.

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