

IMAGING VIGNETTE

INTERMEDIATE

CLINICAL VIGNETTE

# Fluoroscopic Appearance of a Single-Wall Cryoballoon Breach During Pulmonary Vein Isolation



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## ABSTRACT

Cryoballoon ablation therapy is increasingly used for pulmonary vein isolation. Its safety and efficacy profile is comparable to that of radiofrequency ablation therapy. Double-wall cryoballoon breaches have been described in published reports. This report presents a case of single-wall cryoballoon rupture captured under fluoroscopy, with no adverse effect on the patient. (**Level of Difficulty: Intermediate.**) (J Am Coll Cardiol Case Rep 2019;1:259–60) © 2019 Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Pulmonary vein isolation (PVI) is well established as an effective treatment in the management of symptomatic atrial fibrillation (AF). Cryoballoon ablation therapy is increasingly used for PVI, with large prospective studies confirming a safety and efficacy profile of cryoballoon ablation comparable to that of radiofrequency ablation therapy (1,2). The Arctic Front cryoballoon (Medtronic, Minneapolis, Minnesota) uses a double-walled balloon that is inflated at the antrum of each pulmonary vein sequentially, thus resulting in isolation of the pulmonary veins (1). There have been a few case reports of double-wall cryoballoon breaches (3). However, to our knowledge such breaches have not been captured for display in published reports. We present a case of single-wall cryoballoon rupture captured under fluoroscopy, with no adverse effect on the patient.

A 56-year-old woman with a 2-year history of palpitations and documented paroxysmal AF with fast ventricular response, unresponsive to medical therapy, was seen in the clinic and was offered PVI to manage her AF. On the day of the procedure, she was in sinus rhythm. Right femoral venous access was gained, and access to the left atrium was achieved through a transseptal puncture in the usual fashion. Pulmonary vein angiography was undertaken and demonstrated standard anatomy. A 28-mm cryoballoon (Arctic Front Advance) housed within a dedicated delivery sheath (FlexCath Advance, Medtronic) was used to carry out cryoablation to the left pulmonary veins.

Attention then turned to the right-sided pulmonary veins. Occlusion of the right inferior pulmonary vein (RIPV) with the cryoballoon proved challenging because of a horizontal takeoff of the vein and a small left atrium. With careful manipulation, a good seal was achieved, and cryoablation was commenced. During cryoablation, an inner balloon rupture was observed. This was fortuitously captured on fluoroscopy (AVI 1), with clear expansion of the balloon diameter visualized (Video 1). The breach in the integrity was automatically detected by the cryoconsole with an instant halt in delivery of cryoablation therapy and balloon deflation. The failure occurred with no ill effect on the patient. After the balloon was replaced, the procedure was completed

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**ABBREVIATIONS  
AND ACRONYMS****AF** = atrial fibrillation**AVI** = audio video interleaved**LA** = left atrium**PVI** = pulmonary vein isolation**RIPV** = right inferior  
pulmonary vein

with further cryoablation to the RIPV and then to the right superior pulmonary vein. Macroscopic inspection of the balloon once it was out of the body failed to provide any added information on the cause of the inner wall breach.

To our knowledge, this is the first case report of an inner wall breach captured on fluoroscopy. The profile and challenging nature of the RIPV may well have been contributing factors. As in this case, 2 of the previous 6 case reports of double-wall rupture occurred during cryoablation of the RIPV. The number of cases is too small to claim an association. However, it is conceivable that the angulation of the catheter and balloon within the constraints of certain types of left atrial anatomy may cause excess forces to be exerted on the balloon and may thereby increase the possibility of balloon rupture. This possibility should be borne in mind by operators during PVI when using cryoablation.

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**KEY WORDS** ablation, atrial fibrillation, electrophysiology

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 **APPENDIX** For a supplemental video, please see the online version of this paper.