Pulsed field ablation through an atrial shunt device

Marc Sky, BMRS(DiagRad), GradDipEP,* Mikaela White, BNurs, GradCertNurs(CV),*†
Nicholas Collins, BMed,*†‡ Andrew Boyle, MBBS, PhD,*†‡
Bradley Wilsmore, MMBS, PhD*†‡

*From the *Lingard Private Hospital, Merewether, Australia, †John Hunter Hospital, New Lambton, Australia, and ‡The University of Newcastle, Callaghan, Australia.*

Introduction

The Corvia atrial shunt (Corvia Medical. Tewksbury, MA) is a novel treatment for patients with heart failure with preserved ejection fraction (HFpEF) and Farapulse pulsed field ablation (Boston Scientific. Marlborough, MA) is a new treatment for atrial fibrillation (AF). Both involve intervention across the interatrial septum. We present a patient with a pre-existing Corvia atrial shunt, treated using Farapulse pulsed field ablation for pulmonary vein isolation and cavotricuspid isthmus (CTI) line ablation.

KEY TEACHING POINTS

- A 16F outer diameter sheath traveled through the Corvia atrial shunt device without resistance and was easily manipulated around the left atrium.
- Accessing the left atrium via the shunt device negated the need to perform a transseptal puncture.
- Left atrial ablation using Farapulse was performed successfully in a patient 7 months post Corvia atrial shunt device insertion.

Case report

The patient is a 50-year-old woman with AF and atrial flutter (AFL), randomized 7 months prior in a trial for treatment of HFpEF to the Corvia atrial shunt. She remains unaware which treatment she had been randomized to. The patient was having weekly palpitations with electrocardiograms documenting both AF and AFL. Symptoms persisted despite rate control. She drinks 2 standard drinks once per week, is a nonsmoker and does not exercise. Her mother and father both have AF. She recently reduced weight from 108 kg to 96 kg on Ozempic. She has severe asthma, so sotalol is relatively contraindicated. Flecainide was not preferred owing to her AFL, HFpEF, and atrial shunt.

On the day of the procedure, the patient was in sinus rhythm. The procedure was performed under general anesthesia and involved 2 venous accesses: for a decapolar catheter in the coronary sinus, and a Boston Scientific Farawave sheath for ablation. We did not use intracardiac echocardiography. Atrial burst pacing with and without isoproterenol 4 mcg/min induced left-sided atrial ectopy and short, self-terminating AF. It was decided to proceed with a pulmonary vein isolation and CTI line ablation using the Farapulse ablation catheter. The 16F Farawave sheath and Farapulse catheter were introduced into the right atrium and a CTI line ablation was performed using the flower configuration of the Farapulse catheter. Then, 200 mcg of intravenous glyceryl trinitrate was given (to reduce coronary spasm) just prior to the 2 pulses at 4 locations. CTI block was confirmed with pacing across the CTI between the Farapulse and Boston Scientific decapolar catheter in the coronary sinus. Following CTI ablation, the Rosen wire inside the Farawave sheath was placed through the Corvia shunt into the left atrium and the Farawave sheath was guided over the wire and through the Corvia shunt into the left atrium without resistance (Figure 1A and 1B). The wire and sheath went easily; even without image guidance, we were able locate and pass the wire and then the sheath within 60 seconds. Heparin was given to maintain a target activated clotting time between 350 and 400 seconds. The Farapulse ablation was advanced to the veins. The catheter and sheath moved easily and freely through the fixed Corvia device to the pulmonary veins without resistance (Figure 1C). Eight pulses per vein were applied (2 × 2 flower, 2 × 2 basket). Following ablation, the catheter was retracted into the

KEYWORDS Atrial shunt; Transseptal; Pulmonary vein isolation (PVI); Corvia; Farapulse; Atrial fibrillation (AF); Heart failure with preserved ejection fraction (HFpEF)
(Heart Rhythm Case Reports 2024;10:280–282)

Address reprint requests and correspondence: Mr Marc Sky, Lingard Private Hospital - 23 Merewether St, Merewether, NSW 2291, Australia. E-mail address: Marc.Sky@healthecare.com.au.

https://doi.org/10.1016/j.hrcr.2024.01.015

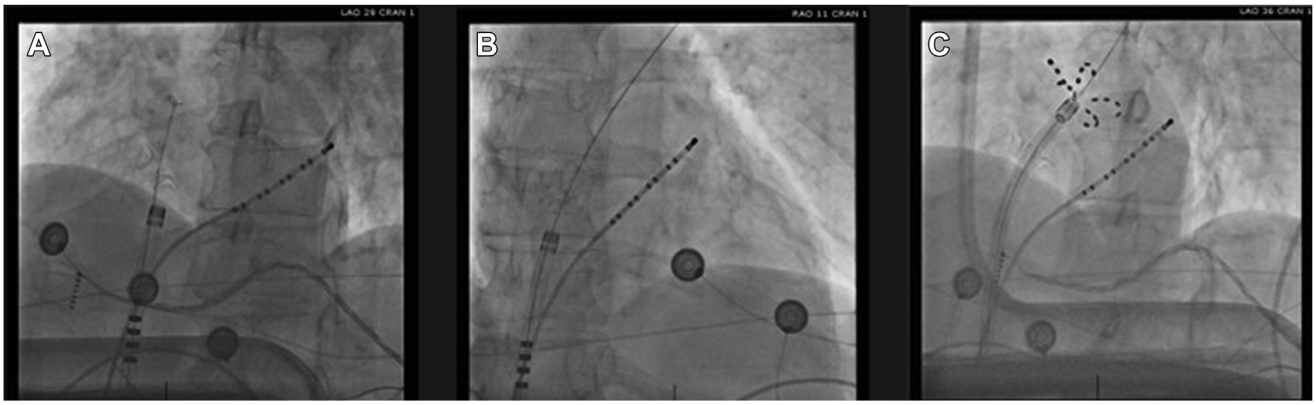

Figure 1 **A:** Wire through atrial shunt, left anterior oblique (LAO) 20°. **B:** Wire through atrial shunt, right anterior oblique 11°. **C:** Flower configuration Boston Scientific Farapulse catheter in left atrium, LAO 36°.

sheath and the sheath was pulled back through the fixed Corvia device into the right atrium without resistance (Figure 2A–2C). There were no complications.

Discussion

Prior to the procedure, the AFL was thought to be typical AFL; however, an atypical AFL using the Corvia could not be ruled out. Ablation would involve the left atrium with concern as to how the Corvia would interact with the electrophysiology wires, catheters, sheaths, and ablation. The primary concerns were as follows: (1) electrophysiology catheters getting caught on an exposed part of the Corvia on either side of the septum that had not been endothelialized; (2) the shunt diameter being too narrow to cross with a sheath owing to endothelialization (the Corvia has an 8 mm shunt diameter[1] and the Farawave sheath that crosses the atrial septum has an outer diameter of 16.8F, which equates to 5.6 mm^2) (3) the safety of ablating tissue close to or on the Corvia in relation to its nitinol material; (4) performing a transseptal puncture in a septum with a Corvia in situ.

Following discussion between the electrophysiologist and the interventional cardiologists that implanted the Corvia, it was decided to proceed with transseptal access via the Corvia.

The procedure was performed as standard for suspected AFL and AF procedures. No changes were made in relation to the patient's having a Corvia atrial shunt other than not using a transseptal needle.

There is an abstract (N = 3) involving Corvia valves that underwent ablation of AF in the left atrium.[3] They did not cross through the Corvia shunt and instead used 3D transesophageal echocardiography to guide dual transseptal punctures and their procedure was performed at least 308 days after Corvia implant. This is the first report

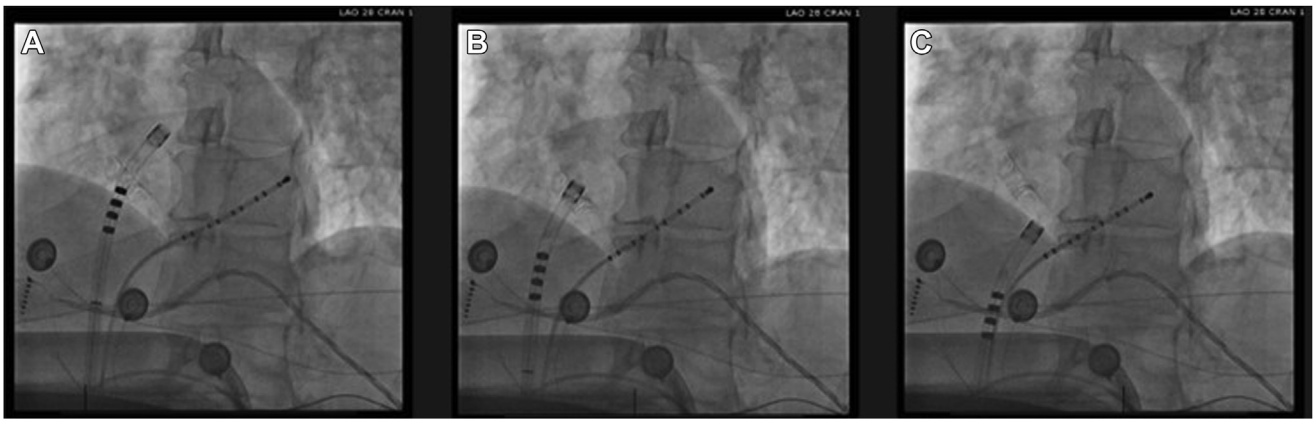

Figure 2 **A–C:** Boston Scientific Farawave sheath being removed from left atrium.

of pulsed field ablation through a Corvia atrial shunt, 7 months postimplant.

There is minimal experience regarding the safety of crossing the Corvia atrial shunt device after device deployment. Patients undergoing atrial septal interventions are typically maintained on dual antiplatelet therapy for a period of 6 months to allow for device endothelialization, and ideally any further procedures involving access to the left atrium should be deferred until that stage. Immediate measurement of the left atrial pressure immediately after Corvia implant has been performed, suggesting early access to the left atrium using low-caliber catheters is safe and feasible.

Funding Sources: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Disclosures: Prof. Nicholas Collins and Prof. Andrew Boyle are investigators on the RESPONDER-HF trial. Dr Bradley Wilsmore receives consultancy fees for Farapulse from Boston Scientific. Mikaela White and Marc Sky have no conflicts of interest to declare.

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