

## Hybrid atrial fibrillation ablation via direct right atrial approach: first-ever case

Eugene H. Chung<sup>1\*</sup>, Mark Joseph<sup>2</sup>, and Andy C. Kiser<sup>2</sup>

<sup>1</sup>Division of Cardiology, The University of North Carolina at Chapel Hill, School of Medicine, 160 Dental Circle CB 7075, Chapel Hill, NC 27599, USA and <sup>2</sup>Department of Surgery, Division of Cardiothoracic Surgery, The University of North Carolina at Chapel Hill, 160 Dental Circle CB 7065, Chapel Hill, NC 27599, USA

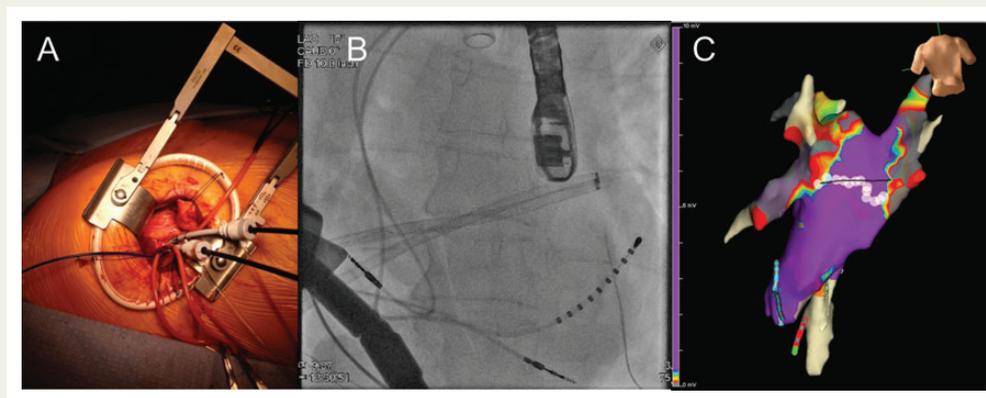
\* Corresponding author. Tel: 919 966 4743; fax: 919 966 4366. E-mail address: ehchung@med.unc.edu

Patients with challenging inferior vena cava (IVC) anatomy, for example from prior surgery or congenital heart disease, may not be eligible for an endocardial catheter ablation for atrial fibrillation (AF). We report, to our knowledge, the first case of a combined epicardial and endocardial AF ablation via a direct right atrial approach in a patient with an occluded IVC filter.

### Case

A 60-year-old female with persistent atrial fibrillation (AF) and flutter was referred for hybrid epicardial-endocardial ablation due to an occluded inferior vena cava (IVC) filter. She had a pacemaker for sinus node dysfunction and an IVC filter for a history of deep vein thrombosis. No guidewire could be passed through the IVC filter during a prior electrophysiology study.

Our hybrid procedure was performed under general anaesthesia with transoesophageal echocardiography (TEE). The patient was in AF at the start. Via right mini-thoracotomy, the pericardium was accessed and unipolar/bipolar radiofrequency (Fusion/Atricure) lesions were placed along the inferior portion of the right atrium (RA), the anterior aspect of the right pulmonary veins (PVs), the inferior/posterior portion of the inferior PVs, the front of the left PVs, and the roof of the LA. The lesion was extended across the top of the RA.<sup>1</sup> During ablation along the posterior LA, the rhythm organized to an atypical flutter then sinus. A decapolar catheter was directly placed through RA into the coronary sinus and secured with purse-string sutures. With fluoroscopy and TEE, a Tuohy needle was used two separate times to puncture the RA free wall and cross the interatrial septum. Left atrial (LA) access was maintained with guidewires over which 12 fr sheaths were positioned in the RA and secured with Rummel tourniquets (Figure 1A). Zurpaz (Boston Scientific) long steerable sheaths were placed in the LA over the guidewires through the 12 fr sheaths (Figure 1B). A PENTARAY (Biosense Webster) catheter was used for 3D-anatomical and voltage maps with the Ensite/NAVX (St Jude Medical) mapping system: purple represents 'healthy' tissue, gray represents scar (Figure 1C). Adequacy of ablation lines was assessed via electrogram abatement. Additional lesions were placed with an open-irrigated CoolPath ablation catheter (St Jude Medical) at areas of signal in the low posterior wall and the anterior aspect of the right superior PV. Assessment of the PVs confirmed entrance and exit block. No arrhythmias were induced and long sheaths were withdrawn. Another decapolar catheter was inserted in one of the 12-fr sheaths and curled along the RA lateral wall. Pacing demonstrated bidirectional conduction along the cavotricuspid isthmus (CTI). Because we had access to the RA, the ablation catheter was inserted into the other 12 fr sheath to create a CTI line to prevent CTI-dependent flutter. Prior to closing the chest, occlusion of the LAA with a 35-mm clip was performed with TEE verification. The patient was treated for moderate pericarditis but otherwise had an



**Figure 1** Hybrid AF ablation utilizing direct right atrial access. To obtain left atrial access, the RA free wall was punctured with a Tuohy needle and the interatrial septum was crossed. Left atrial access was maintained with a guidewire over which a 12 fr sheath was positioned in the RA and secured with Rummel tourniquets (A). After a second transeptal puncture, long steerable sheaths were placed in the LA over the guidewires through the introducing sheaths (B). A PENTARAY (Biosense Webster) catheter was used for a 3D anatomical and voltage map with the Ensite/NAVX (St Jude Medical) mapping system (C).

uneventful recovery. At 30-day and 100-day follow-up, she was in an atrial-paced rhythm. Her AF burden had declined to 41%. We have continued her on dofetilide and oral anticoagulation.

Hybrid epicardial–endocardial AF ablation is rapidly evolving.<sup>2,3</sup> An SVC or subclavian approach with or without magnetic navigation could have been utilized. Given her pacemaker and occluded IVC, we offered her a hybrid approach utilizing direct RA access. We believe our approach could benefit similar patients with challenging venous anatomy as well as have wider applicability as a future technique in patients undergoing hybrid ablation.

**Conflict of interest:** A.K. is a paid speaker and a consultant for Estech. No Estech products were used in this case. The remaining coauthors have no disclosures. E.C. is a consultant for Biosense Webster. He was not a consultant at the time this procedure was performed.

## References

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