Cryoballoon atrial fibrillation ablation with Dacron patch puncture from the internal jugular vein

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Introduction: A 57-year-old female attended with recurrent symptomatic paroxysmal atrial fibrillation (AF) despite treatment with sotalol. Her cardiac history was significant for an atrial septal defect (ASD) with Dacron (Polyethylene terephthalate) patch closure performed at the age of 16 years, and an interrupted inferior vena cava (IVC). Computed tomography (CT) showed a dilated azygous venous system with poly-splenia. Long-term amiodarone was an unattractive option due to side-effect profile and with limited other safe rhythm-control medical options, the decision was made to perform atrial fibrillation cryoballoon ablation.

Methods: Due to the likely absence of a negotiable inferior vena-cava, pre-procedure planning was for a superior approach. Venography performed from the right femoral vein at the start of the procedure confirmed a lack of inferior access and the coronary sinus was subsequently cannulated from the left axillary vein. Left internal jugular vein access was used for phrenic pacing and for trans-septal puncture and subsequent cryo-ablation which required trial of multiple sheaths before the combination of a medium-curve Agilis™ (St Jude Medical) deflectable sheath and HeartSpan® transseptal needle (Merit Medical) was successful under trans-oesophageal echocardiographic (TOE) guidance.

Result: Despite significant tenting of the inter-atrial septum with careful needle advancement it was necessary to apply radiofrequency (RF) energy to the trans-septal needle to puncture the Dacron patch. All four pulmonary veins were then successfully isolated with cryoballoon ablation and AF terminated following the final freeze.

Conclusion: This case illustrates the possibility of overcoming significant anatomical challenges to left atrial access, enabling application of cryoballoon ablation for atrial fibrillation utilising a superior approach. To our knowledge, this is the first documented case of this type to be performed in Australia, and the first in the literature with the added requirement of prosthetic material in the inter-atrial septum for puncture from a superior vena caval approach.