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Approach to ablative management of patient with persistent atrial fibrillation and enduring pulmonary vein isolation.

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Abstract

Enduring isolation of the pulmonary veins (PV) is becoming increasingly common in patients undergoing repeat catheter ablation for atrial fibrillation. We describe our approach to ablation strategy in a patient with enduring isolation of PV and briefly discuss the role of non-PV triggers.

CLINICAL SCENARIO

Sixty-seven year-old hypertensive overweight woman with recurrent persistent atrial fibrillation (AF) having undergone pulmonary vein isolation (PVI) 12 months earlier.

Sinus rhythm was maintained for 6 months following PVI with 3 symptomatic recurrences despite the reintroduction of Sotalol, two of which required electrical cardioversion after 7 days duration. An echo demonstrated normal left ventricular (LV) systolic function with mild to moderate left atrial enlargement. A repeat catheter ablation is performed in AF and you find that all pulmonary veins (PV) are electrically isolated. Please describe your mapping and ablation strategy.

RESPONSE

All catheter ablation procedures are performed under general anesthesia via femoral access with a decapolar catheter placed in the coronary sinus (CS) and a quadripolar

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catheter at the HIS position followed by intravenous administration of 10,000 units of Heparin aiming for an activated clotting time (ACT) of ≥ 350 s. Two separate transseptal punctures are then performed under trans-esophageal guidance (TEE) with an SL1 sheath for the multipolar mapping catheter (20-pole variable curve circular mapping catheter) and the contact force capable irrigated ablation catheter. TEE is then removed followed by insertion of a multi-thermocouple esophageal temperature monitoring probe to guide ablation over the posterior wall.

Upon confirming isolation of pulmonary veins (PV), we would proceed to perform an empiric posterior wall isolation (PWI). Our PWI technique has been described previously.¹ The patient would be cardioverted and PWI performed with CS pacing at 600ms and the circular mapping catheter placed over the posterior left atrium. The timing and directionality of the PW activation are noted prior to ablation. The inferior most aspect of the prior wide antral circumferential ablation (WACA) lesion sets are used as landmarks to perform an inferior line at 25W aiming for a contact force between 10-20g and targeting an ablation index (AI) of 300-400 units² or lesion size index (LSI) of ~ 4.0 units³. These targets are modified by rapid EGM attenuation or if there is rapid esophageal temperature rise. Upon completion of the inferior line and confirmation of bidirectional block, a roof line is performed to complete isolation of the posterior wall. A steerable sheath is generally used for support and stability. If PWI is not achieved with completion of the inferior and roof lines, the mapping catheter is used to identify and target early sites of activation within the posterior wall which are likely to reflect epicardial bridging fibers. Once PWI is confirmed with entrance and exit block, intravenous Adenosine (Usually 12-15mg) is administered to exclude latent conduction.

We would then proceed to non-PV trigger testing with isoproterenol infusion commencing at 4mcg/min increasing to 20mcg/min over a period of 2-3 mins. Isoproterenol at 20mcg/min is continued for at least 10 minutes. This can be increased to 30mcg/min if required.

Non-PV Triggers are defined as:

- (1) Any atrial ectopic that reproducibly (≥ 2) initiates atrial fibrillation,
- (2) Any sustained (>30 seconds) atrial tachycardia
- (3) Any non-sustained (<30 seconds) but repetitive (≥ 2) runs of atrial tachycardia

Non-PV trigger testing is generally performed with a 20-pole deflectable catheter placed over the crista terminalis and activation sequence determined using the decapolar and quadripolar catheters as described previously.⁴ The mapping catheter is then used to localize the atrial tachycardia / ectopic(s) within the respective atrium. Superior vena cava (SVC) is thought to be a common site for non-PV triggers.⁵ Our general approach to ablation strategy in patients undergoing repeat catheter ablation for persistent AF is summarized in Figure 1.

AF ablation can be life-changing. However, any discussion about AF recurrence and repeat ablation procedures will need to acknowledge the 'elephant in the room'. Ablation outcomes are closely linked to patient selection and risk factor modification. Management of risk factors has taken centre stage in recent times with obesity, alcohol and sleep apnea being recognized as AF risk modifiers. Akin to intervention for coronary artery disease, AF ablation needs to be combined with lifestyle and risk factor modification to improve outcomes before and after ablation procedures. This

67y.o women overweight woman will need to consider losing at least 5-10% of her

body weight, abstain or reduce her alcohol intake and be screened for obstructive sleep apnea.

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Figure:

Figure 1: Approach to ablation strategy in patients undergoing repeat catheter ablation for persistent atrial fibrillation (AF). PVI = Pulmonary vein isolation. PV = Pulmonary vein.

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