Role of Remote Magnetic Catheter Navigation-Aided Ablation in a Fontan Patient with Post-MAZE Atrial Tachycardia

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ABSTRACT. We describe a young lady with complex congenital heart disease and recurrent atrial tachycardia after Fontan conversion with the MAZE operation in whom the use of remote magnetic navigation aided the ablation of the atrial tachycardia after conventional mapping and ablation had failed primarily due to lack of maneuverability.

KEYWORDS. atrial tachycardia, catheter ablation, congenital heart disease, remote navigation.

Introduction

Remote magnetic catheter navigation (Stereotaxis, St. Louis, MO) is a novel technique that has been shown to be safe and effective for the mapping and ablation of a variety of arrhythmias. Previous reports have shown it to be useful in children and adults with complex congenital heart disease. We describe a young lady with unusual anatomy where the use of remote magnetic navigation aided the ablation of a post-MAZE atrial tachycardia after conventional mapping and ablation had failed primarily due to lack of maneuverability.

Case report

A 28-year-old woman with previous atriopulmonary Fontan operation for tricuspid atresia was referred for ablation of supraventricular tachycardia (SVT). Previous arrhythmias included sinus node dysfunction treated with an epicardial atrial pacemaker and paroxysmal SVT since age 11. Multiple therapies including antiarrhythmic drugs (amiodarone, flecainide, and sotalol) and two catheter ablation attempts were unsuccessful and so she underwent a Fontan conversion operation with take down of the atriopulmonary Fontan and creation of an extracardiac conduit, a right atrial MAZE procedure, and placement of a dual-chamber atrial antitachycardia pacemaker (EnRhythm, Medtronic, Minneapolis, MN). Unfortunately, her SVT recurred soon after the Fontan conversion operation. She was successfully managed with a combination of dofetilide and atrial antitachycardia pacing for about 7 years.

In 2012, due to exacerbation of palpitations, she underwent an ablation attempt using a baffle puncture of the extracardiac conduit. Despite balloon dilation of the baffle puncture with up to 5-mm balloon catheters, the largest sheath that could be placed across this baffle was a 7.0 French sheath. Magnetic navigation could not be used because of the size of the sheath. Conventional manual mapping using the Carto system (Biosense Webster, Diamond Bar, CA) was compromised by limited maneuverability inside the common atrium. The tachycardia appeared to be a focal atrial tachycardia from the inferior aspect of the right atrium (Figure 1). Lesions at the site did not terminate the tachycardia and the procedure was terminated. She was brought back for ablation and, using progressively upsized cutting balloons (starting at 2.5 mm and progressing to 4 mm) followed by hi-pressure balloon dilation with a 5-mm balloon, a large opening was made in the extracardiac baffle which allowed placement of an 8.5 French sheath into the native right atrium. Using a magnetic navigation catheter, a more detailed map of the atrial anatomy was made. She was found to have a focal atrial tachycardia from a pouch/diverticulum below the coronary sinus (Figure 2). Ablation at this site was successful in terminating the SVT, which could then...
Figure 1: Three-dimensional electro-anatomical activation map of the supraventricular tachycardia using conventional catheter mapping. The red dots at the inferior aspect of the atrium are the lesions placed.

Figure 2: Three-dimensional electro-anatomical activation map of the supraventricular tachycardia using magnetic navigation catheter. Note the blind pouch on the inferior aspect. The red dots inside the pouch are the lesions placed.
not be reinduced. She has remained symptom free for approximately 6 months since this procedure and this is the first time that she has remained free of antiarrhythmic medications since the age of 11.

Discussion

This case illustrates the maneuverability advantages of using a magnetic navigation catheter system in patients with complex anatomy. The extra effort of a larger baffle puncture to place a larger sheath allowing magnetic navigation was, we believe, critical to the successful ablation of the arrhythmia.

References

