

# Remote magnetic navigation catheter ablation for atrial tachycardia in a patient with d-transposition of the great arteries, atrial switch, and a mechanical valve in the tricuspid position

Michał Orczykowski<sup>1</sup>, Magdalena Lipczyńska<sup>2</sup>, Andrzej Hasiec<sup>1</sup>, Piotr Urbanek<sup>1</sup>, Robert Bodalski<sup>1</sup>, Sara Kochańska<sup>3</sup>, Anna Maraszek<sup>1</sup>, Łukasz Szumowski<sup>1</sup>

<sup>1</sup>1<sup>st</sup> Department of Arrhythmia, Arrhythmia Center, National Institute of Cardiology, Warszawa, Poland

<sup>2</sup>Department of Congenital Heart Disease, National Institute of Cardiology, Warszawa, Poland

<sup>3</sup>Department of Radiology, National Institute of Cardiology, Warszawa, Poland

## Correspondence to:

Michał Orczykowski, MD, PhD,  
Ass. Prof. FHRS,  
1<sup>st</sup> Department of Arrhythmia,  
Arrhythmia Center,  
National Institute of Cardiology,  
Alpejska 42, 04–628 Warszawa,  
Poland  
phone: +48 22 343 45 20,  
e-mail: mikeorczyk@gmail.com  
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A 36-year-old male, who underwent Mustard correction for d-transposition of the great arteries (d TGA) at the age of 1 and received a mechanical valve in the tricuspid position (St Jude Medical 31 mm) at 25 due to valve insufficiency, was admitted to our center for catheter ablation of paroxysmal atrial tachycardia. While he remained stable until the age of 35, later he experienced recurrent symptomatic arrhythmias resistant to pharmacotherapy.

Echocardiography revealed post-Mustard correction anatomy without additional abnormalities. Three-dimensional CT displayed a mechanical valve in the tricuspid position, oriented perpendicularly to the sternum (Figure 1A).

The ablation procedure, performed under general anesthesia, utilized the Genesis Robotic Magnetic Navigation System (Stereotaxis, St Louis, MO, US) and a 3D system (CARTO 3, Biosense Webster, Irvine, CA, US).

After double access from the right femoral vein, a deflectable 4-pole, 7F diagnostic catheter (Marinr, Medtronic, US) was placed into the baffle. A transbaffle puncture was conducted under transesophageal echocardiography. Subsequently, the Thermocool RMT ablation catheter (Biosense Webster, US) was advanced to the pulmonary venous atrium (Figure 1B). Bipolar voltage mapping during sinus rhythm was performed (Figure 1C). Due to concerns about catheter entrapment, a Pentaray catheter was not used. Programmed stimulation

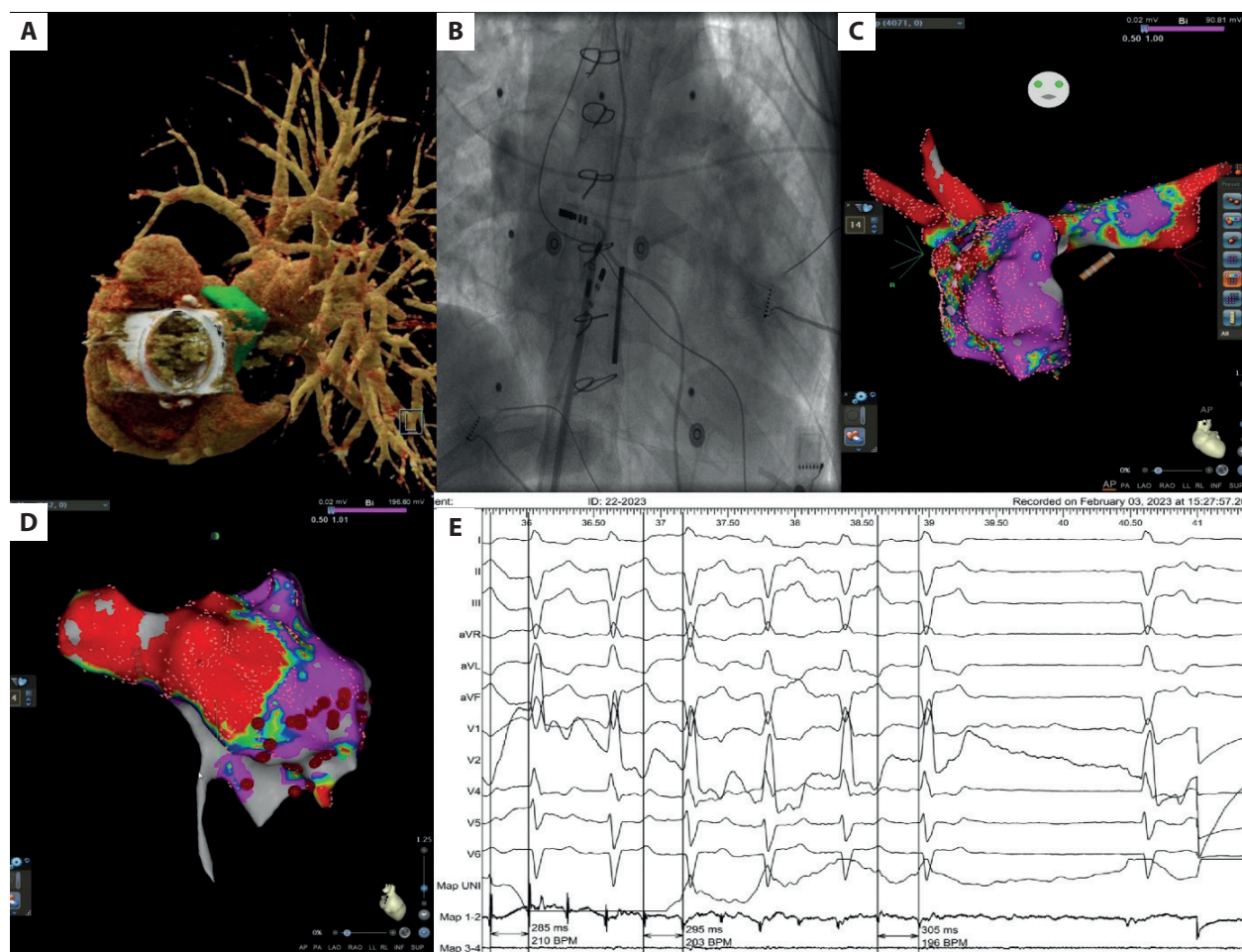
induced atrial tachycardia (AT) with a cycle length of 240 ms and 1:1 conduction to the ventricle.

Entrainment techniques revealed AT dependence on the cavotricuspid isthmus (CTI). Due to the large scar on the right free wall, we were not able to locate the His bundle. Since that block in the CTI in patients after the Mustard correction often requires radiofrequency (RF) delivery in the venous atrium and the baffle, we performed an ablation line from the scar to the mechanical valve in the tricuspid position on the right free wall (Figure 1D).

During the RF application at 48°C and 50 W, the cycle length of AT gradually increased, and sinus rhythm was restored (Figure 1E). The bidirectional block in the created line was confirmed.

Despite an aggressive stimulation program, including up to 3 extra stimuli and burst pacing with and without isoproterenol infusion, no arrhythmias could be induced. The total procedure time and RF time were 360 minutes and 50 minutes, respectively. X-ray exposure was 4.44 mGym<sup>2</sup>, and fluoroscopy time was 23 minutes. Over 11 months of follow-up, no arrhythmias recurred.

In patients with d TGA, the arterial switch has replaced the atrial switch as the preferred surgical procedure, but most adults today have the Mustard or Senning correction, leading to arrhythmias becoming a significant clinical problem [1]. Catheter ablation, though challenging, can be successful [2–4].



**Figure 1.** **A.** Computed tomography scan of PVA and the mechanical valve in the tricuspid position. The green color represents calcification. **B.** Fluoroscopy shows the location of the ablation catheter in the PVA. A diagnostic catheter is positioned as a reference in the baffle. **C.** AP projection of the PVA bipolar voltage map (0.5–0.1 mV) with low voltage areas on the right free wall, **E** PVA bipolar map (0.5–0.1 mV) in the PA projection. **D.** RL projection of the PVA bipolar voltage map (0.5–0.1 mV) with RF lesion sets from the scar to the mechanical valve in the tricuspid position (remapping of the PVA due to the patient’s movement). **E.** Successful radiofrequency application resulted in restoration of sinus rhythm

Abbreviations: AP, anteroposterior; PVA, pulmonary venous atrium; RL, right lateral

This report represents the first successful transbaffle ablation of AT using robotic magnetic navigation (RMN) in a patient with a mechanical valve in the tricuspid position and after Mustard correction for d TGA. The procedure appears to be feasible, safe, and effective.

We have decided to use RMN because, in patients after Mustard correction, some areas in the pulmonary venous atrium are difficult to reach with the manual transbaffle ablation approach. The implementation of the transbaffle puncture technique and RMN offers a promising avenue for successful ablation of arrhythmias, even in the presence of a mechanical valve in the tricuspid position and Mustard anatomy.

### Article information

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