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Can the first radiofrequency application for ablation of atrial tachycardia be successful in patient after Fontan correction? With a little bit of luck… yes

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Can the first radiofrequency application for ablation of atrial tachycardia be successful in patient after Fontan correction? With a little bit of luck… yes

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Short title: Ablation of atrial tachycardia in patient after Fontan correction
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A 42-year-old woman with a history of a single ventricle secondary to tricuspid valve atresia, who underwent a left Blalock-Taussig shunt at age 2, a Fontan atriopulmonary connection at age 10, a radiofrequency ablation of an atrial tachycardia (AT) at age 28, a conversion to a Glenn connection with a 22 mm collagen-coated woven polyester intraatrial tunnel, partial removal of the interatrial septum, and surgical ablation with epicardial pacemaker implantation at the age of 36, was admitted to our institute due to an incessant AT and worsening symptoms of heart failure.

After careful evaluation of the clinical data, due to resistant to pharmacotherapy AT, we decided to perform a radiofrequency catheter ablation. The procedure was performed under general anesthesia. We inserted 2 sheaths into the right femoral vein. From the intraatrial tunnel, we recorded the AT which had a cycle length of 350 ms.

Under transesophageal echocardiography guidance (Figure 1A) and with computed tomography visualization of the intraatrial tunnel course (Figure 1B) we were able to puncture the intraatrial tunnel (Figure 1C and 1D) and successfully dilated the hole in the punctured polyester material.

We attempted the use of an angioplasty balloon but after the first contrast injection, it was discovered that the balloon leaked and during subsequent maneuvers the guidewire was displaced. Successful insertion of the long sheath was achieved with the use of a typical, transseptal-like approach using a needle and long sheath.

We performed a brief 3-dimensional activation map of the right atrium (Figure 1E) with the use of the CARTO 3 system (Biosense Webster, Inc., Diamond Bar, CA, USA) and a reference located within the intraatrial tunnel. We recorded the low voltage, fractionated potentials at the lower part of the atrium (Figure 1F), and with entrainment maneuvers, we confirmed the area as the part of arrhythmia activation. First radiofrequency energy delivery restored sinus rhythm.

We were able to eliminate all fragmented signals in the area and an aggressive programmed stimulation protocol failed to induce any arrhythmias.

Procedure and fluoroscopy times were 310 and 73 minutes, respectively, and radiation dose was 13683 cGy cm^2 and mostly related to tunneling procedures. The patient's oxygen saturation (98%) was unchanged from her prior value before the transtunnel puncture. No complications of the procedure have been noted. The patient was discharged from the hospital in sinus rhythm with a significant clinical improvement. There were no recurrences of arrhythmia at her 6-month follow-up.

In children with univentricular hearts, the introduction of a Glenn shunt followed by the breakthrough correction described by Fontan and Baudet and intracardiac and extracardiac total cavopulmonary connection techniques have improved the outcomes and survival of affected patients. The last 2 techniques are associated with a lower risk of atrial arrhythmias [1]. However, cases in which an arrhythmia occurs can be a real challenge for electrophysiologists.

The implementation of the transtunnel (transbaffle) puncture technique (besides the remote navigation) provides an opportunity for successful ablation of the arrhythmia even in the presence of complex anatomy [2–5].

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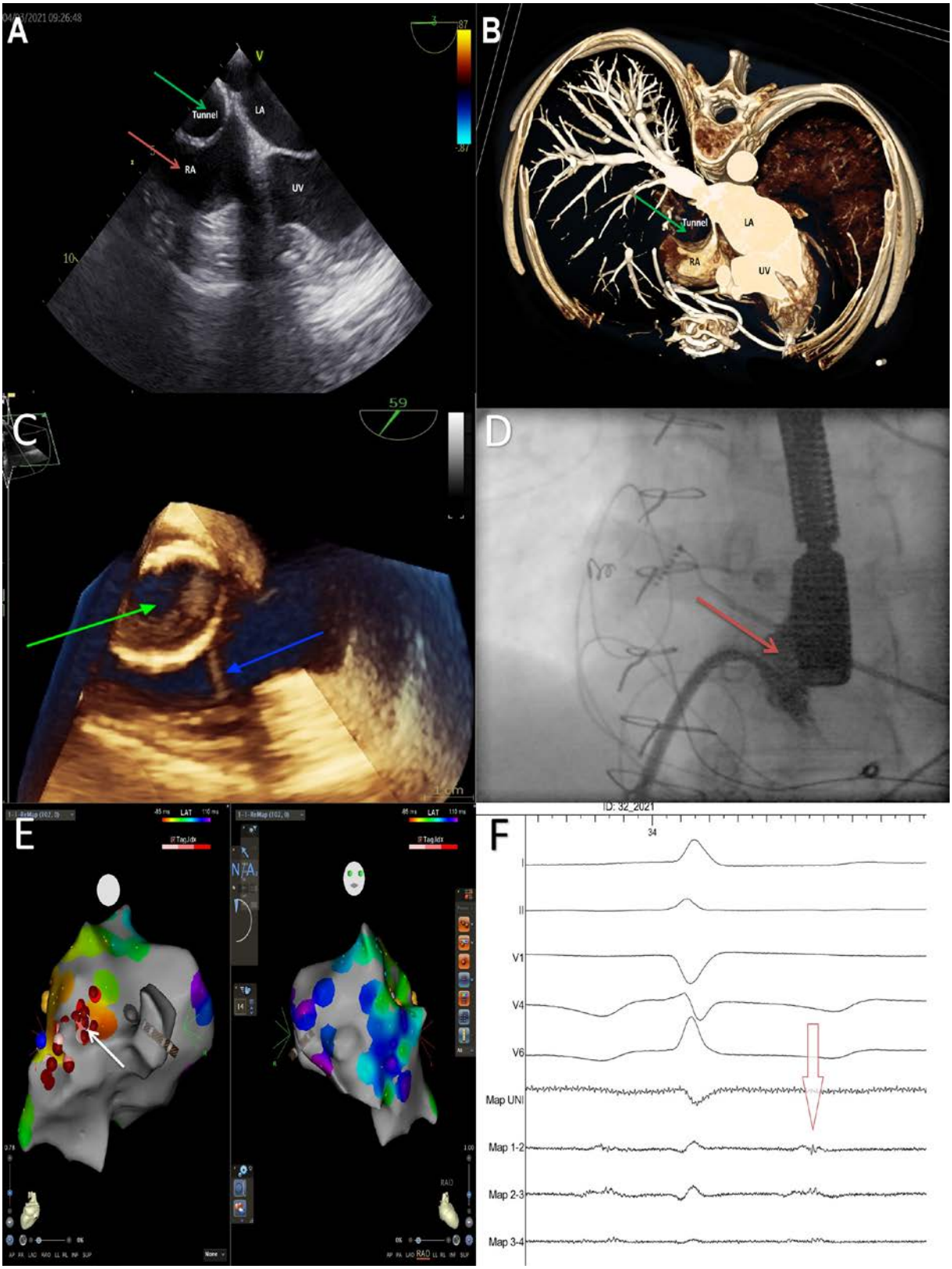

Figure 1. A. Transesophageal echocardiographic visualization of the tunnel (green arrow) and right atrium (red arrow). **B.** Computed tomography visualization of the intraatrial tunnel (green arrow). **C.** Three-dimensional transesophageal echocardiographic visualization of the tunnel (green arrow), right atrium (red arrow), and transeptal sheath (white arrow) after

transtunnel puncture. **D.** Contrast visible in the right atrium after transtunnel puncture (red arrow). **E.** Brief 3-dimensional activation map (CARTO 3) of atrial tachycardia with successful ablation spot (white arrow). **F.** Low voltage, fractionated potentials recorded before successful ablation application.