EP CASE REPORT

Successful catheter ablation of a focal atrial tachycardia originating from the coronary sinus ostium in a patient with a history of Fontan conversion and dextrocardia

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A 44-year-old man with a history of complex congenital heart disease, including a functionally univentricular heart, dextrocardia, and situs ambiguous with the right atrium (RA) and superior vena cava to inferior vena cava (IVC) on the left, and the left atrium (LA) on the right and posteriorly, and multiple cardiac surgeries, developed an atrial tachycardia (AT), and underwent electrophysiological testing. He had undergone right Blalock–Taussig shunt at the age of 4, modified Fontan at the age of 15, and conversion of the Fontan to a total cavopulmonary connection (TCPC) with an extra-anatomic conduit from the IVC to pulmonary artery (PA), bidirectional Glenn shunt, and right and limited left Maze procedure at the age of 36. The pre-procedural computed tomography images revealed that the RA was completely separated into two components after the TCPC with the internal baffle (*Figure 1*). This finding suggested that a transvenous approach could not reach the pulmonary venous atrium (PVA). During the electrophysiological study, a decapolar catheter was placed in the PA through the baffle to record the LA electrogram as a reference for 3D mapping. Activation mapping was performed with a contact force sensing ablation

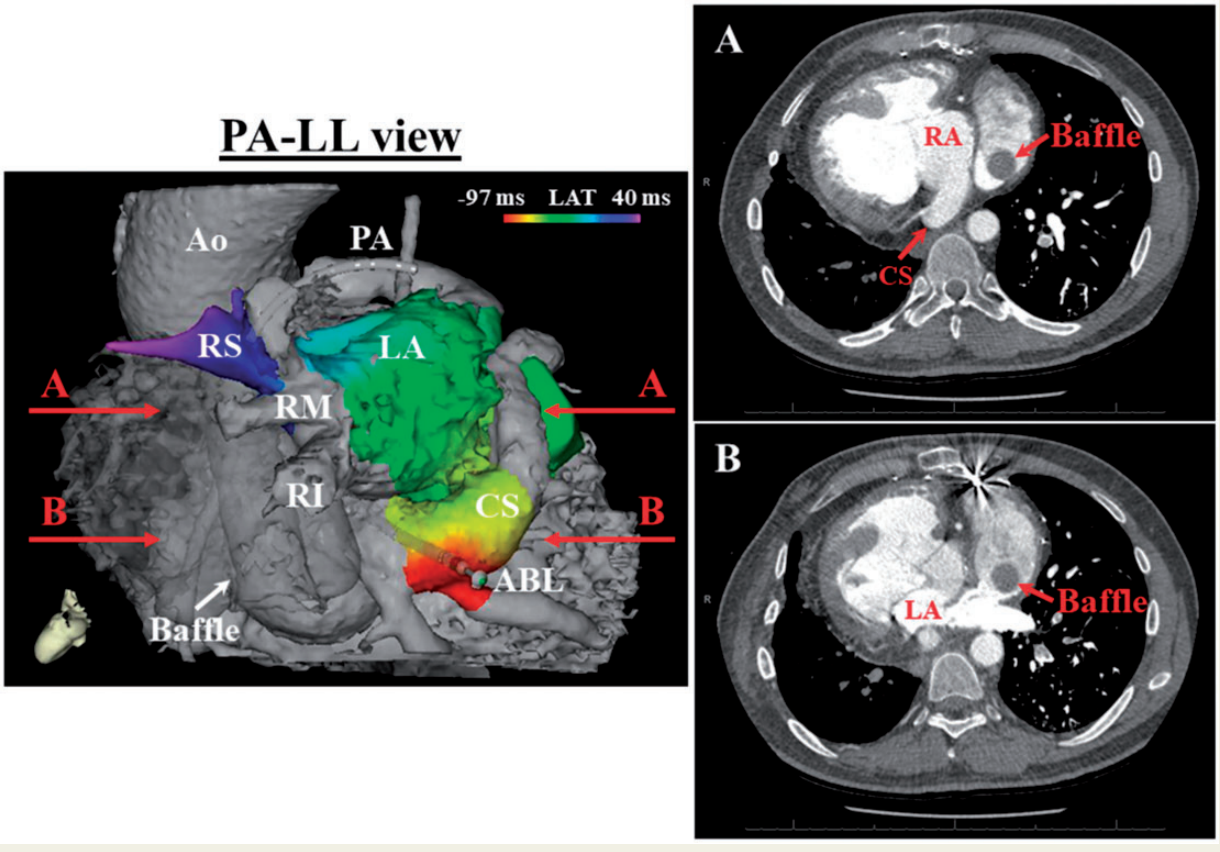

Figure 1 Three-dimensional activation map merged with a computed tomography image (left panel) and two-dimensional computed tomography images (right panels) at the two different levels indicted in the left panel (*A* and *B*). ABL, the ablation catheter; Ao, aorta; CS, coronary sinus; LA, left atrium; PA, pulmonary artery; RA, right atrium; RI, RM, and RS, right inferior, mid, and superior pulmonary veins.

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catheter through a retrograde transaortic approach during the AT, revealing a centrifugal activation pattern from the coronary sinus (CS) ostium. A single irrigated radiofrequency application delivered at this site eliminated the AT. No complications occurred. The patient has been free from any atrial tachyarrhythmias (ATAs) for a follow-up period of >2 years.

Catheter ablation (CA) of ATAs in the Fontan population is challenging because of a complex anatomy, unusual and difficult approach to ATA substrates, and limited availability of 3D mapping. In this case, CA of the AT was more challenging because of dextrocardia, and a history of a TCPC with an extra-anatomic conduit. A retrograde transaortic approach was used because the other techniques to access the PVA such as a transbaffle approach with a potential risk of systemic thromboembolism, and transcatheter entry into the PVA through an area of native tissue,[1] were impossible after the TCPC with an extra-anatomic conduit. For 3D mapping of ATAs, recording of a reference atrial electrogram is necessary, but it would be challenging in patients with a TCPC. This case demonstrated that recording of the LA electrogram within the PA as a reference for 3D mapping was feasible in patients with TCPC. This case report illustrated successful CA of a focal AT originating from the CS ostium in a patient with a TCPC with an extra-anatomic conduit, dextrocardia, and situs ambiguous by using a contact force sensing catheter and 3D mapping system.

Reference

1. Moore JP, Hendrickson B, Brunengraber DZ, Shannon KM. Transcaval puncture for access to the pulmonary venous atrium after the extracardiac total cavopulmonary connection operation. *Circ Arrhythm Electrophysiol* 2015;**8**:824–8.