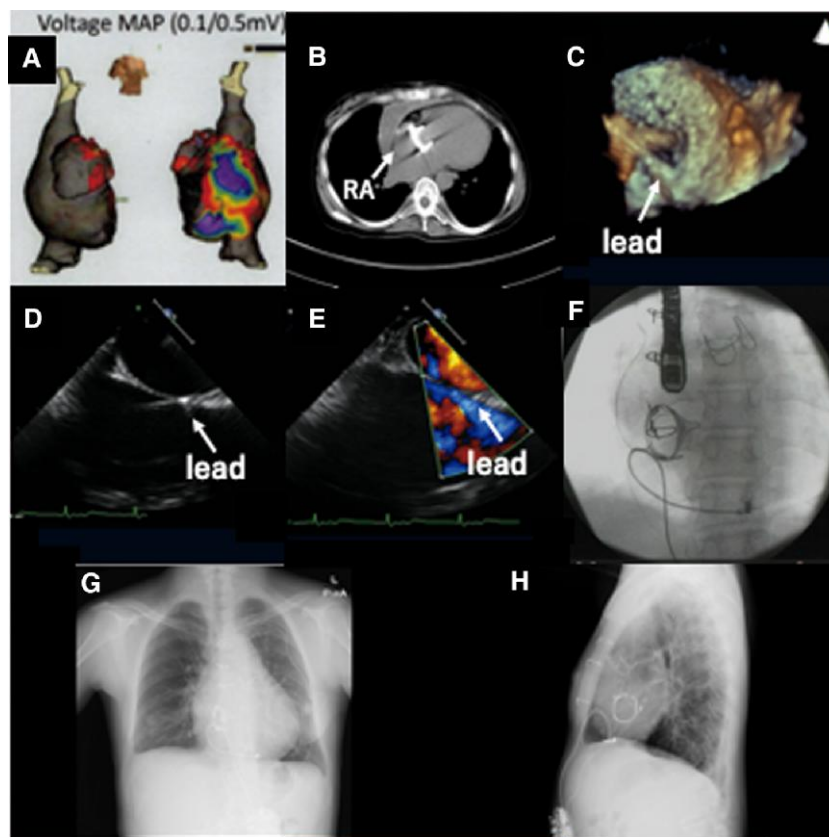


# Catheter delivery system-assisted atrial lead placement in the rim of foramen ovale under transoesophageal three-dimensional echocardiography

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A 45-year-old woman with a history of tetralogy of Fallot required atrial pacing due to sick sinus syndrome (SSS). Before the age of 20 years, she had undergone Blalock-Taussig shunt procedure, ventricular septum defect (VSD) closure, right ventricle outflow tract patch reconstruction, residual VSD closure, and tricuspid/pulmonary valve replacement. She subsequently underwent five catheter ablations for atrial tachycardia. Her last electrophysiology study found a potential in a limited septum section of the right atrium (RA) but no potential in the free wall (*Panel A*). She developed SSS after her fifth ablation at the age of 43 years, and her tricuspid valve stenosis continued to progress. Epicardial pacemaker implantation (VVI) was performed with residual VSD closure, tricuspid valve re-replacement, and RA plication (*Panel B*). Forty-six days later, a highly challenging transvenous atrial lead placement in the RA septum was performed using a stylet delivery system. However, atrial pacing failure occurred after a few months, and her heart failure worsened. We replaced the atrial lead using a catheter delivery system (CDS). The existing atrial lead had dislodged in the narrowed RA and was easily removed. Voltage mapping of the RA using CDS with transoesophageal three-dimensional (3D) echocardiography detected an appropriate zone in the rim of the foramen ovale (*Panels C–E*). The atrial lead was implanted without further dislodgement (*Panels F–H*). All parameters were satisfied (amplitude: 1.3 mV, threshold: 0.9 V/0.5 ms, impedance: 450  $\Omega$ ). CDS and transoesophageal 3D echocardiography may be useful for lead implantation in challenging cases.

## Lead author biography



Mai Ishiwata is a physician at National Cerebral and Cardiovascular Center.

**Consent:** The authors confirm that the consent for submission and publication of this case report has been obtained from the patient.

**Conflict of interest:** K.K. and K.I. received honoraria for lectures from Medtronic Japan Co., Ltd.

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## Data availability

No new data were created or analysed in this article.