Catheter ablation of ventricular tachycardia originating from a coronary arterial-right ventricle fistula

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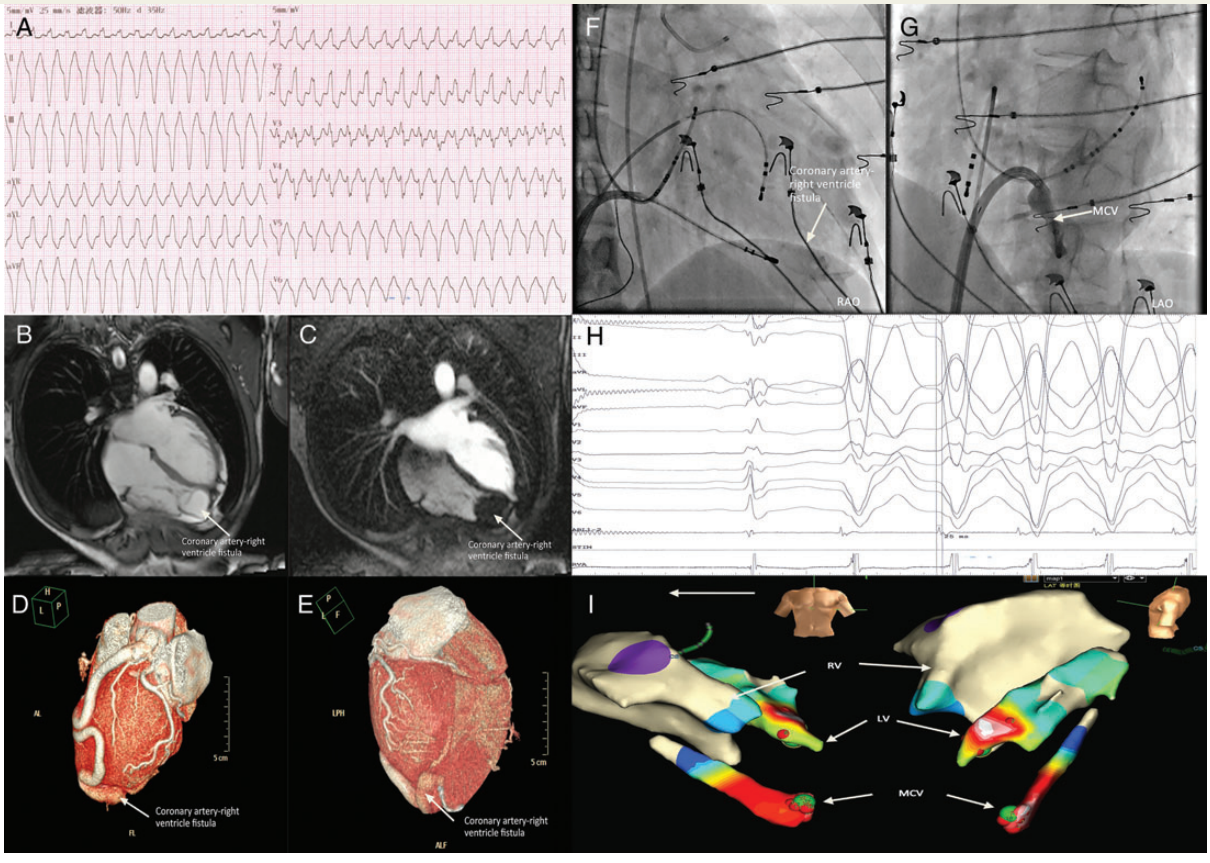
A 38-year-old man was referred to our hospital for radiofrequency catheter ablation of recurrent ventricular tachycardia (VT). In cardiac magnetic resonance imaging and in coronary artery 3D computed tomography, a left anterior descending coronary arterial-right ventricle fistula was noted with its tortuous dilated terminal part forming the aneurysm. Ablation lesion in middle cardiac vein terminated the VT. There was no arrhythmia recurrence during 6-month follow-up.

A 38-year-old man was referred to our hospital for radiofrequency catheter ablation of recurrent ventricular tachycardia (VT). Normal heart outline and an apical high density area was apparent in routine chest roentgenogram; electrocardiography showed left bundle branch block-like VT, originating from the apical area of the right ventricle (RV) (*Panel A*), and echocardiography revealed a sac-like mass connected to the RV apex near to the left ventricular (LV) apex. In cardiac magnetic resonance imaging, the left anterior descending (LAD) coronary artery appeared tortuous and dilated terminating in an aneurysm in the RV (*Panels B* and *C*), and in coronary artery three-dimensional computed tomography, an LAD coronary arterial-RV fistula was noted with its dilated terminal part forming the aneurysm (*Panels D* and *E*). Although in the first RV and LV mapping, the earliest activation area was at LV near the fistula with local potential 17 ms before QRS onset, ablation of this LV apical lesion did not terminate the VT. Because the patient refused cardiac surgery to obliterate the fistula, we performed a second mapping procedure of the coronary sinus branches. As soon as the ablation catheter entered the middle cardiac vein (MCV) (*Panels F* and *G*), a local potential 25 ms prior to QRS onset was recorded (*Panels H* and *I*). Coronary angiography



showed that the aneurysm formed by the terminal part of fistula was near the MCV. Ablation lesion (green point in *Panel I*) in MCV terminated the VT, rendering it non-inducible (four applications at 40°C/40 W). There was no arrhythmia recurrence during 6-month follow-up.

Discussion

To our knowledge, this is the first case report of successful catheter ablation for VT, originating from a rare coronary arterial-RV fistula with an aneurysm near the middle coronary vein; epicardial ablation in MCV terminated the VT.

Ischaemia, scar, abnormal automaticity might underlie VT origin from coronary fistulae. In the patient reported here, VT did not appear secondary to re-entry induced by ischaemia, favouring triggering activity, or abnormal automaticity, but micro-re-entry could not be excluded. Catheter ablation circumvents the risk of new ischaemia or infarction secondary to ligation or intervention occlusion of the fistula, which would have rendered it more difficult to eliminate the VT.

A review of the literature revealed four previous case reports on different treatment modalities for VT, originating from coronary arteriovenous fistulas. Sueda reported on a coronary arteriovenous fistula with a mild left-to-right shunt in a 22-year-old man with VT for 8 years. The coronary fistula was presumed to be the cause of VT; however, the VT persisted 4 years after its surgical closure. In catheter endomyocardial mapping and coronary angiography, the coronary artery was intact and a pre-excitation area was located in the LV apicolateral wall; surgical cryoablation (−150°C) to the LV posteroseptal wall terminated the VT.[1] Moro-Serrano reported that ligation of a coronary arteriovenous fistula in a patient suffering from VT eliminated the arrhythmia.[2] Corvaja reported a case of exercise-induced VT associated with coronary arteriovenous fistula that was corrected by transcatheter coil embolization.[3] The long-term effectiveness merits watchful follow-up in the case reported here.

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