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Influence of Coronary Artery Fistulae on the Diagnosis of Ischemia

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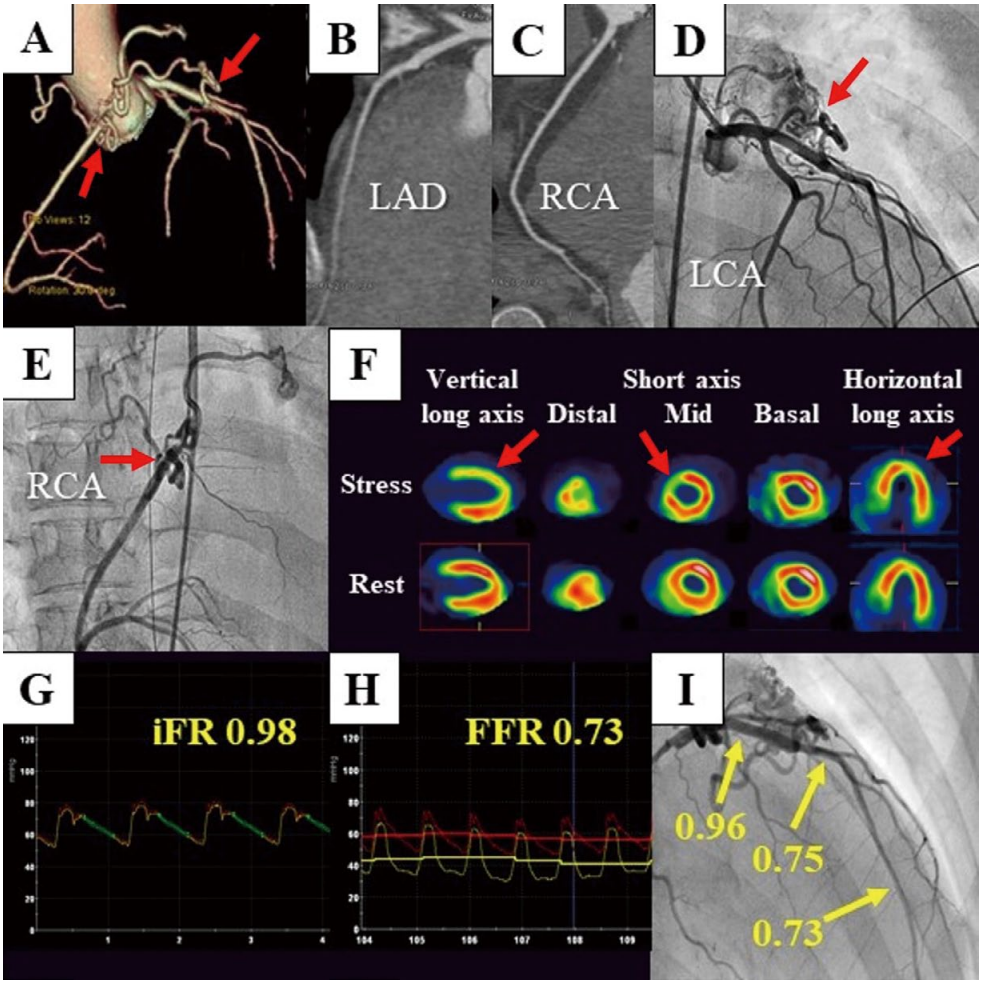

Figure. (**A**–**E**) Coronary angiography and coronary computed tomography angiography showing fistulae originating from both coronary arteries to the pulmonary artery. (**F**) Myocardial perfusion scan showing reversible hypoperfusion in the anterior wall. (**G**,**H**) Fractional flow reserve (FFR) was 0.73, in contrast to the index at rest. (**I**) FFR increased across the fistula on pullback recording. iFR, instantaneous wave-free ratio; LAD, left anterior descending artery; LCA, left coronary artery; RCA, right coronary artery.

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A 44-year-old woman admitted with cardiac arrest consequent to ventricular fibrillation (VF) was investigated after stabilization. Coronary angiography and coronary computed tomography angiography showed fistulae originating from both coronary arteries to the pulmonary artery, without coronary stenosis (**Figure A**–**E**). Myocardial perfusion scans (MPS) with i.v. adenosine triphosphate (ATP) showed reversible hypoperfusion in the anterior wall (**Figure F**). Associated intracardiac shunt disease was not observed on echocardiography. On right heart catheterization, the shunt ratio was low (Qp/Qs=1.1). The left anterior descending artery (LAD) was assessed physiologically to investigate the anterior wall ischemia on MPS. The instantaneous wave-free ratio (iFR) was 0.98, but the fractional flow reserve (FFR) with ATP was 0.73 at the distal LAD (**Figure G**,**H**) and increased from 0.75 to 0.96 across the fistula (**Figure I**). The patient underwent implantable cardioverter defibrillator placement as a secondary prevention measure for VF, without any intervention for the fistulae.

Isolated iFR and Qp/Qs measurements cannot dictate treatment. FFR and MPS during hyperemia were suggestive of myocardial ischemia but were unrelated to coronary stenosis and may have been caused by the marked increase of fistulous blood volume. The resistance of the fistulae to coronary flow may be lower than that of the entire myocardial microvasculature. Therefore, the blood volume passing through the fistulae may increase, leading to dramatic pressure reductions proximal to the fistulae during hyperemia. Measuring both iFR and FFR may improve understanding of coronary hemodynamics in coronary artery disease with fistulae.

Disclosures

The authors declare no conflicts of interest.