Computed Tomography Image of a Coronary Arcade, an Intercoronary Communication

Yoshihiro Yamada, MD, PhD; Keiki Sugi, MD, PhD;
Kenji Fukushima, MD, PhD;
Toshihiro Muramatsu, MD, PhD;
Shintaro Nakano, MD, PhD

A 57-year-old female with dyspnea presented to the emergency department of Saitama Medical University International Medical Center. Coronary angiography revealed significant stenosis in right coronary artery (RCA; **Figure A**). Notably, an abnormal bidirectional flow in distal RCA was observed (**Figure A**). A coronary angiogram of the left coronary artery was subsequently performed and revealed a toing-and-froing of contrast media in the distal left circumflex artery (LCX; **Figure B,C**; **Supplementary Movie**). Coronary computed tomography angiography (CCTA) demonstrated an epicardial anastomosis between the distal RCA and LCX forming an arcade, which caused the abnormal flow of contrast material (**Figure D,E**). Curved planar reconstruction images of the RCA and LCX showed the anastomosis of large and straight epicardial arteries (**Figure F**). A stress-rest myocardial perfusion study revealed no inducible ischemia in the left ventricle.

Intercoronary communication (ICC) is a rare anomaly with uni- or bidirectional blood flow between 2 or more coronary arteries, with the most common type being between the RCA and LCX.^{1,2} Several investigations have reported that the incidence of ICC is less than 0.05% on invasive coronary angiograms.³ ICC should be distinguished from coronary collaterals in the obstructive disease, which are mostly smaller in diameter and non-terminal. However, in this case, significant stenosis in the RCA was observed. We performed stress-rest myocardial perfusion imaging to identify transient ischemia caused by RCA stenosis, but no

significant reversible ischemia was identified. In this case, we still speculate that the epicardial communication was acquired; the form of connection was not typical collateral course. Sufficient supply from collateral flow from the LCX protected the distal RCA territory, and it was speculated that the patient's dyspnea was due to inducible ischemia in the right ventricle, which perfusion imaging was not able to detect.

In this case, CCTA was useful to visualize the whole cardiac structure, including anomalous coronary formation.

Disclosures

The authors declare no conflicts of interest.

References

1. Abreu G, Nabais S, Enes V, Marques J, Costa J, Correia A. Coronary arcade: A rare anomaly of the coronary circulation. *Rev Port Cardiol* 2014; **33**: 241.e1–241.e5.
2. Gholoobi A, Vojdanoparast M. Anomalous intercoronary communication with unidirectional flow in the absence of obstructive coronary artery disease: A case report. *J Tehran Heart Cent* 2016; **11**: 203–205.
3. Yamanaka O, Hobbs RE. Coronary artery anomalies in 126,595 patients undergoing coronary arteriography. *Cathet Cardiovasc Diagn* 1990; **21**: 28–40.

Supplementary Files

Supplementary Movie

Please find supplementary file(s):
<http://dx.doi.org/10.1253/circj.CJ-21-0763>

Received August 26, 2021; revised manuscript received September 10, 2021; accepted September 14, 2021; J-STAGE Advance Publication released online October 14, 2021 Time for primary review: 3 days

Department of Cardiology (Y.Y., K.S., T.M., S.N.), Department of Nuclear Medicine (K.F.), Saitama Medical University International Medical Center, Hidaka; Department of Cardiology, JA Gifu Kouseiren Chuno Kousei Hospital, Seki (Y.Y.), Japan

Mailing address: Kenji Fukushima, MD, PhD, Department of Nuclear Medicine, Saitama Medical University International Medical Center, 1397-1 Yamane, Hidaka 350-1298, Japan. E-mail: kfukush4@saitama-med.ac.jp

All rights are reserved to the Japanese Circulation Society.

For permissions, please e-mail: cj@j-circ.or.jp

ISSN-1346-9843

Figure. (A) Coronary angiography demonstrated significant stenosis in the mid right coronary artery (RCA; red arrow). (A–C) An abnormal bidirectional flow was found in a distal site of the RCA and left circumflex artery (LCX; yellow arrows). (D,E) Coronary computed tomography angiography revealed an epicardial anastomosis between the distal RCA and LCX forming an arcade (yellow arrows). (F) Curved planar reconstruction images of the RCA and LCX showed an anastomosis of the large epicardial arteries (yellow arrows). (G) Bulls eye map for the stress-rest myocardial perfusion imaging study (Upper, stress; Lower, rest). No significant inducible ischemia was observed.