An Extremely Rare Coronary Variation: Direct Communication between the Circumflex and Right Coronary Arteries

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Abstract

Keywords

- open-ended circulation
- intercoronary communication
- coronary artery variation

Coronary collateral circulation frequently develops in the presence of obstructive coronary lesions as an alternative source of blood supply. We present a case of rare direct communication between the circumflex and right coronary arteries in a 30-year-old male with continuity between the distal segments of the circumflex and right coronary artery and no coronary artery stenoses. Direct intercoronary connections may be seen in the absence of an occlusive coronary lesion, as a remnant of the fetal circulation in adult life. We present this case to increase awareness of this rare coronary variation and its clinical implications.

Coronary collateral circulation (i.e., intra- and intercoronary anastomoses) frequently develops in the presence of obstructive coronary lesions as an alternative source of blood supply.¹ Rarely, direct intercoronary connections (intercoronary continuity, open-ended circulation pattern) may be seen in the absence of an occlusive coronary lesion, as a remnant of the fetal circulation in adult life.²

We present a case of rare direct communication between the circumflex and right coronary arteries in a 30-year-old male who died from a noncardiac reason. Postmortem anatomical dissection revealed the continuity between the distal segments of the circumflex and right coronary artery and no coronary artery stenoses (► **Fig. 1**). A tortuous connecting vessel lying in the posterior atrioventricular groove had a diameter similar to that of the distal portions of the communicating arteries suggesting that the connection was functional in vivo.

Although open-ended coronary circulation is encountered in only 0.001 to 0.05% of all diagnostic coronary angiographies,³ the importance of being aware of this rare coronary variation is twofold. First, despite being distinct from coronary collaterals, intercoronary continuity can potentially be confused with collateral arteries occurring in patients with coronary occlusions, leading to the misinterpretation of coronary angiograms.⁴ Second, this coronary anomaly could be functionally significant—the presence of intercoronary continuity has been reported to have a protective role if occlusive coronary artery disease develops in one of interconnected vessels,⁵ but it has also been linked to causing myocardial ischemia via coronary steal phenomenon.⁶

We present this case to increase awareness of this rare coronary variation, as the number of anatomical and angiographic descriptions of this congenital coronary anomaly is very limited.

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Fig. 1 The posterior surface of the heart showing the intercoronary communication between the LCx and RCA (arrowheads in the upper panel). After arising from the aortic bulb (Ao), the RCA and left coronary arteries had usual epicardial path and branching pattern on the sternocostal heart surface (bottom panel). After curving around the corresponding heart margins, the terminal portions of both arteries formed a tortuous connecting vessels lying in the posterior atrioventricular groove. LAD, left anterior descending coronary artery; LCx, circumflex; PA, pulmonary artery, RCA, right coronary artery.

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