

Cardiac Imaging

Intercoronary Communication Between the Circumflex and Right Coronary Arteries: A Very Rare Coronary Anomaly

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A 54-year-old man came to our clinic with chest discomfort suggesting stable angina pectoris. He had hypertension and smoking as risk factors for coronary artery disease. Physical examination was entirely normal. Resting ECG revealed negative T waves on anterolateral leads. Coronary angiography demonstrated critical coronary lesions in the proximal part of the left anterior descending artery and the mid-portion of the diagonal branch, and non-critical lesions in the proximal part of the right coronary artery and the mid-portion of the obtuse marginal branch of the circumflex artery. Selective injection of the right coronary artery showed retrograde filling of the circumflex artery, whereas left coronary injection did not fill the right coronary artery (unidirectional intercoronary communication) (Figure 1). Percutaneous coronary intervention was recommended to the patient, but he refused. For 3 months his follow up under medication has been uneventful.

Intercoronary communication is a very rare coronary artery anomaly with a prevalence of 2.37/100,000. It is defined as an open-ended circulation with bidirectional blood flow between two coronary arteries.^{1,2} It can be distinguished from collateral arter-

ies by its angiographic features, and in itself does not usually reflect an underlying coronary artery disease.³ Two types of intercoronary communication have been defined: 1) between anterior and posterior interventricular arteries in the distal portion of the posterior interventricular groove; and 2) between the distal right coronary artery and circumflex arteries in the posterior atrioventricular groove, as described in our case.⁴

It is thought that this connection is of congenital origin. The histological structure has the characteristics of a normal arterial wall, so that persistence of the foetal coronary circulation has been suggested as the underlying mechanism. Intercoronary arterial connections are larger in diameter, extramural, and straight compared with collaterals. Also, the histological structure of the connecting vessel has the characteristics of a normal arterial wall, with a well defined muscular layer.

There are conflicting views regarding the functional significance of an intercoronary connection. It may play a protective role if lesions develop in one of the two vessels it links together;⁵ on the other hand, it could be a cause of myocardial ischaemia, if the unidirectional intercoronary communication causes a coronary

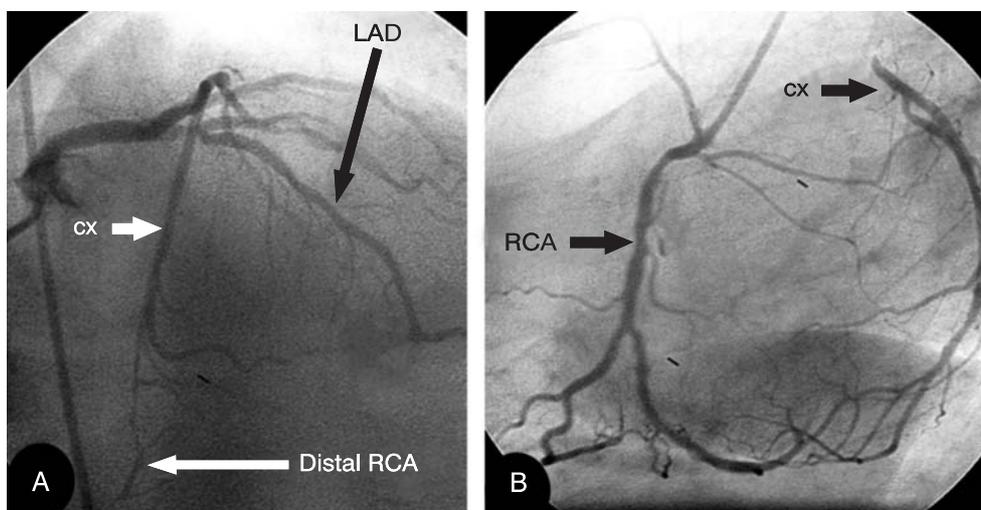


Figure 1. A. Injection of the left coronary artery showed a connection between the circumflex artery and the distal part of the right coronary artery. In this angiographic view, it is not clear whether the connection is an intercorony communication or retrograde filling of an occluded right coronary artery by collaterals. B. Selective injection of the right coronary artery showed retrograde filling of the circumflex artery via the communication (unidirectional intercorony communication). Note the absence of critical lesions involving right coronary and circumflex arteries. CX – circumflex artery; LAD – left anterior descending artery; RCA – right coronary artery.

steal phenomenon that results in inadequate perfusion.⁴ Possible ischaemic consequences of an intercorony connection with unidirectional flow may be explained by its potential similarity to a fistula from a coronary artery to a low pressure cardiac space, as in a case described by Androulakis et al.⁶ Therefore, the potential protective role of an intercorony connection is questionable. In our patient, there were critical stenotic lesions leading to ischaemic manifestations, but additional unidirectional flow from the right coronary artery to the circumflex artery might have exaggerated the ischaemic symptoms.

In conclusion, intercorony communication is a very rare coronary anomaly that is highly likely to be of congenital origin. It must be distinguished from collaterals, especially in patients who have coronary atherosclerosis, and its protective role against coronary ischaemia is dubious.

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