A Patient With Bicuspid Aorta and Intercoronary Continuity

A Rare Variant of Coronary Circulation

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SUMMARY

Bidirectional flow in patients with normal coronary arteries is an indicator of intercoronary continuity, a rare variant of coronary circulation, distinct from collaterals. The case of an 18 year old Turkish male with bicuspid aorta and intercoronary artery is reported and different aspects of this interesting entity are emphasized. (Jpn Heart J 2004; 45: 153-155)

Key words: Coronary angiography, Coronary circulation, Coronary anomalies, Bidirectional flow

BIDIRECTIONAL coronary flow is frequently seen in patients with severe coronary stenosis and after coronary artery by-pass surgery. In patients with normal coronary arteries, it is an indicator of intercoronary continuity or the so called "coronary cascade".

CASE

An 18 year old boy presented with exertional chest pain in the left arm. His past medical history was unremarkable. He had none of the classical risk factors for coronary artery disease. Physical examination revealed a 4/6 systolic ejection sound radiating to the carotids and a 2/6 diastolic murmur. ECG revealed sinus rhythm with signs of marked left ventricular hypertrophy. Echocardiography showed left ventricular dilatation and hypertrophy, a severely calcified aortic valve with severe regurgitation and a mean gradient of 52 and peak gradient of 75 mmHg. Transesophageal examination demonstrated a bicuspid aorta as the underlying pathology. Coronary angiography showed normal coronaries but during left coronary injection the distal part of the right coronary artery (RCA) was

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visualized. During right coronary injection, the posterolateral branch could not be visualized completely and a flow reversal with contrast dilution indicating bidirectional flow was observed. Simultaneous injection of contrast material into the right coronary and circumflex (Cx) ostia revealed an interarterial continuity between the RCA and Cx (Figure).

Intercoronary continuity, a rare variant of the coronary circulation, has been reported as the anatomical cause of bidirectional flow by several authors. Its presence was demonstrated in patients with and without coronary narrowing.[1-3] The true prevalence of this entity is unknown. Atak, *et al* reported one case among 7,986 angiograms.[4] Our case was the first among 12,674 angiograms performed during the last five years. In a postmortem study of 100 human hearts from individuals with an average age of 61 years, 7 cases of intercoronary artery were described.[3] The authors described two types: 1) most common was the continuity between the anterior and posterior interventricular arteries in the distal portion of the posterior interventricular groove, and 2) continuity between distal RCA and Cx arteries in the posterior atrioventricular groove, as described in the present case. In all described cases intercoronary continuity was by means of a single vessel in the epicardial position with a diameter similar to that of the termi-

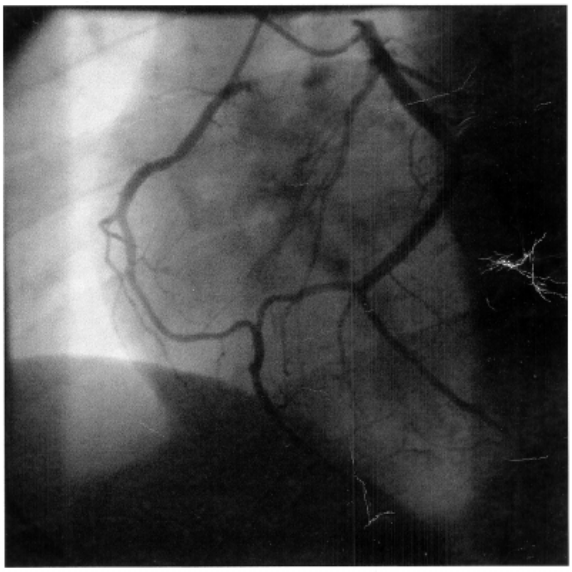


Figure. Simultaneous injection of right and left coronary ostia: Interarterial continuity between RCA and Cx.

nal portions of the connected arteries, usually ≥ 1 mm. The histologic structure has the characteristics of a normal arterial wall so that persistence of the fetal coronary circulation was suggested as the underlying mechanism.[3] The association with other congenital anomalies as in the described case is unknown. The functional significance of these connections is unclear and some authors speculated that they would represent a potential "self-cure" for obstructive disease.[2] However Donaldson, *et al* reported a case with > 95% narrowing of the RCA in which LAD (left anterior descending artery)-PDA (posterior descending artery) continuity did not prevent extensive transmural infarction in the distribution of the PDA, so that the theoretical protective role of "the potential self-cure" is questionable.[1]

In summary, intercoronary continuity, a variant of coronary circulation distinct fom collaterals, is an interesting entity. Its potential role in protecting jeopardized myocardium and association with other congenital anomalies as well as its true prevalence are points that need to be further investigated.

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