

Anomalous Origin of Left Anterior Descending Coronary Artery from Right Coronary Artery Associated with Hypertrophic Cardiomyopathy

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Abstract

The anomalous origin of the left anterior descending (LAD) coronary artery from the right coronary artery (RCA) is a rare congenital anomaly. Herein we report an adult male referred to our hospital for an evaluation of his chest pain. Echocardiography revealed hypertrophic cardiomyopathy. Coronary angiography revealed an anomalous origin of the LAD from the RCA. Such an association constitutes an extremely rare congenital condition (*Iranian Heart Journal 2008; 9 (2):59-61*).

Key words: anomalous coronary artery ■ hypertrophic cardiomyopathy

Case report

A 35-year-old male was referred for an evaluation of his chest pain to the cardiology ward. His chest pain was atypical for ischemia, and he had no history of hypertension, diabetes mellitus or smoking, but he had hypercholesterolemia. Cardiac auscultation revealed an S4 sound. A twelve-lead-electrocardiogram showed sinus rhythm and T-wave inversion in the precordial leads. Two-dimensional echocardiography showed hypertrophy of both ventricles with no gradient in the left ventricular outflow tract. No regional wall motion abnormality was found (Fig. 1).

The patient underwent angiography for diagnostic clarification. Contrast injection in the left coronary artery showed a normal left circumflex coronary artery, but the left anterior descending (LAD) coronary artery was not visualized in its normal course (Fig. 2).



Fig. 1. Apical four-chamber view echocardiography revealing biventricular hypertrophy.

Right coronary artery (RCA) angiography revealed a normal RCA as well as an LAD which originated from the ostial part of the RCA (Fig. 3).

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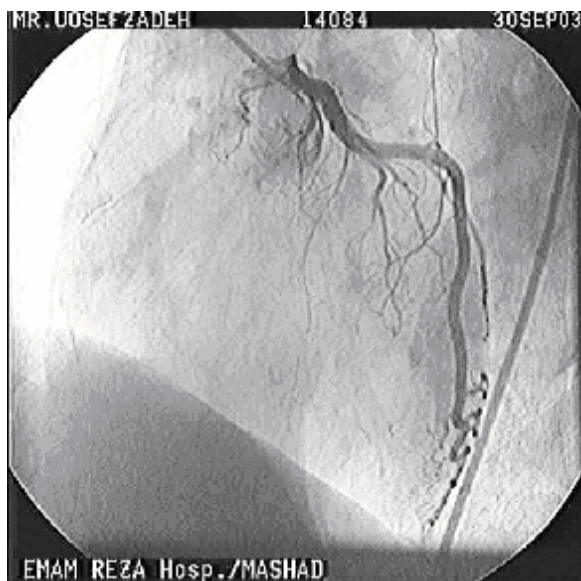


Fig. 2. Left coronary angiography in the cranial left anterior oblique view revealing left circumflex coronary artery and absent left anterior descending coronary artery.

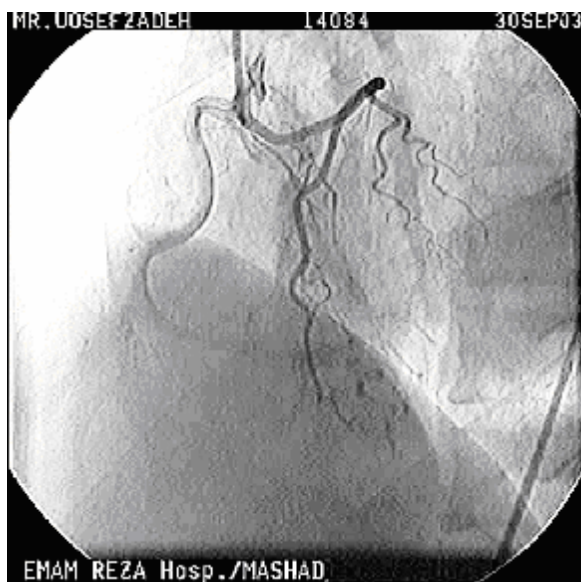


Fig. 3. Right coronary angiography in the left anterior oblique view revealing a left anterior descending coronary artery arising from the right coronary artery.

There was no angiographic evidence of atherosclerosis, myocardial bridge or compression of the LAD. The patient was discharged on β -blockers. On one year's follow-up, he was asymptomatic and in good general status.

Discussion

The anomalous origin of the LAD from the RCA is a rare coronary anomaly but is occasionally seen in the tetralogy of Fallot. This anomaly has been reported to occur in 0.01-0.07% of patients undergoing cardiac catheterization and 1.2-6.1% of those with an isolated coronary anomaly.^{1,2} There are three variations in the initial course of the LAD:³

1- anterior to the right ventricular infundibulum (anterior type),

2- between the aorta and the pulmonary trunk (intra-arterial type), and

3- in the ventricular septum beneath the right ventricular infundibulum (septal type).

Rigatelli proposed a classification based on clinical relevance and including four classes as described in Table II.⁵

Table II. Clinical relevance-based classification of coronary artery anomalies in the adult

Class	Coronary Artery Anomalies
I-benign	Ectopic origin of the LCx from the RS Separate origin of the LCx and LAD Ectopic origin of the LCx from the RCA Ectopic Coronary origin from AO Dual LAD type I-IV* Myocardial bridge (score \leq 5)** Inter-coronary circulation
II-Relevant	Coronary artery fistula Single coronary artery R-L, I-II-III, A-P [§] Ectopic origin of LCA from the PA Atretic coronary artery Hypoplastic coronary artery
III-Severe	Ectopic origin of the LCA from the RS Ectopic origin of the RCA from LS Ectopic origin of the RCA from the PA Single coronary artery R-L, I-II-III B [§] Myocardial bridge (score 5)
IV-Critical	Class II and superimposed CAD Class III and superimposed CAD

AO=ascending aorta; CAD=coronary artery disease; LAD=left anterior descending coronary artery; LCA=left coronary artery; LCx=left circumflex coronary artery; LS=left sinus; PA=pulmonary artery; RCA=right coronary artery; RS=right sinus. *according to the classification of Spindola-Franco et al.⁴; ** according to Angelini et al.⁶; § according to the classification of Lipton et al.⁹

This case was considered class I according to Rigatelli's classification. It is not associated with invariable events in the absence of coronary atherosclerosis.^{6,7}

In the present report, we found a rare anomalous coronary artery in association with hypertrophic cardiomyopathy. To our knowledge, this combination has not been previously reported. In the present case, there was no angiographic evidence of myocardial bridge, compression on the LAD or any atherosclerotic lesion.

The mechanism proposed by the authors to explain the chest pain in this patient is that responsible for hypertrophic cardiomyopathy.

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