



Case Report

Single Coronary Artery with Anomalous Origin of the Right Coronary Artery from the Distal Portion of Left Circumflex Artery: A Very Rare Case

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Abstract

Congenital anomalies of coronary arteries, albeit rare, may be significant contributors to angina pectoris, hemodynamic abnormalities, and sudden cardiac death. A 47-year-old man referred to us with atypical chest pain. Electrocardiography demonstrated no significant ischemic changes, but cardiac troponin I test was positive. The patient underwent coronary angiography, which revealed a single coronary artery from the left Valsalva sinus. In addition, the left anterior descending (LAD) and the left circumflex (LCx) arteries were in normal position with significant stenosis in the mid-portion of the LAD and the distal portion of the LCx. A large branch originated from the distal portion of the LCx and tapered toward the proximal portion as the right coronary artery (RCA). This is a rare coronary anomaly that has no ischemic result. Coronary lesions were the cause of the patient's angina pectoris. Angioplasty and stenting of the LAD and LCx was done, and medical therapy (Clopidogrel, Aspirin, Atorvastatin, and Metoprolol) was continued. The patient was asymptomatic at 8 months' follow-up.

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Introduction

Coronary anomalies are defined in terms of the number, origin, course, and termination of the arteries and are rarely encountered in the general population. These anomalies may be detected incidentally in 0.3% to 1% of all patients undergoing coronary arteriography, depending on the anatomical variant.^{1,2} Accordingly, coronary artery anomalies are divided into those that cause and those that do

not cause myocardial ischemia.² A coronary anomaly may be compatible with a normal life expectancy; nevertheless, its sufferers, especially younger individuals, are at an increased risk for sudden death during or shortly after exercise.^{1,2} We report a case with a rare congenital anomaly of the left anterior descending coronary artery (LAD) and the left circumflex coronary artery (LCx), with stenosis in the mid-portion of the LAD and the distal portion of the LCx. The anomaly was successfully treated by stenting.

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Case Report

A 47-year-old man referred to the Cardiac Center of Boushehr University Hospital with atypical chest pain of one-week duration. One year previously, he had developed chronic stable angina, as is defined by the Canadian classification II.²

The patient's atherosclerotic risk factors included untreated hypertension and smoking. Serial electrocardiograms (ECG) did not show significant changes, while cardiac troponin I test was positive. Transthoracic echocardiography revealed normal chamber sizes, mild mitral regurgitation, and slightly decreased left ventricular function (ejection fraction = 50%).

The patient's symptoms were relieved with the prescription of anti-ischemic medication. Coronary angiography demonstrated a single coronary artery from the left Valsalva sinus. Moreover, LAD and LCx arteries were in normal position, and there was significant stenosis in the mid-portion of the LAD and the distal portion of the LCx (Figure 1). A large branch originated from the distal portion of the LCx and tapered toward its proximal portion.

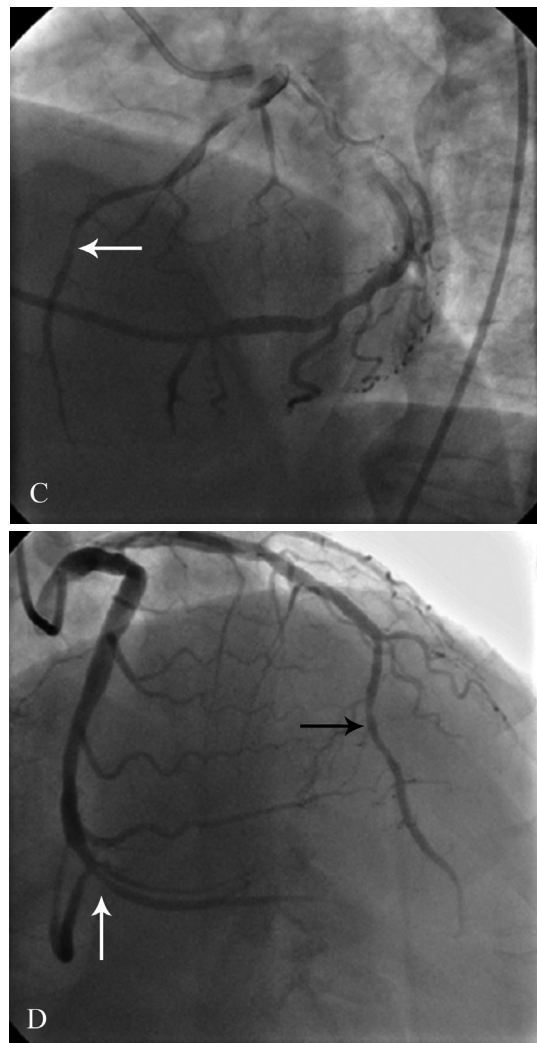
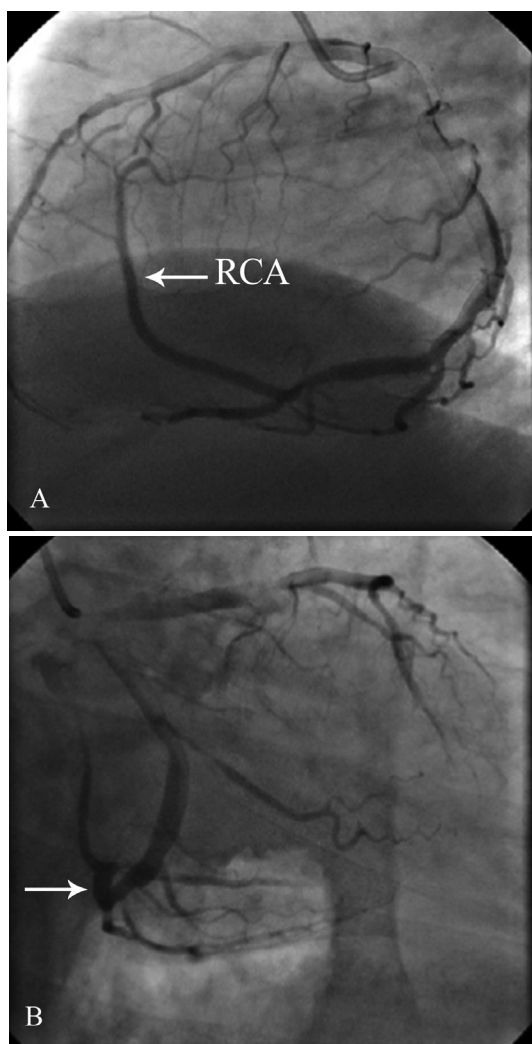


Figure 1. Coronary angiography. A single left coronary artery with the distal left circumflex (LCx) continuing as the right coronary artery (RCA). Significant stenosis can be seen in the mid-portion of the left anterior descending artery (LAD) and the distal portion of the LCx. A) Left lateral (LL) angiographic view shows the RCA origin and its course. B) Right anterior oblique (RAO) caudal angiographic view shows the RCA origin. C) Left anterior oblique (LAO) cranial view shows the LAD lesion. D) Right anterior oblique (RAO) cranial view shows the LAD stenosis (black arrow) and LCx lesion (right arrow) clearly

Aortic root contrast injection showed a single coronary artery, which took off from the left coronary sinus, and the right coronary artery (RCA) originated from the distal portion of the LCx. This finding is a rare coronary anomaly with no ischemic result. The patient's clinical symptoms were due to coronary lesions. Angioplasty and stenting of the LAD and LCx was done. Before discharge, medical therapy (Clopidogrel, Aspirin, Atorvastatin, and Metoprolol) was prescribed for the patient. He was asymptomatic in follow-up visits. The stent was intact in an 8-month follow-up coronary angiography.



Discussion

Coronary artery anomalies are classified based on the anomalies of the origin, course, and termination. They may also be classified as hemodynamic according to a modified version of a classification system.³⁻⁵ Isolated coronary artery anomalies are rare. Indeed, the incident of a single coronary artery, occurring without associated congenital heart disease, detected during routine coronary angiography reports is extremely infrequent (0.02-0.04%).⁶

Canbay et al.⁷ reported 3 cases with a single left coronary artery from the left Valsalva sinus giving off branches to the LAD, LCx, and RCA. Considerably, significant anomalies of the coronary arteries are characterized by abnormalities that influence myocardial perfusion and thus lead to an increased risk of myocardial ischemia or sudden death.⁵ Myocardial ischemia or sudden cardiac death is usually associated with its route between the aorta and main pulmonary artery.⁷ Another case with a single coronary artery originating from the distal portion of the LCx was reported by Asha et al.,⁸ who observed an atherosclerotic lesion during coronary angiography. In an extremely rare condition, a case similar to the one presented herein was reported in 2010, in which the RCA originated from the distal portion of the LCx.⁹

The treatment modality of patients with a single coronary artery has yet to be clearly defined. However, the course of the clinical symptoms and the extent of the atherosclerosis of the coronary artery should determine the therapy. Coronary artery bypass graft surgery may be effective in this group of patients. Of course, successful percutaneous coronary intervention has also been reported in some cases.

Conclusion

The importance lies in the recognition of this anomaly at cardiac catheterization as these patients may present symptoms of coronary ischemic disease. However, it is unlikely that this anomaly by itself could induce myocardial ischemia.

References

1. Popma JJ. Coronary arteriography. In: Bonow RO, Mann DL, Zipes DP, Libby P, eds. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. 9th ed. Washington: Elsevier Saunders; 2012. p. 406-440.
2. Kim SY, Seo JB, Do KH, Heo JN, Lee JS, Song JW, Choe YH, Kim TH, Yong HS, Choi SI, Song KS, Lim TH. Coronary artery anomalies: classification and ECG-gated multi-detector row CT findings with angiographic correlation. *Radiographics* 2006;26:317-333.
3. Eckart RE, Scoville SL, Campbell CL, Shry EA, Stajduhar KC, Potter RN, Pearse LA, Virmani R. Sudden death in young adults: a 25-year review of autopsies in military recruits. *Ann Intern Med*

- 2004;141:829-834.
4. Angelini P, Velasco JA, Flamm S. Coronary anomalies: incidence, pathophysiology, and clinical relevance. *Circulation* 2002;105:2449-2454.
5. Reagan K, Boxt LM, Katz J. Introduction to coronary arteriography. *Radiol Clin North Am* 1994;32:419-433.
6. Wilkins CE, Betancourt B, Mathur VS, Massumi A, De Castro CM, Garcia E, Hall RJ. Coronary artery anomalies: a review of more than 10,000 patients from the Clayton Cardiovascular Laboratories. *Tex Heart Inst J* 1988;15:166-173.
7. Canbay A, Ozcan O, Aydoğdu S, Diker E. Single coronary artery anomaly: a report of three cases. *Turk Kardiyol Dern Ars* 2008;36:473-475.
8. Asha M, Sriram R, Mukundan S, Abraham KA. Single coronary artery from the left sinus with atherosclerosis. *Asian Cardiovasc Thorac Ann* 2003;11:163-164.
9. Chung SK, Lee SJ, Park SH, Lee SW, Shin WY, Jin DK. An extremely rare variety of anomalous coronary artery: right coronary artery originating from the distal left circumflex artery. *Korean Circ J* 2010;40:465-467.