

**Case
Report**

Anomalous Origin of the Left Coronary Artery from the Right Coronary Sinus

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Anomalous origin of the left coronary artery (LCA) from the right coronary artery sinus is a rare congenital coronary anomaly. We report a case of a 48-year-old symptomatic man who was admitted to our clinic with a history of hypertension, type 2 diabetes mellitus, myocardial infarction and hypercholesterolemia. Coronary angiography was performed revealing anomalous left coronary artery from the right coronary artery sinus. In addition, stenosis of RCA and well developed stenotic diagonal artery were detected with coronary angiography. We performed coronary by-pass with left internal mammarian artery to diagonal artery and vena saphena to right coronary artery (RCA). Both coronary angiography and intraoperative view should be evaluated well in patients with anomalous of the coronary artery.

Keywords: coronary artery anomalies, coronary artery disease, coronary angiography, coronary by-pass

Introduction

The incidence of coronary artery anomalies has been reported between 0.2 to 1.3% in the angiographic series and 0.3% in the autopsy series.¹⁾ Most anomalies are not of clinical significance. But, some anomalies are related to angina, dyspnea, syncope, acute myocardial infarction and sudden death.²⁾

We present a case of a 48-year-old symptomatic man with anomalous origin of the left coronary artery (LCA) from the right coronary artery sinus. In addition, a proximal stenosis of right coronary artery (RCA) and well developed stenotic diagonal artery were detected with coronary angiography.

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Case Report

A 48-year-old man with a prior history of hypertension, type 2 diabetes mellitus, myocardial infarction, and hypercholesterolemia was admitted to our clinic because of stable angina pectoris. His symptoms had begun 3 months before admission. On admission, he was hypertensive (150/85 mmHg) with a regular pulse of 75 bpm. Cardiac auscultation was unremarkable, and the chest was clear. The ECG showed sinus rhythm at 75 bpm with significant ST-segment changes. Left Coronary angiogram (left anterior oblique caudal view) showed well developed diagonal artery which appeared like LCA. Right Coronary angiography (left anterior oblique view) was performed revealing anomalous left coronary artery (= the branch of RCA) from the right coronary artery sinus. In addition, 80%–90% stenosis in the mid RCA and 80% stenosis in the proximal diagonal artery were detected with coronary angiography (**Figs. 1** and **2**). We viewed well developed diagonal artery, which appeared like LCA and during the operation it was recognized that this artery was not LCA. So we performed coronary by-pass with left internal mammary artery to diagonal artery (**Fig. 3**) and vena saphena to RCA. On postoperative follow-up, our

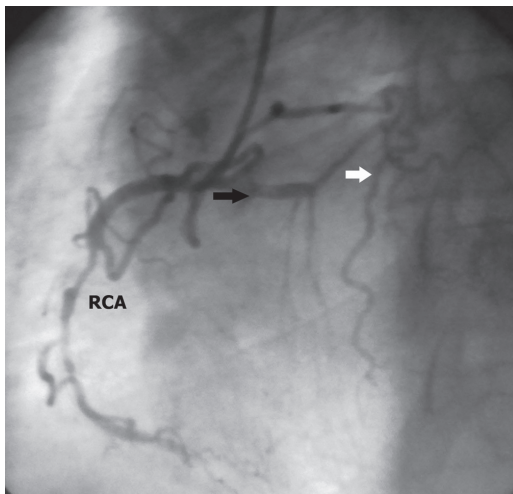


Fig. 1 White arrow indicates filling of the LCA from the branch of RCA. RCA, right coronary artery; LCA, left coronary artery. Black arrow indicates the origin of the left coronary artery (= the branch of RCA) from the right coronary artery sinus.

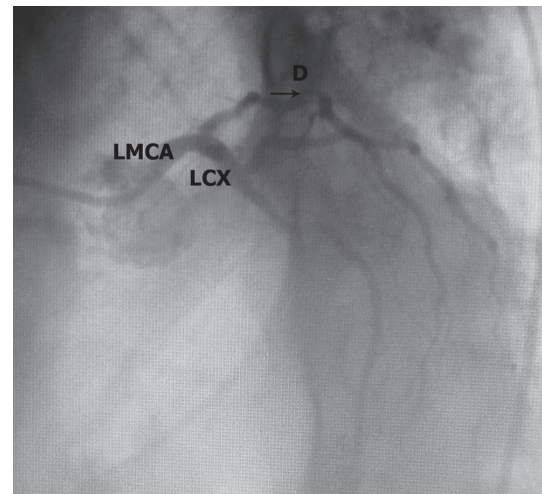


Fig. 2 Stenosis diagonal artery was detected with coronary angiography. Black thin arrow indicates diagonal artery. LMCA: left main coronary artery; D: diagonal artery; LCX: left circumflex artery

patient was asymptomatic with no bleeding, atrial fibrillation, myocardial infarction, stroke, respiratory distress, abdominal complications, infection or renal failure and our patient was well in follow-up period.

Discussion

The incidence of coronary artery anomalies has been reported between 0.6 to 1.3% in the angiographic series and 0.3% in the autopsy series.³⁾ Zhang et al showed that 24 patients with an anomalous origin of the coronary artery were detected among 1879 patients underwent coronary angiography, giving incidence of 1.3%. 12 from left coronary sinus and 3 high takeoff patients had an anomalous origin of the right coronary artery. Also, LCA from posterior sinus of Valsalva in three cases, left circumflex coronary artery (LCX) from the right coronary sinus, LCX from RCA, high takeoff, LCA from the right coronary sinus, and single coronary artery in one case, respectively had an anomalous origin of the left coronary artery, and one patient had an anomalous origin of both coronary arteries (high takeoff).¹⁾

The interarterial course of the LCA, between the aortic root and the pulmonary artery trunk, correlates with the higher incidence of angina, syncope and sudden death.⁴⁾ The anomalous origin of LCA from the right sinus of Valsalva is not always associated with the symptoms of angina pectoris. Other anatomic variants including retro-

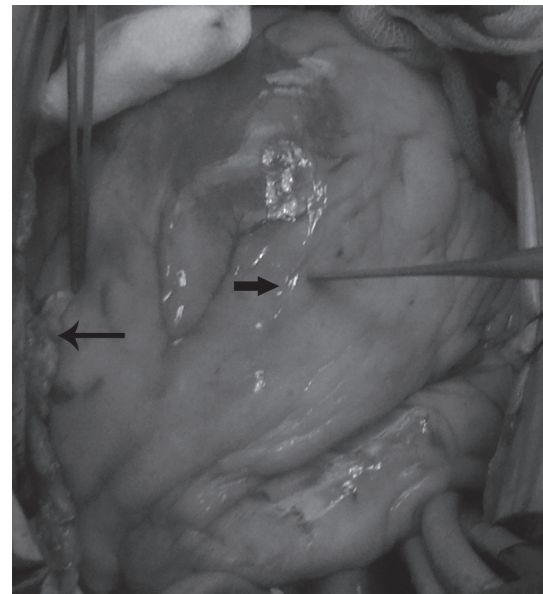


Fig. 3 Black thick arrow indicates left coronary artery. Black thin arrow indicates left internal mammary artery-diagonal artery by-pass graft.

aortic course of the anomalous LCA, right ventricle free wall course and septal course, along the floor of the right ventricle, are considered benign.⁵⁾ In our case, Left Coronary angiogram (left anterior oblique caudal view) showed normal LMCA, LCX and a well-developed stenotic diagonal artery which appeared like LCA. The

treatment with surgical intervention is indicated in symptomatic patients.⁵⁾ The ideal imaging tool for the diagnosis and delineation of coronary artery anomalies is coronary angiography. Other imaging modalities including computed tomography, magnetic resonance imaging and transesophageal echocardiography are considered to have a complementary role according to recent studies.⁶⁾ In our case, coronary angiography was used to determine the course of the anomalous left coronary artery and stenotic arteries. The anomalous left coronary artery (= the branch of RCA) from the right coronary artery sinus and stenotic arteries were detected. This anatomic variation was considered benign and surgical intervention was not required. We assessed the left coronary artery system well by angiographically and intraoperatively in this case, and we determined that LCA was not occluded completely and well developed stenotic diagonal artery. If we have performed by-pass surgery by thinking the complete occlusion of the LCA, not only we would induce a trauma to a normal coronary artery, but also we would have to accept all potential surgical complications. Anomalous coronary arteries do not appear to be associated with an increased risk for development of coronary atherosclerosis.⁷⁾ Some patients with anomalous coronary arteries have symptoms of angina pectoris due to atherosclerosis. The presence of an anomalous LCA is usually detected when it is symptomatic due to stenosis or occlusion of the vessel. The treatment option for patients with anomalous LCA and significant stenotic lesions is coronary angioplasty and stent implantation or surgical intervention. In our patient, the anomalous LCA was without atherosclerotic lesions while the severe stenotic RCA and diagonal artery were treated with coronary by-pass. The therapeutic choice depends on the site and character of the lesion. Therefore, both coronary angiography and intraoperative view should be evaluated well in patients with anomalous of the coronary artery and unnecessary interventions must be avoided.

Disclosure Statement

The authors declare that the manuscript does not have any potential conflict of interest. MCC: no conflict of interest, NE: no conflict of interest, OD: no conflict of interest, EK: no conflict of interest, HBC: no conflict of interest, BB: no conflict of interest.

References

- 1) Zhang LJ, Yang GF, Huang W, et al. Incidence of anomalous origin of coronary artery in 1879 Chinese adults on dual-source CT angiography. *Neth Heart J* 2010; **18**: 466-70.
- 2) Sato Y, Inoue F, Kunimasa T, et al. Diagnosis of anomalous origin of the right coronary artery using multislice computed tomography: evaluation of possible causes of myocardial ischemia. *Heart Vessels* 2005; **20**: 298-300.
- 3) Vincelj J, Todorovi N, Marusi P, et al. Anomalous origin of the left coronary artery from the right sinus of Valsalva in a 62-year-old woman with unstable angina pectoris: a case report. *Int J Cardiol* 2010; **142**: 35-7.
- 4) Tejada JG, Hernandez F, Sanches I, et al. Stenting of anomalous left main coronary artery arising from the right sinus of Valsalva: a case report. *Int J Cardiol* 2007; **119**: 266-7.
- 5) Dogan SM, Gursurer M, Aydin M, et al. Myocardial ischemia caused by a coronary anomaly left anterior descending coronary artery arising from right sinus of Valsalva. *Int J Cardiol* 2006; **112**: e57-9.
- 6) Makaryus AN, Orlando J, Katz S. Anomalous origin of the left coronary artery from the right coronary artery: a rare case of a single coronary artery originating from the right sinus of Valsalva in a man with suspected coronary artery disease. *J Invas Cardiol* 2005; **17**: 56-8.
- 7) Gowda RM, Chamakura SR, Dogan OM, et al. Origin of left main and right coronary arteries from right aortic sinus of Valsalva. *Int J Cardiol* 2003; **92**: 305-6.