

IMAGING VIGNETTE

BEGINNER

CLINICAL VIGNETTE

Single Coronary Artery Anomaly in a Woman With Acute ST-Segment Elevation Myocardial Infarction



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ABSTRACT

A 65-year-old woman presented with an acute inferior ST-segment elevation myocardial infarction and was found to have a rare single coronary artery anomaly on coronary angiography. A complete occlusion at the mid right coronary artery was identified as the culprit lesion and underwent successful percutaneous revascularization with stenting. (Level of Difficulty: Beginner.) (J Am Coll Cardiol Case Rep 2020;2:69-71) © 2020 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

A 65-year-old woman with type 2 diabetes mellitus presented to the emergency room with epigastric discomfort. Initial 12-lead electrocardiography confirmed an acute inferior ST-segment elevation myocardial infarction (STEMI) for which the cardiac catheterization laboratory was emergently activated.

Following an emergent left radial cardiac catheterization, the left main coronary artery could not be engaged despite multiple attempts. Right coronary artery cannulation was then performed and demonstrated a single coronary anomaly (SCA), with a short type 1 left anterior descending artery, a nondominant left circumflex artery, and a large dominant right coronary artery; all epicardial coronary arteries arising from a single ostia off the right coronary sinus of Valsalva (Figure 1, Videos 1 and 2). This case is consistent with a type R-III-C pattern following the modified Lipton's classification model for isolated SCA (1).

Coronary angiography confirmed the presence of a complete atherothrombotic occlusion at the mid-segment of a large, dominant, right coronary artery (Video 1) that underwent successful percutaneous revascularization with coronary stenting (Video 2) without procedural complications. Residual thrombus in the right posterolateral branch off the right coronary artery was managed with coronary thrombectomy, with persistent, residual distal thrombus following thrombectomy managed with intravenous glycoprotein IIb/IIIa inhibitor infusion. The coronary angiogram was reviewed with a congenital cardiologist and concluded to not demonstrate high-risk features warranting surgical correction. She received dual antiplatelet therapy for 1 year, followed by lifelong aspirin, in addition to high-intensity statin and a beta-blocker. She completed cardiac rehabilitation and has remained asymptomatic at 2 years.

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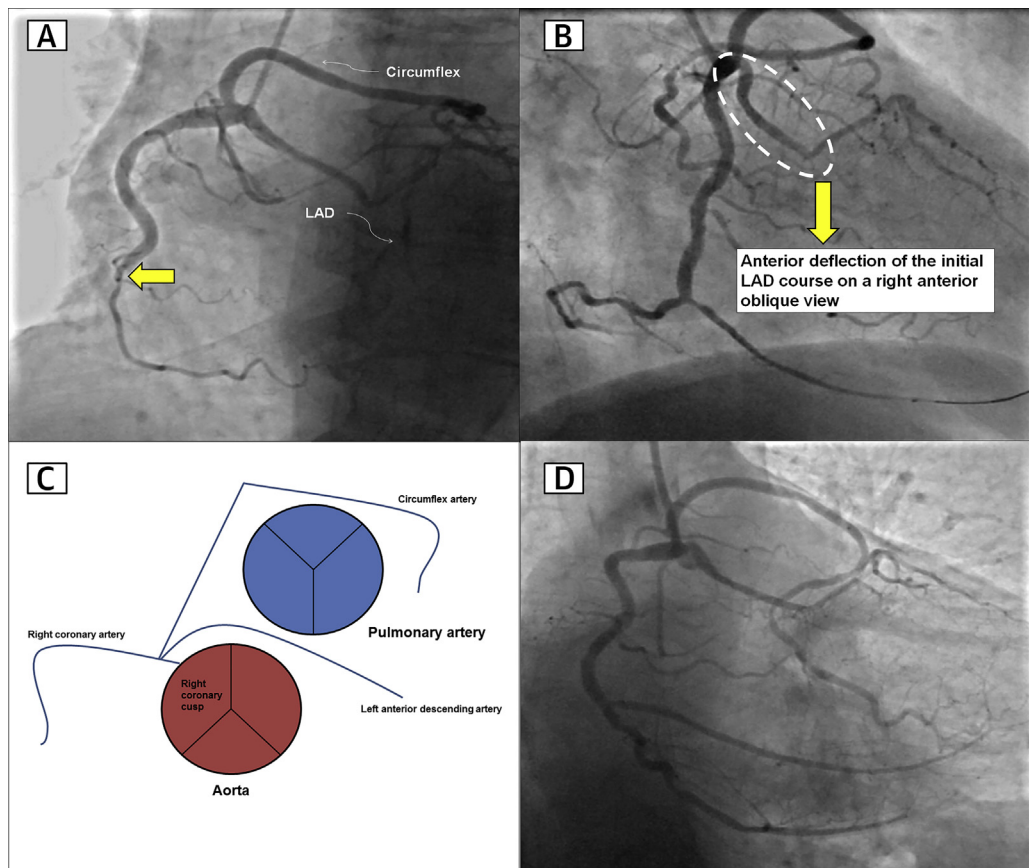
Informed consent was obtained for this case.

Manuscript received October 30, 2019; revised manuscript received December 2, 2019, accepted December 3, 2019.

**ABBREVIATIONS
AND ACRONYMS****SCA** = single coronary artery**STEMI** = ST-segment elevation
myocardial infarction**DISCUSSION**

This case presentation illustrates the incidental finding of a SCA arising from the right coronary sinus of Valsalva, an infrequent congenital anomaly identified in <1% of coronary angiographies (2), occurring in the context of acute inferior STEMI. Coronary atherosclerosis is generally uncommon in younger patients with SCA, but accelerated atherosclerosis may occur in older patients. This may result from turbulent blood flow in the SCA with predisposition to endothelial injury, thus accelerating atherosclerosis and eventual myocardial ischemia (3). Coronary anomalies can be angiographically challenging and increase procedural time when encountered in emergencies such as STEMI. Given that a SCA supplies the entire heart, extreme caution must be undertaken to avoid percutaneous coronary intervention complications that could jeopardize the entire myocardium.

FIGURE 1 Single Coronary Artery Anomaly Angiography Before and After Percutaneous Coronary Intervention in Patient With ST-Segment Elevation Myocardial Infarction




(A) Initial coronary angiography (left anterior oblique projection) showing culprit right coronary artery lesion (yellow arrow) and both left anterior descending artery and circumflex arteries supplying the anterior and lateral walls (white arrows with labels). (B) Coronary angiography (right anterior oblique projection) following revascularization showing anterior deflection of the initial course of the left anterior descending artery (LAD) suggesting an intra-arterial course (dashed white circle and yellow arrow). (C) Diagram showing the relationship between the coronary arteries and the great vessels. (D) Final coronary angiography (anteroposterior-caudal projection) following successful percutaneous coronary intervention.

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KEY WORDS congenital heart disease, single coronary artery, ST-segment elevation myocardial infarction

 **APPENDIX** For supplemental videos, please see the online version of this paper.