

MINI-FOCUS ISSUE: CONGENITAL HEART DISEASE

BEGINNER

IMAGING VIGNETTE: CLINICAL VIGNETTE

Single Coronary Artery in a Young Male with Chest Pain



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ABSTRACT

A young male presented to the hospital with chest pain. A coronary angiogram and a subsequent computed tomography coronary angiogram revealed a single coronary artery arising from the right coronary sinus which bifurcated into the right coronary artery and a large branch which supplies the left coronary artery territory. (**Level of Difficulty: Beginner.**) (J Am Coll Cardiol Case Rep 2020;2:721-2) © 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 32-year-old male with hypertension and hyperlipidemia presented to the hospital with complaints of central chest pain which was worse on exertion. Results of serum troponin analysis and resting electrocardiograms were normal. He underwent an exercise treadmill test which returned normal results. In view of the nature of his chest pain, he underwent a coronary angiogram. Coronary angiography (**Figure 1A**, **Video 1**) in the anteroposterior cranial view (RAO 1 CRAN 39) revealed a single coronary artery arising from the right coronary sinus giving rise to the right coronary artery and a large branch that supplies the left anterior descending and left circumflex arteries. An aortogram did not reveal any other coronary origin.

Computed tomography coronary angiography (CTCA) (**Figure 1B**) 3-dimensional volume-rendered computed tomography heart image (LAO 7 CRAN 56) was obtained which showed a single coronary artery arising from the right coronary cusp bifurcating into the right coronary artery and an anomalous left main artery which coursed leftward anterior to the main pulmonary artery before dividing into the left anterior descending artery and the left circumflex artery. The Agatston coronary calcium score was 0. There was no coronary artery stenosis or other cardiac abnormality. He was treated with analgesia for presumed musculoskeletal chest pain, with resolution of his symptoms. There was no symptom recurrence during the subsequent 2 years of follow-up.

Single-coronary artery is a rare congenital anomaly that is usually isolated but may be associated with other congenital heart anomalies such as tetralogy of Fallot and truncus arteriosus (1). CTCA is useful for delineating the coronary anatomy and exclude associated cardiac anomalies. It is important to identify the “malignant” interarterial course of the anomalous coronary artery between the main pulmonary artery and the aorta, which is associated with myocardial ischemia and sudden death. In the present patient, the anomalous left main artery assumed a “benign” course anterior to the main pulmonary artery and was not found to be the cause of his chest pain.

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the *JACC: Case Reports* [author instructions page](#).

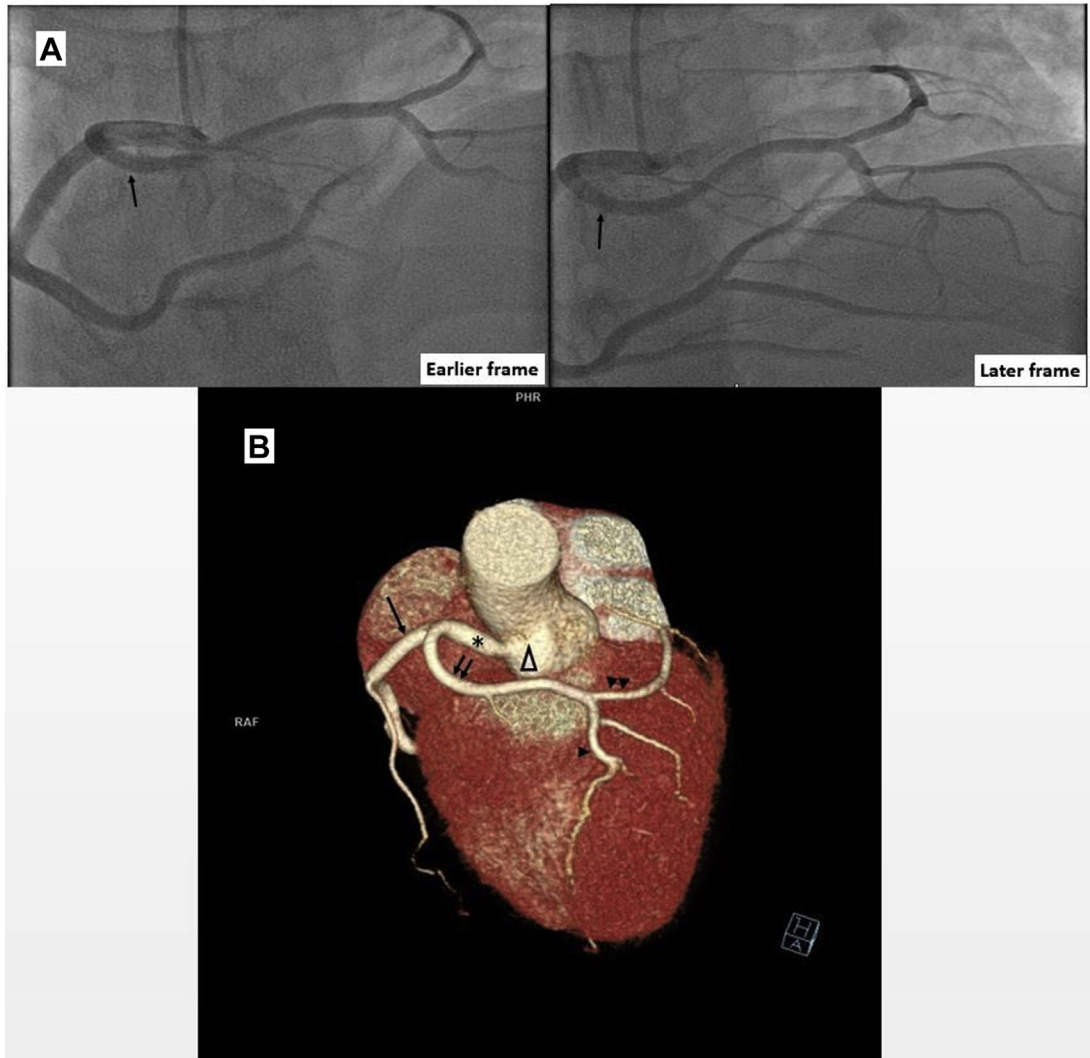
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**ABBREVIATIONS
AND ACRONYMS**

CTCA = computed tomography
coronary angiogram

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FIGURE 1 Coronary Angiogram and CTCA Image of Patient



The proximal RCA bifurcates into an anterior branch (**arrow**) and the mid RCA. (**A**) AP cranial view (RAO 1 CRAN 39). The proximal RCA bifurcates into an anterior branch (**arrow**) and the mid RCA. (**B**) 3D VR CT heart image (LAO 7 CRAN 56) which shows a single coronary artery (**asterisk**) arising from the right coronary cusp (**Δ**) which bifurcates into the RCA (**single arrow**) and an anterior branch (**double arrows**) which courses leftward and further bifurcates anteriorly to the main pulmonary artery into anterior (**single arrowhead**) and posterolateral (**double arrowheads**) branches. The anterior branch courses along the anterior interventricular groove to supply the LAD territory and the posterolateral branch courses along the left atrioventricular groove to supply the LCX territory. AP = anteroposterior; CT = computed tomography; LAD = left anterior descending artery; LCX = left circumflex artery; RCA = right coronary artery; VR = volume rendered.

REFERENCE

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KEY WORDS congenital coronary anomaly, single coronary artery

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