



Absence of Right Coronary Ostium with Single Coronary Artery: A Rare Anomaly

CASE REPORT

AYHAM MAHMOUD, MD

MUHAB SAADEH

MOATH SAID ALFAWARA, MD

WILLIAM GHAZI MAAIAH, MD

AMMAR AL-AWAISHEH, MD

*Author affiliations can be found in the back matter of this article

HOUSTON
Methodist
DEBAKEY HEART &
VASCULAR CENTER

ABSTRACT

Coronary arteries normally originate from two separate cusps from the aorta, and various anomalies can occur. One such anomaly is the single coronary artery (SCA), where the coronary arteries originate from a single ostium due to the absence of the contralateral ostia. In a rare case we encountered while evaluating a patient with atypical chest pain, computed tomography angiography revealed that the right ostia was absent, and the right coronary artery originated from the left circumflex artery. This subtype of SCA has been exceedingly rare, with only a few cases reported in the literature.

CORRESPONDING AUTHOR:

Ammar Al-awaisheh, MD

Al Kindi Hospital, Amman,
Jordan

Ammarawisheh@gmail.com

KEYWORDS:

coronary artery anomaly; single coronary artery; right coronary artery anomaly; absent right coronary ostium; chest pain; computed tomography angiography (CTA); left circumflex artery

TO CITE THIS ARTICLE:

Mahmoud A, Saadeh M, Alfawara MS, Maaiah WG, Al-awaisheh A. Absence of Right Coronary Ostium with Single Coronary Artery: A Rare Anomaly. *Methodist DeBakey Cardiovasc J.* 2024;20(1):94-97. doi: [10.14797/mdcvj.1458](https://doi.org/10.14797/mdcvj.1458)

CASE PRESENTATION

A 26-year-old male patient with a smoking history of 12 pack years presented to the emergency department with atypical chest pain. He had exertional chest pain and dyspnea for the past 2 years. No effort-related syncope or palpitations were reported, no significant medical issues or regular medication use were reported, and there was no family history of cardiovascular disease. He works as a merchandiser and engages in regular physical activities.

Physical examination, including his vital signs, were unremarkable. The initial evaluation aimed to rule out acute coronary syndrome by performing an electrocardiogram and serial cardiac troponin levels, which were negative. Following this, 2-dimensional transthoracic echocardiography was performed, showing

normal structure and function of all four cardiac chambers and valves.

Subsequent computed tomography angiography revealed a complete absence of the right coronary artery (RCA) at the level of the right coronary ostium (Figure 1). The heart exhibits a single coronary artery (SCA) as the RCA arises from the distal left circumflex artery (LCx) (Figures 2, 3; Video 1). No evidence of stenosis or atherosclerosis was observed in any of the coronary arteries.

We offered the patient cardiac nuclear testing to evaluate microvascular ischemia and myocardial blood flow reserve. However, he was reluctant due to concern about radiation exposure. Our management strategy was conservative, emphasizing strict lifestyle modifications including smoking cessation, regular lipid profile evaluations, and the avoidance of strenuous exercise.

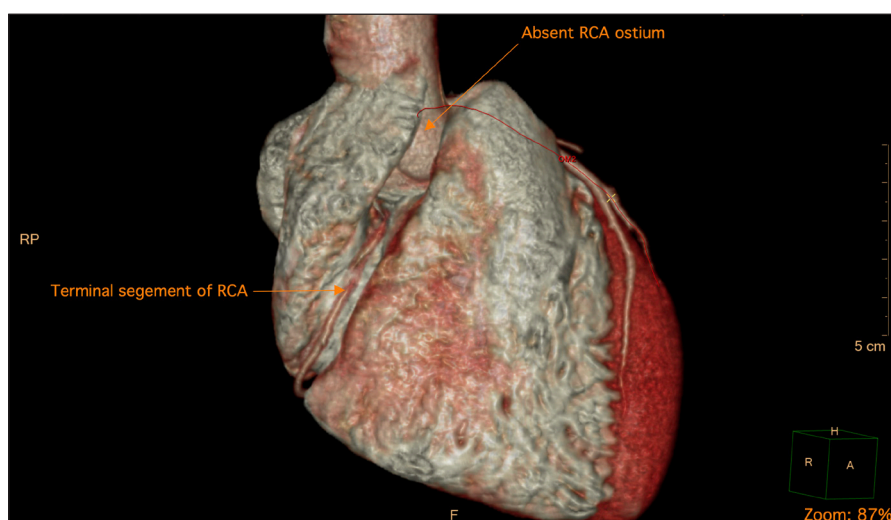


Figure 1 Cardiac computed tomography angiography 3-dimensional reconstruction showing absent right coronary artery (RCA) ostium and terminal segment of RCA.

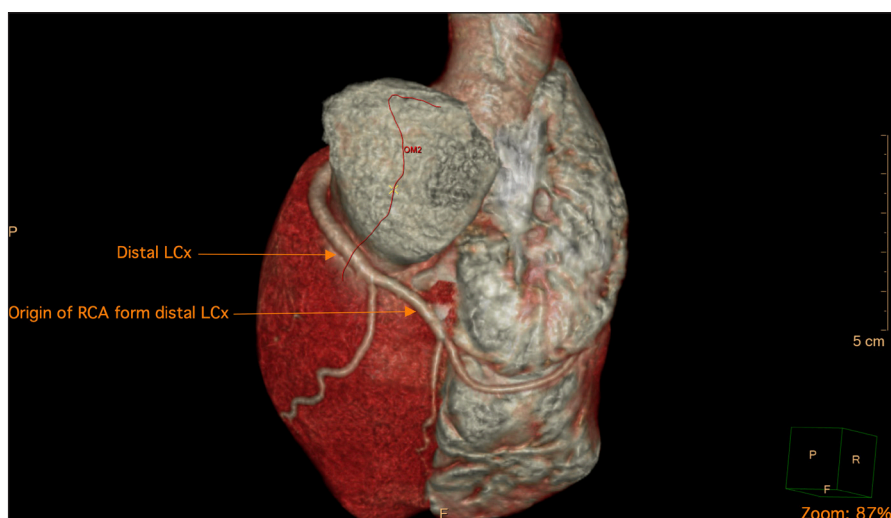


Figure 2 Cardiac computed tomography angiography 3-dimensional reconstruction showing right coronary artery originating from the left circumflex artery. RCA: right coronary artery; LCx: left circumflex artery

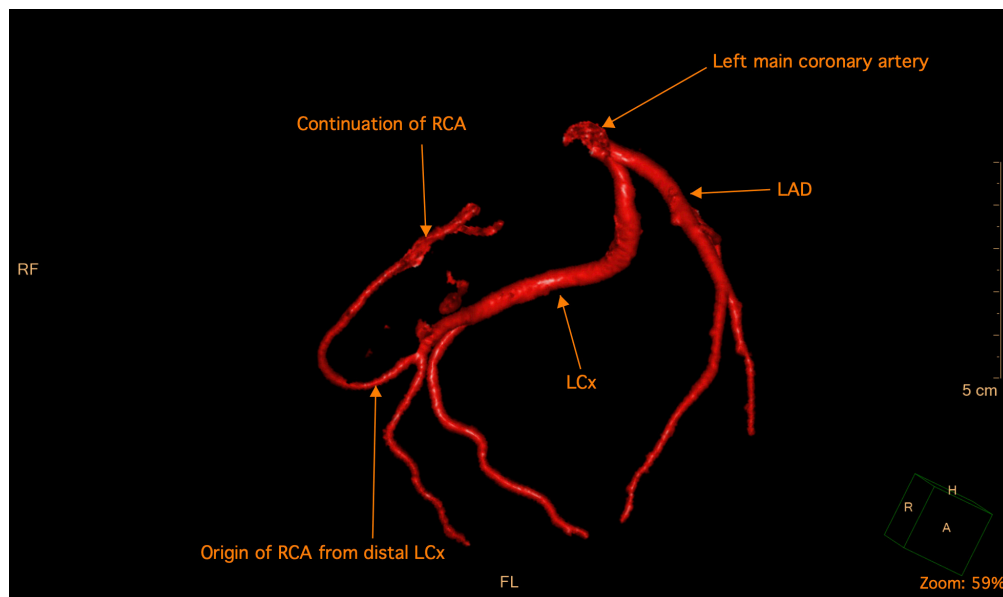
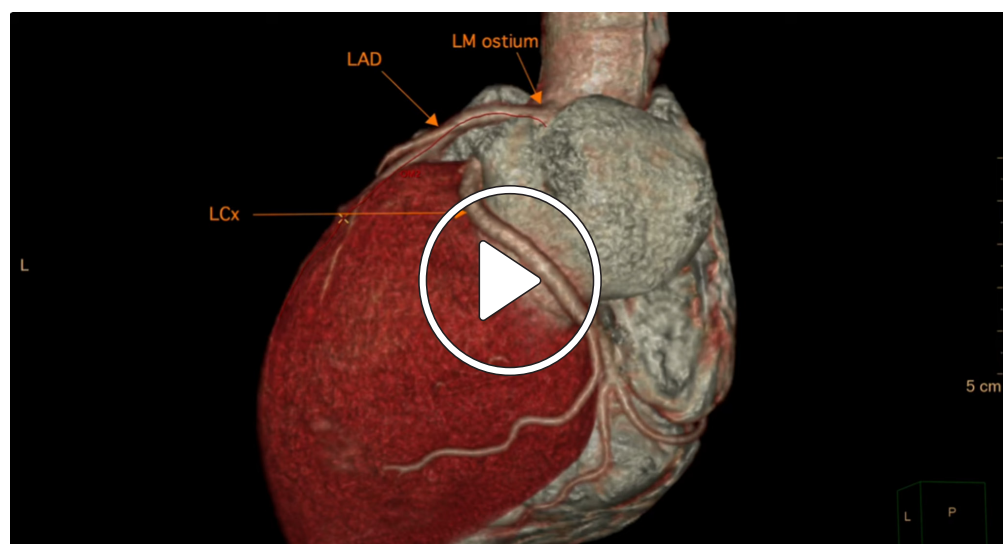


Figure 3 Coronary computed tomography angiography-subtracted VRT reconstruction image shows origin of right coronary artery (RCA) from left circumflex artery with absence of RCA ostium. VRT: volume rendering technique; LCx: left circumflex artery; LAD: left anterior descending artery



Video 1 Cardiac computed tomography angiography 3-dimensional reconstruction shows the complete absence of right coronary artery (RCA) ostium and the course of RCA as it arises from the left circumflex artery (LCx) and terminates in the right coronary sulcus; see also at <https://youtu.be/gfDtCQCge00>.

DISCUSSION

According to the classification proposed by Lipton-Yamanaka et al., the described case is an LI type: (L) indicates that an SCA arises from the left cusp, giving off the left anterior descending and LCx, with the RCA originating from the LCx; (I) indicates that all the mentioned arteries follow their normal courses.¹ Patients with SCA can present with cardiomyopathy or acute coronary syndromes, but this particular anomaly was reported to have a benign course, with negative cardiac work-up in the majority of cases unless there is significant

atherosclerosis.² Some case reports attributed exertional chest pain to abnormally slow blood flow to the RCA. This reasoning was supported by the patient's excellent response to medical management with calcium channel blockers and nitrates and the absence of significant atherosclerosis on work-up.³ True right myocardial ischemia that required primary coronary intervention was reported in a case as well,⁴ while another case was incidentally found while working up pulmonary embolism.⁵ In conclusion, the presentation for this anomaly is highly variable, and treatment strategy is tailored to a case-by-case basis. Percutaneous coronary

intervention providers should carefully review primary team imaging to facilitate easier manipulation and reduce contrast usage, thereby enhancing patient care.

COMPETING INTERESTS

The authors have no competing interests to declare. The patient provided informed consent for documenting this case.

AUTHOR AFFILIATIONS

Ayham Mahmoud, MD  orcid.org/0009-0008-5414-9018

Jordan University Hospital, Amman, Jordan

Muhab Saadeh  orcid.org/0009-0002-4166-3065

The University of Jordan, Amman, Jordan

Moath Said Alfawara, MD  orcid.org/0000-0002-2676-3095

King Fahad Armed Forces Hospital, Jeddah, KSA

William Ghazi Maaiah, MD  orcid.org/0009-0001-8081-3196

Al Kindi Hospital, Amman, Jordan

Ammar Al-awaisheh, MD  orcid.org/0009-0006-7712-1558

Al Kindi Hospital, Amman, Jordan

REFERENCES

1. **Yamanaka O, Hobbs RE.** Coronary artery anomalies in 126,595 patients undergoing coronary arteriography. *Cathet Cardiovasc Diagn.* 1990 Sep;21(1):28-40. doi: [10.1002/ccd.1810210110](https://doi.org/10.1002/ccd.1810210110)
2. **Pourafkari L, Taban M, Ghaffari S.** Anomalous Origin of Right Coronary Artery from Distal Left Circumflex Artery: A Case Study and a Review of its Clinical Significance. *J Cardiovasc Thorac Res.* 2014;6(2):127-130. doi: [10.5681/jcvtr.2014.027](https://doi.org/10.5681/jcvtr.2014.027)
3. **Shammas RL, Miller MJ, Babb JD.** Single left coronary artery with origin of the right coronary artery from distal circumflex. *Clin Cardiol.* 2001 Jan;24(1):90-2. doi: [10.1002/clc.4960240115](https://doi.org/10.1002/clc.4960240115)
4. **Ma SH, Kim DH, Hur JY, et al.** Right Ventricular Myocardial Infarction due to Right Coronary Artery Total Occlusion Originating From the Distal Left Circumflex Artery. *Korean Circ J.* 2012 Aug;42(8):565-7. doi: [10.4070/kcj.2012.42.8.565](https://doi.org/10.4070/kcj.2012.42.8.565)
5. **Ghaffari S, Pourafkari L.** Pulmonary embolism in a patient with a rare coronary anomaly – a clue to the importance of proximal right coronary artery branches. *Kardiol Pol.* 2010 Jul;68(7):844-6; discussion 847.

TO CITE THIS ARTICLE:

Mahmoud A, Saadeh M, Alfawara MS, Maaiah WG, Al-awaisheh A. Absence of Right Coronary Ostium with Single Coronary Artery: A Rare Anomaly. *Methodist DeBakey Cardiovasc J.* 2024;20(1):94-97. doi: [10.14797/mdcvj.1458](https://doi.org/10.14797/mdcvj.1458)

Submitted: 02 August 2024 **Accepted:** 22 August 2024 **Published:** 26 September 2024

COPYRIGHT:

© 2024 The Author(s). This is an open-access article distributed under the terms of the Attribution-NonCommercial 4.0 International (CC BY-NC 4.0), which permits unrestricted use, distribution, and reproduction in any noncommercial medium, provided the original author and source are credited. See <https://creativecommons.org/licenses/by-nc/4.0/>.

Methodist DeBakey Cardiovascular Journal is a peer-reviewed open access journal published by Houston Methodist DeBakey Heart & Vascular Center.