

Anomalous origin of Left Main coronary artery from right sinus presenting as non-ST elevation ACS: A case Report

Amit Mandal *, Oommen K George

Department of Cardiology, Christian Medical College, Vellore, Tamil Nadu, India.

*Corresponding Author: Amit Mandal, Department of Cardiology, Christian Medical College, Vellore, Tamil Nadu, India.

Received date: June 03, 2024; Accepted date: June 13, 2024; Published date: June 24, 2024

Citation: Amit Mandal, Oommen K George, (2024), Anomalous origin of Left Main coronary artery from right sinus presenting as non-ST elevation ACS: A case Report, *Cardiology Research and Reports*, 6(4); DOI:10.31579/2692-9759/131

Copyright: © 2024, Amit Mandal. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

Congenital anomalies of the coronary arteries are a cause of sudden cardiac death. Of the known anatomic variants, anomalous origination of a coronary artery from an opposite sinus of Valsalva (ACAOS) remains a major clinical issue and a challenging condition to treat. Congenital coronary anomalies are likely to be under-recognized, as completing an anatomic assessment in a very large portion of the population would seem unfeasible. However, we present a case report with image of a 54-year-old female presented with acute non-ST elevation ACS for which she underwent diagnostic angiography of the coronary system which revealed a common origin of both right and left main coronary artery from right sinus of Valsalva.

Keywords: covid-19; internet; trolling; stalking; stashing; texting; bullying

Introduction

Coronary artery anomalies (CAAs) are rare congenital defects involving the epicardial coronary arteries. The reported incidence of such anomaly ranges from 1% to 6% of the population undergoing a coronary angiography procedure and 0.3% of all autopsies. (1,2) CAAs can be classified based on coronary artery origin, course and anomalies of coronary termination(3). Herein, we present a case report with image of a 54-year-old female presented with acute non-ST elevation ACS for which she underwent diagnostic angiography of the coronary system which revealed a common origin of both right and left main coronary artery from right sinus of Valsalva.

Case Presentation

This 52-year-old lady was admitted with history of chest pain on exertion for past one month. It was retrosternal, radiating to back, associated with sweating and relieved with rest. There was worsening chest pain and for last 1-2 weeks and she started having rest pain on and off associated with sweating lasting for minutes to an hour. Last episode of pain was night before

admission which lasted for 2-3 hours and relieved slowly on its own. There was associated dyspnoea on exertion but there was no palpitations or syncope. There was no history of acute coronary syndrome or cerebrovascular accident in the past. There was history of diabetes mellitus and systemic hypertension for 15 years.

She was hemodynamically stable, and her systemic examination was unremarkable. Based on her investigations (elevated cardiac enzymes with T wave inversion in lead I and aVL) she was diagnosed with ACS-NSTEMI and was advised for early invasive PCI. She underwent coronary angiogram which showed anomalous origin of LM from right sinus (Fig1a-b) and double vessel coronary artery disease (Proximal LCx with tubular 60% stenosis, Distal LCx with a tubular 80% stenosis, super dominant RCA with diffuse disease, RPLB has proximal 80% stenosis in RPLB). She was advised CT coronary angiogram to assess vessel course followed by CABG with grafts to RCA and LCx with Coronary reimplantation.

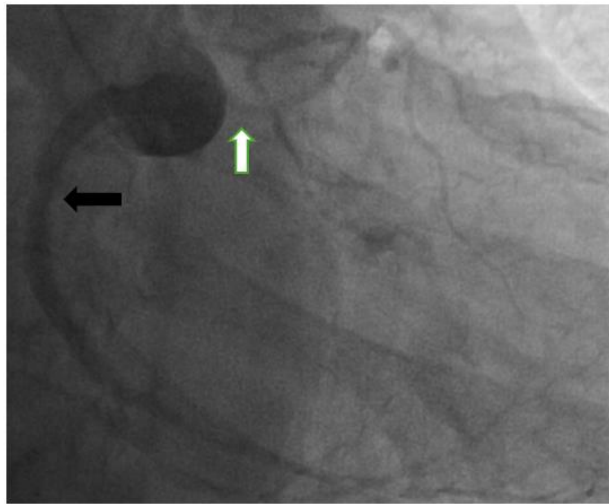


Fig1a: Aortic root angiogram showing same origin of both coronaries. (RCA: Black arrow, Left Main: white arrow)

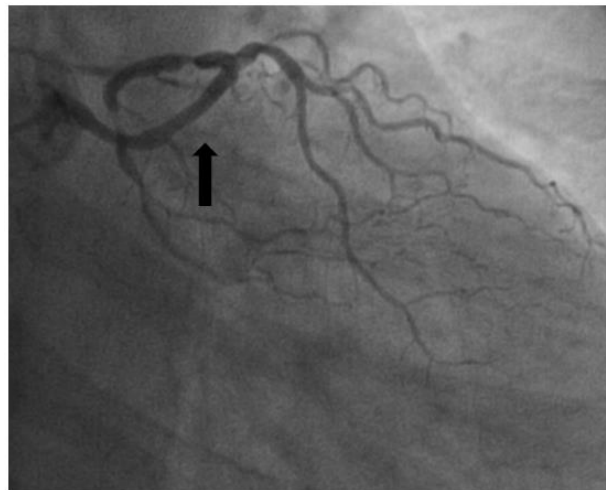


Figure 1b: LAO view to show left coronary system arising from right sinus. (black arrow)

Discussion

Normally, there are 3 main epicardial coronary arteries: the right coronary artery, arising from the right sinus of Valsalva, and the left anterior descending and left circumflex coronary arteries, characterized by an initial common tract (the left main coronary artery) that emerges from the left sinus of Valsalva. (1) Coronary artery anomalies (CAAs) include several congenital conditions characterized by abnormal origin or course of any of the 3 main epicardial coronary arteries. Their clinical manifestations vary from silent bystanders to sudden cardiac death. As per previous studies, the incidence of CAA is between 1% and 6%. (1,2,4)

The clinical presentations of CAAs varies from being asymptomatic to chest pain, dyspnea, and dysrhythmia leading to SCD. (1) The underlying cause of sudden cardiac death in patients with congenital coronary abnormalities is multifactorial and has been attributed to contortion of the vessel's slit-like, tangential origin during exercise leading to ischemia and resultant arrhythmia.

Anomalous origin of the left coronary artery from the right sinus of Valsalva may be further separated into four separate subtypes: (5)

- The left main coronary artery courses between the aorta and the pulmonary artery.

- the left main coronary artery tracks anteriorly over the right ventricular outflow tract.
- the left main coronary artery takes an intramyocardial course before resurfacing at the proximal portion of the interventricular groove; and
- the left main coronary artery passes posteriorly around the aortic root.
- Of these, the first anomalous configuration is classically considered the most dangerous placing patients at the highest risk of sudden cardiac death.(1)

Although the presence of a coronary artery anomaly (CAA) can be suspected in the case of a young individual with ischemia-like symptoms, however CAAs are more often incidental findings during workup for ischemic heart disease. CCTA is currently considered the gold standard, and cardiac magnetic resonance (CMR) is an alternative. (6)

Once an anomalous coronary artery is identified, it should be evaluated for hemodynamic significance, particularly in athletes, using stress testing, like exercise treadmill test, stress echocardiogram, and nuclear perfusion imaging (7) However there is no standardized protocols available for stratification of CAA-related ischemia.

In this report, we present a case with the classical angiographic finding with common origin of right and left main coronary arteries from the right sinus of Valsalva, i.e. Anomalous origin of left coronary origin from the opposite Sinus (L-ACAOS). She presented with acute coronary syndrome (NSTEMI-ACS) for which she was managed medically and later she was advised detail assessment of anatomy and the arterial course by CT coronary angiogram followed by CABG with grafts to RCA and LCx with Coronary reimplantation.

Treatment of an asymptomatic CAA is mostly observational and symptomatic patients almost always warrant surgical intervention. (8) Aim of surgery is to restore a dual coronary system through the reimplantation of the anomalous vessel in the ascending aorta. If the anomalous ostium is too distant from the aorta, the Takeuchi procedure can be performed by creating an intrapulmonary tunnel with a parietal flap from the pulmonary artery connecting the anomalous ostium to the aorta. (9) Coronary artery bypass graft could be a final alternative. (8) Postoperative outcome depends on left ventricular dysfunction at baseline. Based on previous study published so far (n=65), operative mortality was 6.2% (10), however uniform long-term data is lacking.

Conclusion

The left main trunk arising from the right coronary cusp is a rare congenital anomaly associated with an increased risk of cardiac events and sudden deaths. In a patient with coronary artery disease, these anomalies may pose difficulties in their management using revascularization strategies. Further research is essential to broaden our knowledge and improve diagnostic and therapeutic modalities.

References

1. Angelini P. (2007). Coronary artery anomalies: an entity in search of an identity. *Circulation*. 115(10):1296–1305.
2. Zeppilli P, dello Russo A, Santini C, Palmieri V, Natale L, et al. (1998). In Vivo Detection of Coronary Artery Anomalies

- in Asymptomatic Athletes by Echocardiographic Screening. *Chest*. 114(1):89–93.
3. Pursnani A, Jacobs JE, Saremi F, Levisman J, Makaryus AN, et al. (2012). Coronary CTA assessment of coronary anomalies. *J Cardiovasc Comput Tomogr*. 6(1):48–59.
4. Maron BJ, Doerer JJ, Haas TS, Tierney DM, Mueller FO. (2009). Sudden Deaths in Young Competitive Athletes. *Circulation*. 119(8):1085–1092.
5. Congenital anomalies of the coronary arteries | Heart [Internet]. [cited 2024 May 31].
6. Frommelt P, Lopez L, Dimas VV, Eidem B, Han BK, et al. (2020). Recommendations for Multimodality Assessment of Congenital Coronary Anomalies: A Guide from the American Society of Echocardiography: Developed in Collaboration with the Society for Cardiovascular Angiography and Interventions, Japanese Society of Echocardiography, and Society for Cardiovascular Magnetic Resonance. *J Am Soc Echocardiogr Off Publ Am Soc Echocardiogr*. 33(3):259–394.
7. Brothers J, Carter C, McBride M, Spray T, Paridon S. (2010). Anomalous left coronary artery origin from the opposite sinus of Valsalva: Evidence of intermittent ischemia. *J Thorac Cardiovasc Surg*. 140(2):e27–39.
8. Stout KK, Daniels CJ, Aboulhosn JA, Bozkurt B, Broberg CS, et al. (2019). AHA/ACC Guideline for the Management of Adults with Congenital Heart Disease. *J Am Coll Cardiol*. 73(12):e81–192.
9. Takeuchi S, Imamura H, Katsumoto K, Hayashi I, Katohgi T, et al. (1979). New surgical method for repair of anomalous left coronary artery from pulmonary artery. *J Thorac Cardiovasc Surg*. 78(1):7–11.
10. Reul RM, Cooley DA, Hallman GL, Reul GJ. (2002). Surgical treatment of coronary artery anomalies: report of a 37 1/2-year experience at the Texas Heart Institute. *Tex Heart Inst J*. 29(4):299–307.



This work is licensed under Creative Commons Attribution 4.0 License

To Submit Your Article Click Here:

[Submit Manuscript](#)

DOI:10.31579/2692-9759/130

Ready to submit your research? Choose Auctores and benefit from:

- fast, convenient online submission
- rigorous peer review by experienced research in your field
- rapid publication on acceptance
- authors retain copyrights
- unique DOI for all articles
- immediate, unrestricted online access

At Auctores, research is always in progress.

Learn more <https://www.auctoresonline.org/journals/cardiology-research-and-reports>