JACC: CASE REPORTS VOL. 30, NO. 5, 2025

CORONARY, PERIPHERAL, AND STRUCTURAL INTERVENTIONS

THE FOUR CORNERS: CLINICAL VIGNETTE CORNER

Giant Left Main Coronary Artery Aneurysm

A Decade-Long Evolution of an Incidental Finding

Martina Rizzo, MD,[a,b] Federico Landra, MD,[c] Giulia Elena Mandoli, MD,[c] Gianfranco Montesi, MD,[b] Matteo Cameli, MD, PhD[c]

ABSTRACT

This clinical vignette details a rare case of a patient with a left ventricular aneurysm and an incidentally discovered giant left main coronary artery aneurysm. A review of the patient's history and previous imaging revealed the aneurysmal dilation had been present for 10 years. Giant coronary artery aneurysms are rare and typically asymptomatic, with unclear pathophysiology and poorly documented natural history. There is no consensus on the optimal intervention, underscoring the need for awareness of this rare pathology for early detection and prevention of future complications.
(JACC Case Rep. 2025;30:103113) © 2025 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/).

Coronary artery aneurysms (CAAs) are defined as artery segments where dilation exceeds 1.5 times the diameter of an adjacent healthy segment. A rare subset of this condition is giant coronary artery aneurysms (GCAAs), characterized by a dilation >20 mm, occurring in just 0.02% of cases.[1,2] CAAs are often discovered incidentally and are typically asymptomatic during their growth. Moreover, they can lead to serious complications such as local thrombosis, distal embolization, rupture, and heart failure.[1-3] Cases involving both a GCAA and a left ventricular wall aneurysm are particularly rare and noteworthy because of their complex clinical management.

TAKE-HOME MESSAGES

- The simultaneous presence of a left main giant coronary artery aneurysm and a LVAA is rare and raises important questions regarding the optimal treatment approach. Regular monitoring and timely intervention are crucial in managing CAAs, even when asymptomatic, to prevent serious complications.
- When performing a cardiac CT, it is important to conduct a thorough assessment of the cardiac anatomy and coronary vessels, always considering the possibility of rare pathologies. This approach can help in the incidental discovery of uncommon findings.

From the [a]Department of Cardiothoracic Surgery, School for Cardiovascular Disease (CARIM) Maastricht University, Maastricht, the Netherlands; [b]Cardiac Surgery Unit, Cardiothoracic and Vascular Disease Department, Santa Maria Alle Scotte Hospital, University of Siena, Siena, Italy; and the [c]Cardiology Unit, Cardiothoracic and Vascular Disease Department, University of Siena, Siena, Italy.

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 Author Center.

Manuscript received August 26, 2024; revised manuscript received October 16, 2024, accepted October 21, 2024.

ISSN 2666-0849 https://doi.org/10.1016/j.jaccas.2024.103113

ABBREVIATIONS AND ACRONYMS

CAA = coronary artery aneurysm

CT = computed tomography

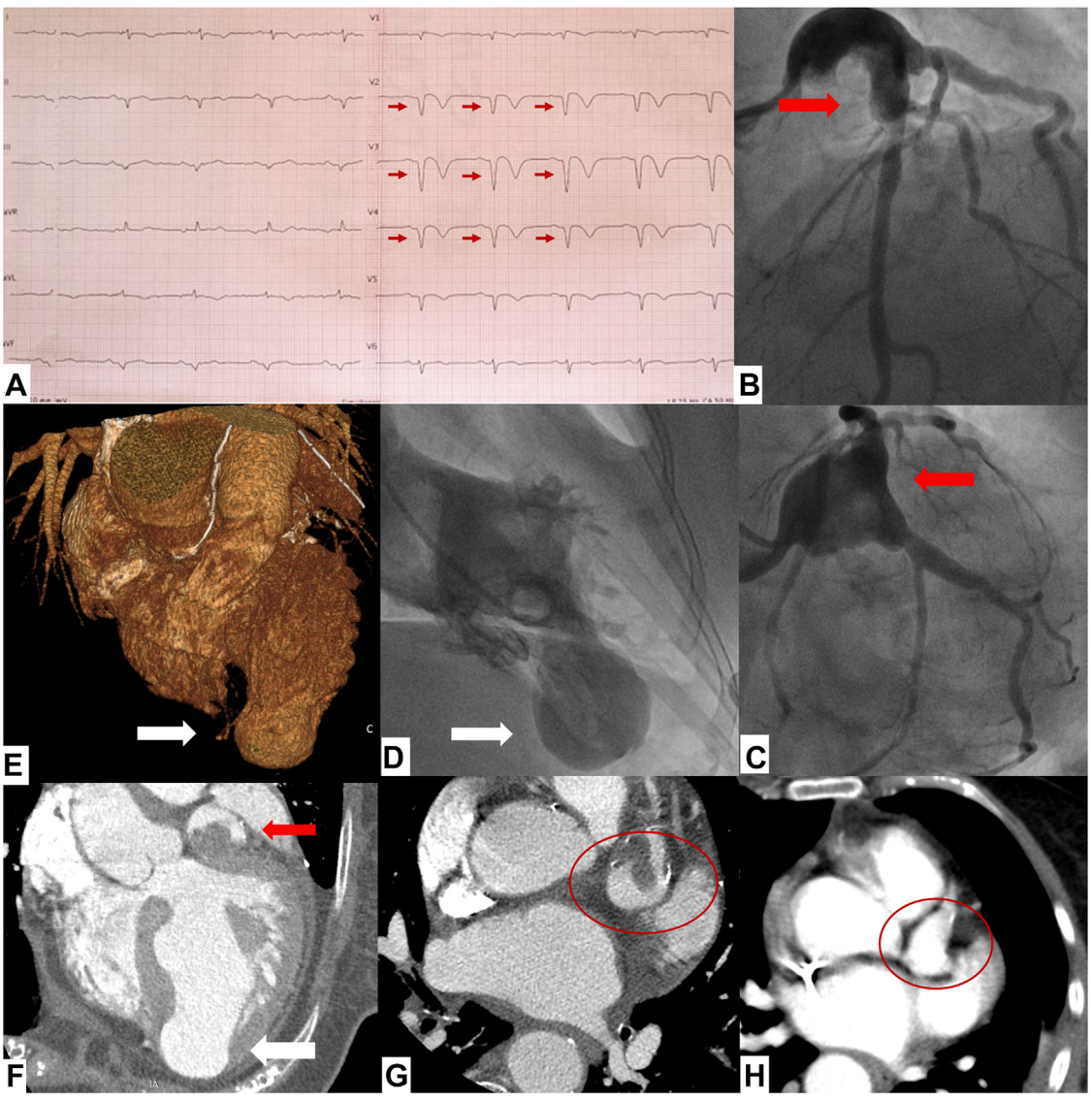
GCAA = giant coronary artery aneurysm

LVAA = left ventricular apical aneurysm

CLINICAL VIGNETTE

A 72-year-old woman, with no history of cardiovascular disease, presented to the emergency department with worsening dyspnea and thoracic pain. Initial examinations were conducted: an electrocardiogram revealed negative Q waves in anterior leads (**Figure 1A**), and a transthoracic echocardiogram showed a left ventricular apical aneurysm (LVAA) with a left ventricular ejection fraction of 30%. Subsequent coronary and ventricular angiographies (**Figures 1A to 1D**, Videos 1 and 2) were performed, confirming the LVAA presence and revealing a left main GCAA, involving the main branch of the left coronary artery and the proximal segments of both the left anterior descending and

FIGURE 1 Main Findings of Giant Left Main Coronary Artery Aneurysm and Left Ventricular Apical Aneurysm



(A) Electrocardiogram shows negative Q waves in anterior leads, indicated by red arrows. (B and C) Left main coronary artery aneurysm (LMCAA) angiography indicated by the red arrows. (D) Left ventricular angiography shows the left ventricular apical aneurysm (LVAA) indicated by the red arrow. (E) Computed tomography (CT) scan 3-dimensional volume rendering of the left ventricular aneurysm (white arrow). (F) Cardiac CT scan shows LMCAA indicated by the red arrow and the contemporary presence of the LVAA indicated by the white arrow. (G) Left main giant coronary artery aneurysm indicated by the red circle and partially occupied by a thrombus formation. (H) Cardiac CT scan from 10 years prior; red circle shows the LMCAA perfused.

circumflex arteries. A computed tomography (CT) angiography scan was performed to evaluate the dimensions of the GCAA, revealing a size of 3.2 × 2.5 cm. It also identified the concurrent presence of the LVAA (**Figures 1E and 1F**) and detected a thrombus partially occupying the GCAA (**Figure 1G**). The patient presented a history of brain tumor, surgically removed 10 years earlier. A thoracic CT scan conducted at the time of the previous recovery demonstrated a perfused left main coronary artery aneurysm (**Figure 1F**), which remained undiagnosed at the time, measuring 2.5 × 1.5 cm. A cardiac surgery referral followed due to symptom deterioration.

DISCUSSION

CAAs are relatively rare, with a prevalence ranging from 0.3% to 5.3% among the population, and the primary etiology in adults is atherosclerosis. Management of CAAs varies based on the size and shape of the aneurysm and includes medical therapy with anticoagulants, interventional procedures like coil embolization, and, for giant CAAs, surgical operations such as coronary artery bypass grafting.[1] In the case discussed, a patient silently developed a left main GCAA and a clot within the aneurysmal sac, which possibly led to distal thromboembolism and subsequent myocardial infarction. This ischemic event prompted the remodeling of the ventricular myocardial wall, culminating in the formation of a true left ventricular aneurysm (LVA). The simultaneous presence of a left main GCAA and an LVA is a particularly rare occurrence.[4] The management of these entities remains under debate because of their rarity and the complexity of their clinical presentations. Although surgical correction is frequently used to restore ventricular geometry and manage complications, the risks after surgery are considerable and include fatal arrhythmias, thromboembolism, and cardiogenic shock. The determination of the most effective therapy for simultaneous CAAs and LVAs continues to be a subject of active research and debate, underscoring the need for more definitive treatment guidelines.

FUNDING SUPPORT AND AUTHOR DISCLOSURES

The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

ADDRESS FOR CORRESPONDENCE: Dr Martina Rizzo, Cardiac Surgery Unit, Cardiothoracic and Vascular Disease Department, Santa Maria Alle Scotte Hospital, University of Siena, Viale Mario Bracci, 1, 53100 Siena, Italy. E-mail: rizzo.mr@yahoo.com. X handle: @MartinaRizzoMD.

REFERENCES

1. Pham V, Hemptinne Q, Grinda JM, Duboc D, Varenne O, Picard F. Giant coronary aneurysms, from diagnosis to treatment: a literature review. *Arch Cardiovasc Dis*. 2020;113(1):59-69. https://doi.org/10.1016/j.acvd.2019.10.008

2. Fukamachi D, Okumura Y. Giant coronary-artery aneurysm. *N Engl J Med*. 2022;387(11):e23. https://doi.org/10.1056/NEJMicm2119409

3. Kawsara A, Núñez Gil IJ, Alqahtani F, Moreland J, Rihal CS, Alkhouli M. Management of coronary artery aneurysms. *JACC Cardiovasc Interv*. 2018;11(13):1211-1223. https://doi.org/10.1016/j.jcin.2018.02.041

4. Gundogdu F, Bakirci EM, Arslan S, Kantarci M, Acikel M. Coexistence of idiopathic left ventricular aneurysm and aneurysm of right coronary artery. *J Cardiovasc Med (Hagerstown)*. 2011;12(11):808-810. https://doi.org/10.2459/JCM.0b013e32834cadaf

KEY WORDS cardiac CT, coronary angiography, giant coronary artery aneurysm, ventricular aneurysm, ventricular angiography

APPENDIX For supplemental videos and a video summary, please see the online version of this paper.