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Giant Right Coronary Artery Aneurysm With a Fistula to the Coronary Sinus: A Case Report

Hassan Elshebiny [1], Abdallatif Dawoud [1], Susan Bennett [1], Hani Saad [2]

1. Medicine, University of Toledo, Toledo, USA 2. Hospital Medicine, University of Toledo Medical Center, Toledo, USA

Corresponding author: Hani Saad, hani.saad@utoledo.edu

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Abstract

Giant coronary artery aneurysms (CAAs) are rare vascular abnormalities, defined as a dilated segment exceeding four times the normal vessel diameter or >8 mm. Management is challenging due to limited guidelines. This report describes a tortuous right coronary artery (RCA) aneurysm with a fistulous connection to the coronary sinus, initially diagnosed in 2012. Despite radiographic stability for over a decade, the patient underwent complex surgical repair in December 2024, followed by favorable functional recovery at the latest follow-up in October 2025.

Giant coronary artery aneurysms with fistulous cardiac connections are exceedingly rare and require individualized management based on aneurysm size, symptoms, anatomical complexity, and risk of complications. Although conservative surveillance may be considered in selected asymptomatic patients, prolonged anatomical stability does not eliminate the potential need for surgical intervention. This case highlights the importance of individualized management, long-term imaging surveillance, and postoperative follow-up.

Categories: Cardiology, Cardiac/Thoracic/Vascular Surgery
Keywords: ct coronary angiography, giant coronary artery aneurysms, right coronary artery aneurysm, right coronary artery fistula, thoracic aortic aneurysm (taa)

Introduction

Coronary artery aneurysms (CAAs) are uncommon abnormalities characterized by focal or diffuse dilation of a coronary artery beyond its expected normal diameter in coronary angiographic series [1-2]. Giant coronary artery aneurysms, generally defined as those exceeding 8 mm in diameter or four times the diameter of the adjacent normal coronary segment, represent a particularly rare and clinically important subset [1,3].

The etiology of CAAs is heterogeneous. In adults, atherosclerosis is the most common underlying cause, while Kawasaki disease predominates in pediatric and young adult populations [4]. Less frequent etiologies include vasculitis, connective tissue disorders, iatrogenic injury following percutaneous coronary intervention, mycotic infection, and cocaine use.

Giant CAAs carry a substantial risk of serious complications, including in situ thrombosis with distal embolization, myocardial ischemia and infarction, rupture with cardiac tamponade, arrhythmia, and heart failure [1,5]. Data from the CAAR international registry, encompassing over 436,000 coronary angiograms, demonstrated a 22% mortality rate at a median follow-up of 44.8 months among patients with coronary aneurysmal disease, driven primarily by overall atherosclerotic burden [2]. In Kawasaki-associated giant CAAs, long-term studies have reported approximately 90% survival at 30 years, but a cardiac event-free rate of only 36%, with bilateral involvement and markedly elevated Z-scores predicting worse outcomes [6-8].

The management of giant CAAs remains challenging. Current approaches include antithrombotic therapy, typically aspirin combined with warfarin or low-molecular-weight heparin as recommended by the American Heart Association, as well as percutaneous exclusion strategies using covered stents or coil embolization, and surgical bypass with aneurysm ligation [3,9-11]. Novel oral anticoagulants are being explored as alternatives to warfarin, though evidence remains limited [12]. Notably, no randomized controlled trials have been conducted to compare these strategies, and the 2021 ACC/AHA/SCAI revascularization guidelines have identified CAA management as an area of significant unmet need.

Case Presentation

A 72-year-old woman, without a smoking history or family history of coronary artery disease, was initially evaluated in 2012 after an abnormal chest X-ray raised suspicion for thoracic aortic aneurysm. Coronary CT angiography revealed a tortuous, aneurysmal RCA with three dilated segments (14 mm, 13 mm, and 11 mm) and an RCA-to-coronary sinus fistula (Figure *1*). At diagnosis, the patient was asymptomatic and physically active.

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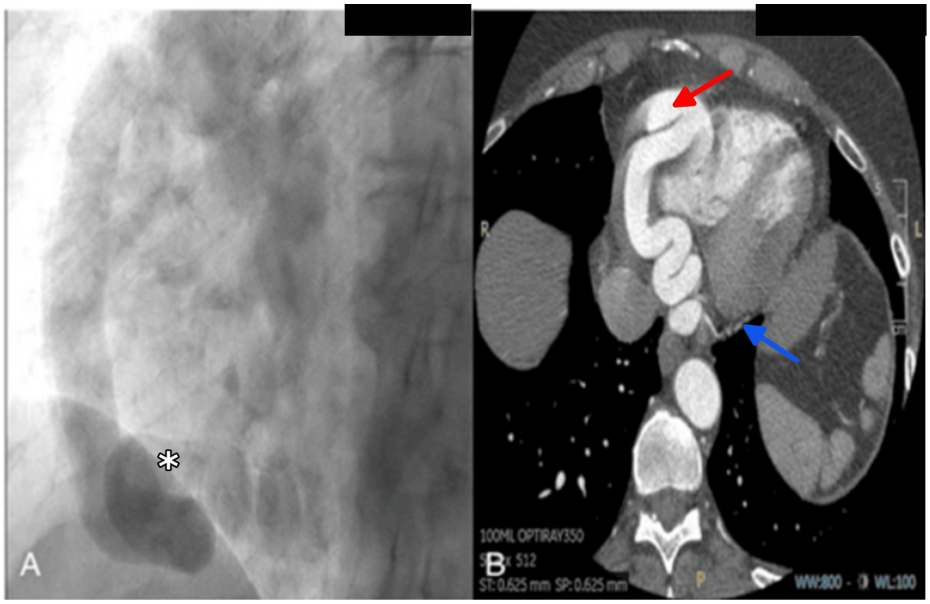


FIGURE 1: Tortuous, aneurysmal right coronary artery (RCA) with an RCA-to-coronary sinus fistula

(A) Invasive coronary angiography showing a giant aneurysmal RCA (white asterisk). (B) Coronary CT angiography (axial view) demonstrating a markedly tortuous and aneurysmal RCA with three sequentially dilated segments. The red arrow indicates a dilated aneurysmal segment of the tortuous RCA. The blue arrow indicates the fistulous tract arising from the distal RCA and draining into the coronary sinus (RCA-to-coronary sinus fistula).

Serial CT imaging was performed during prolonged surveillance of the aneurysm, with subsequent imaging demonstrating interval growth that contributed to the decision to proceed with surgical repair in December 2024. The maximum reported aneurysm diameter was 15 mm, with no evidence of rupture or hemopericardium.

The patient underwent RCA aneurysm repair, ligation of the RCA-coronary sinus fistula, CABG ×2 (SVG to the acute marginal branch and PDA), and tricuspid valve repair (Kay stitch). The perioperative course required ECMO and intra-aortic balloon pump support, which were discontinued on postoperative days 2 and 3, respectively.

Postoperative coronary CTA 10 days after surgery confirmed successful fistula closure and patency of both bypass grafts. Repeat CTA in March 2025 demonstrated continued patency of the SVG to the acute marginal branch but occlusion of the SVG to the PDA. Echocardiography showed an LVEF of approximately 51% with preserved right ventricular systolic function.

At the latest documented follow-up in October 2025, the patient remained clinically stable, reporting the ability to walk 1.5-2 miles daily without chest pain or dyspnea. Her outpatient medications included aspirin, atorvastatin, and carvedilol.

Discussion

A giant right coronary artery aneurysm with an associated coronary fistula is a rare cardiovascular condition characterized by marked dilation of the right coronary artery, commonly defined as exceeding 8 mm or four times the reference vessel diameter, although definitions vary across studies. This aneurysm creates direct communication to the coronary sinus by passing through the myocardial capillary network. It represents a combination of two distinct abnormalities: a coronary artery aneurysm and a coronary-cameral fistula. This malformation can be either congenital or acquired [12].

The aneurysmal dilation usually develops just before the fistulous connection because of the high-volume blood flow through the abnormal channel [13]. The fistula causes a left-to-right shunt, where oxygenated blood from the coronary artery drains directly into the coronary sinus instead of supplying the myocardium. Potential complications of a giant right coronary artery aneurysm with a fistula to the coronary sinus include myocardial ischemia or infarction due to the coronary steal phenomenon, thrombosis within the aneurysmal segment, heart failure caused by volume overload, arrhythmias, rupture, and infectious endocarditis [14]. Additionally, the aneurysm may mechanically compress nearby cardiac structures, which can lead to mitral valve obstruction or further arrhythmias [15].

The standard treatment for a giant right coronary artery aneurysm with a fistula to the coronary sinus is surgical exclusion of the aneurysm combined with closure of the fistula. However, percutaneous techniques such as atrial septal occluders, covered stents, or coil embolization have also been successfully used in selected cases [16]. The choice between surgical and percutaneous intervention depends on factors like the complexity of the anatomy, the aneurysm's size, and the presence of complications. Given the rarity and potential severity of this condition, management typically involves a multidisciplinary team approach [17].

This case illustrates the complexity of long-term management of coronary artery aneurysms with associated fistulas. Despite radiographic stability for more than a decade, the patient ultimately underwent complex surgical repair in December 2024, requiring temporary mechanical circulatory support. Subsequent imaging confirmed successful fistula exclusion, although one bypass graft became occluded by March 2025. Nevertheless, the patient demonstrated favorable functional recovery at the latest clinical follow-up in October 2025. These findings emphasize that prolonged anatomical stability does not eliminate the potential need for intervention and that management should remain individualized.

Conclusions

Giant coronary artery aneurysms with fistulous communications are rare and require individualized management. This case demonstrates prolonged radiographic stability of a tortuous RCA aneurysm with an associated coronary sinus fistula, followed by complex surgical repair after more than a decade of surveillance. Despite postoperative complications, the patient demonstrated favorable functional recovery. This case highlights the importance of longitudinal imaging surveillance, individualized assessment of intervention risks, and continued postoperative follow-up.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Acquisition, analysis, or interpretation of data: Hani Saad, Abdallatif Dawoud, Susan Bennett

Critical review of the manuscript for important intellectual content: Hani Saad, Abdallatif Dawoud

Supervision: Hani Saad

Concept and design: Abdallatif Dawoud, Hassan Elshebiny, Susan Bennett

Drafting of the manuscript: Abdallatif Dawoud, Hassan Elshebiny, Susan Bennett

Disclosures

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References

1. Kawsara A, Núñez Gil IJ, Alqahtani F, Moreland J, Rihal CS, Alkhouli M: Management of coronary artery aneurysms. JACC Cardiovasc Interv. 2018, 11:1211-23. 10.1016/j.jcin.2018.02.041
2. Sánchez-Sánchez I, Cerrato E, Bollati M, et al.: Long-term prognosis of coronary aneurysms: Insights of CAAR, an international registry. JACC Cardiovasc Interv. 2024, 17:2681-91. 10.1016/j.jcin.2024.08.034
3. Lawton JS, Tamis-Holland JE, Bangalore S, et al.: 2021 ACC/AHA/SCAI guideline for coronary artery revascularization: a report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. J Am Coll Cardiol. 2022, 79:e21-e129. 10.1016/j.jacc.2021.09.006
4. Gupta A, Seth A: Oral anticoagulants for coronary artery aneurysm: For few or for all? . Catheter Cardiovasc Interv. 2021, 98:872-3. 10.1002/ccd.29979
5. Price J, Okyere R, Al-Kindi S, Gupta A: Management of a right coronary artery mycotic coronary aneurysm with percutaneous intervention with covered stents. Catheter Cardiovasc Interv. 2023, 101:108-12. 10.1002/ccd.30494
6. Day-Lewis M, Son MB, Lo MS: Kawasaki disease: contemporary perspectives. Lancet Child Adolesc Health. 2024, 8:781-92. 10.1016/S2352-4642(24)00169-X
7. Newburger JW, Takahashi M, Burns JC: Kawasaki Disease. J Am Coll Cardiol. 2016, 67:1738-49. 10.1016/j.jacc.2015.12.073

8. Elias MD, Brothers JA, Hogarty AN, et al.: Outcomes associated with giant coronary artery aneurysms after Kawasaki disease: a single-center United States experience. J Pediatr. 2024, 274:114145. 10.1016/j.jpeds.2024.114145
9. McCrindle BW, Rowley AH, Newburger JW, et al.: Diagnosis, treatment, and long-term management of Kawasaki disease: a scientific statement for health professionals from the American Heart Association. Circulation. 2017, 135:e927-99. 10.1161/CIR.0000000000000484
10. Roy SK, Kadakia J, Shittu A, Budoff MJ: Coronary artery aneurysms as seen on multidetector computed tomography angiography. Catheter Cardiovasc Interv. 2011, 78:1127-32. 10.1002/ccd.23293
11. Chaturvedi A, Haberman D, Waksman R, Bernardo NL: Percutaneous intervention of a giant native coronary artery aneurysm using self-expanding stents. Catheter Cardiovasc Interv. 2024, 104:247-51. 10.1002/ccd.31112
12. Dummer KB, Miyata K, Shimizu C, Tremoulet AH, Gleason J, Gordon JB, Burns JC: DOACs in patients with giant coronary artery aneurysms after Kawasaki disease. JAMA Netw Open. 2023, 6:e2343801. 10.1001/jamanetworkopen.2023.43801
13. Pestana G, Ribeiro V, Sousa C, et al.: Percutaneous Closure of a fistulous giant coronary aneurysm . Can J Cardiol. 2018, 34:812.e13-5. 10.1016/j.cjca.2018.01.088
14. Frommelt P, Lopez L, Dimas VV, et al.: 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. 2020, 33:259-94. 10.1016/j.echo.2019.10.011
15. Vassilikou A, Xenitopoulou MP, Ziampa K, et al.: Acute myocardial infarction due to giant coronary artery aneurysm and arteriovenous fistula: a challenging case report and review of the literature. BMC Cardiovasc Disord. 2024, 24:187. 10.1186/s12872-024-03851-w
16. Maier J, Schneider M, Toth D, Laufer G, Mahr S: Arrhythmia caused by a giant coronary artery aneurysm . Ann Thorac Surg. 2022, 114:e331-3. 10.1016/j.athoracsur.2021.12.060
17. Yang Z, Zhang L, Gao J, et al.: Giant coronary artery fistula complicated with coronary artery aneurysm and acute myocardial infarction: a case report. BMC Cardiovasc Disord. 2020, 20:136. 10.1186/s12872-020-01415-2