AUCTORES
Globalize your Research

Cardiology Research and Reports
Obeidat Saleh *

Open Access

Case Report

Giant Right Coronary Artery Aneurysm with Coronary-Cameral Fistula Presenting as Acute Heart Failure and Atrial Fibrillation: A Case Report

Obeidat Saleh *, Lemaitre Ann-Iris, Litalien John, Messaoud Idir

Department of Cardiology, Hospital Center of Perigueux, Perigueux, France.

***Corresponding Author:** Obeidat Saleh, Department of Cardiology, Hospital Center of Perigueux, Perigueux, France.

Received date: August 27, 2025; **Accepted date:** September 08, 2025; **Published date:** November 03, 2025

Citation: Obeidat Saleh, Lemaitre Ann-Iris, Litalien John, Messaoud Idir, (2025), Giant Right Coronary Artery Aneurysm with Coronary-Cameral Fistula Presenting as Acute Heart Failure and Atrial Fibrillation: A Case Report, *Cardiology Research and Reports*, 7(6); **DOI:10.31579/2692-9759/172**

Abstract

Giant coronary artery aneurysms with fistulas are rare and may present with heart failure and arrhythmias. We report a 62-year-old man with hypertension who developed acute decompensated heart failure and rapid atrial fibrillation. Imaging revealed a giant right coronary artery aneurysm with a large fistula draining into the right atrium. Cardiac MRI was not performed due to claustrophobia. Medical management stabilized the patient, and invasive treatment was deferred. This case illustrates the diagnostic and therapeutic challenges of complex coronary anomalies, emphasizing the role of multimodality imaging and a heart team approach for optimal care planning in such rare conditions.

Keywords: coronary artery aneurysm; coronary-cameral fistula; heart failure; atrial fibrillation; multimodal imaging; case report

List of Abbreviations

AF : Atrial Fibrillation
CAF : Coronary Artery Fistula
CCTA : Coronary Computed Tomography Angiography
CMR : Cardiac Magnetic Resonance
CT : Computed Tomography
ECG : Electrocardiogram
HFrEF : Heart Failure with Reduced Ejection Fraction
LA : Left Atrium
LV : Left Ventricle
LVEF : Left Ventricular Ejection Fraction
MRI : Magnetic Resonance Imaging
RA : Right Atrium
RCA : Right Coronary Artery
RV : Right Ventricle
TAPSE : Tricuspid Annular Plane Systolic Excursion
TDI : Tissue Doppler Imaging
TTE : Transthoracic Echocardiography

Introduction

Coronary artery fistulas (CAFs) represent uncommon congenital or acquired vascular anomalies, defined by an abnormal connection between a coronary artery and a cardiac chamber or major vessel, thereby bypassing the myocardial capillary network [1].

While frequently asymptomatic and discovered incidentally, large or hemodynamically significant fistulas can precipitate severe clinical events such as myocardial ischemia, cardiac arrhythmias, and heart failure [2]. The coexistence of a coronary artery aneurysm significantly elevates the risk profile, introducing potential complications like rupture, thrombosis, or systemic embolization, thus demanding meticulous evaluation and prompt therapeutic consideration [3].

Fistulas draining into right-sided cardiac chambers, particularly coronary-cameral fistulas, can induce substantial volume overload, leading to dilation of the right atrium and ventricle, pulmonary hypertension, and eventual biventricular failure [4]. When presenting in the context of acute heart failure and atrial fibrillation, these anomalies pose considerable diagnostic and therapeutic challenges. These difficulties are further compounded when advanced imaging modalities, such as cardiac magnetic resonance imaging (CMR), are contraindicated due to patient-specific factors.

This report details the case of a 62-year-old male presenting with acute decompensated heart failure and rapid atrial fibrillation.

Case Presentation

A 62-year-old gentleman with a known history of arterial hypertension sought emergency medical attention due to progressively worsening exertional dyspnea over several weeks, accompanied by lower limb edema and palpitations. He reported significant fatigue and a marked decline in his ability to perform daily activities, with an acute exacerbation of symptoms recently. Notably, there was no prior history suggestive of coronary artery disease or typical angina pectoris. The patient denied any history of tobacco use or excessive alcohol intake.

Upon admission, the clinical examination revealed an irregular tachycardia with a ventricular rate of 140 beats per minute. His blood pressure was recorded at 145/90 mmHg, and oxygen saturation was 93% while breathing ambient air. Cardiac auscultation confirmed the irregular rhythm but detected no significant murmurs. Clear signs of systemic venous congestion were present, including elevated jugular venous pressure and bilateral basal pulmonary crackles, indicative of pulmonary congestion. Symmetrical pitting edema was observed in both lower extremities.

The electrocardiogram confirmed atrial fibrillation with a rapid ventricular response (approximately 140 bpm) but showed no signs of acute myocardial ischemia. A chest radiograph demonstrated cardiomegaly, evidenced by an increased cardiothoracic ratio, along with findings of bilateral pulmonary congestion consistent with acute decompensated heart failure.

An urgent transthoracic echocardiogram (TTE) was performed, revealing significant left ventricular systolic dysfunction, with an estimated ejection fraction (LVEF) of 35%. The assessment showed a moderately dilated left atrium (area 34 cm²) and marked right atrial enlargement (area 39 cm²). The right ventricle was significantly dilated (basal diameter 58 mm; end-diastolic area 37 cm²) with moderately impaired systolic function, indicated by a Tricuspid Annular Plane Systolic Excursion (TAPSE) of 14 mm and a tissue Doppler imaging (TDI)-derived tricuspid lateral annular systolic velocity (S' wave) of 8 cm/s. Moderate tricuspid regurgitation (grade 3/4) was noted, likely secondary to annular dilation and suboptimal leaflet coaptation. The estimated pulmonary artery systolic pressure was elevated at 52 mmHg. Crucially, color Doppler interrogation identified a turbulent flow jet along the lateral wall of the right atrium, raising strong suspicion of an abnormal vascular communication (Figure 1).

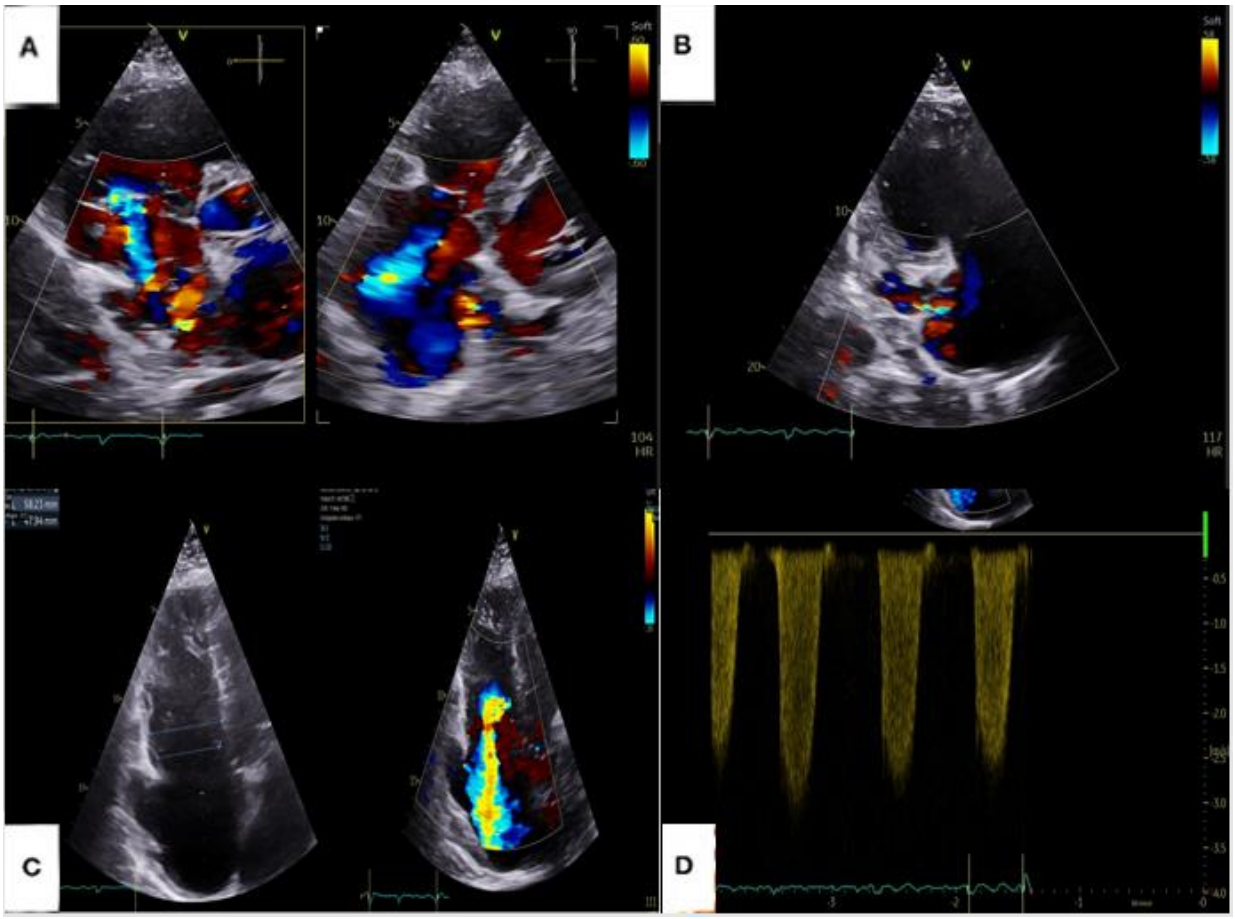

Figure 1: Transthoracic echocardiogram performed showed a turbulent flow characteristic of a coronary-cameral fistula draining into the right atrium, with a mosaic color pattern indicating high velocities and multidirectional flow (A), a small channel in the right atrial wall with aliased flow on modified parasternal long-axis view focused on the right chambers (B), significant right atrial dilation and moderate right ventricular dilation on 2D imaging with tricuspid regurgitation on color Doppler (C), and continuous wave Doppler of tricuspid regurgitation allowing estimation of systolic pulmonary artery pressure at 50-55 mmHg (D).

Following initial stabilization measures, including intravenous diuretics and rate-controlling agents, an etiological workup for the newly diagnosed left ventricular dysfunction was pursued. Invasive coronary angiography revealed a strikingly aneurysmal right coronary artery. Furthermore, it demonstrated definitive evidence of a coronary-cameral fistula originating from the RCA and draining directly into the right atrium, characterized by substantial angiographic flow at the fistulous connection. The left coronary system appeared free from significant atherosclerotic lesions.

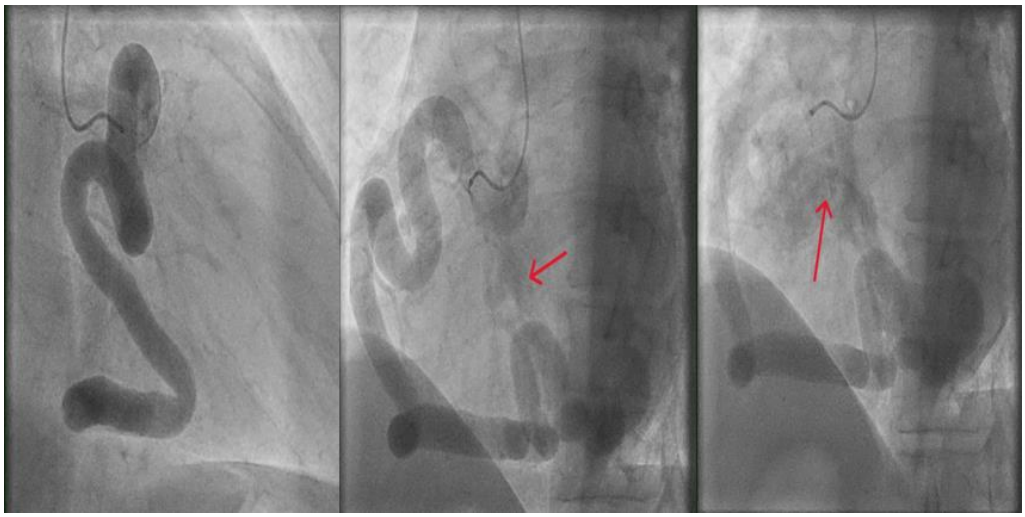

Figure 2: Invasive coronary angiography demonstrated a giant right coronary artery aneurysm with a tortuous, serpentine course (A), with evidence of a coronary-cameral fistula (red arrow) draining into the right atrium (B, C).

To better delineate the complex vascular anatomy, coronary computed tomography angiography (CCTA) was subsequently performed. The CCTA confirmed the giant aneurysmal nature of the RCA and precisely mapped the trajectory of the coronary-cameral fistula (Figure 3). Although Cardiac Magnetic Resonance (CMR) was planned for a more comprehensive assessment of myocardial structure, function, tissue characteristics, and potential fibrosis, it could not be completed due to the patient experiencing severe claustrophobia.

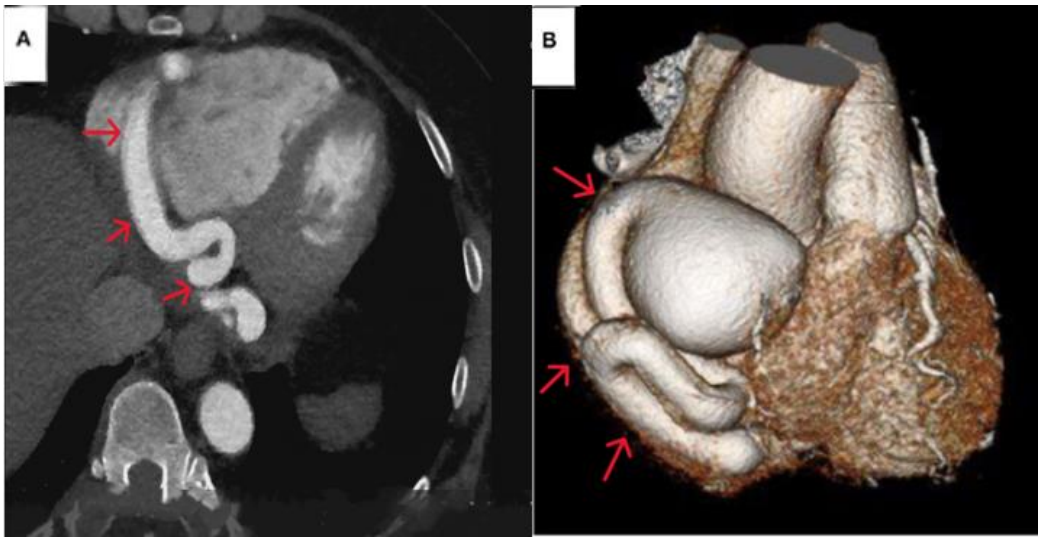

Figure 3: Axial cardiac computed tomography (CT) scan (A) and three-dimensional volume-rendered reconstruction (B) clearly demonstrate a markedly aneurysmal and tortuous right coronary artery (RCA). The red arrows indicate the path of the dilated RCA terminating in a coronary-cameral fistula draining into the right atrium. Panel A highlights the serpiginous trajectory and luminal enhancement of the aneurysmal vessel on axial imaging, while panel B offers a comprehensive spatial view of the abnormal vascular anatomy encircling the right heart chambers.

The patient's acute heart failure and rapid atrial fibrillation were managed with supplemental oxygen, intravenous furosemide, and beta-blockade (bisoprolol), leading to gradual symptomatic improvement and effective heart rate control. Anticoagulation therapy was initiated with low molecular weight heparin and subsequently transitioned to apixaban for long-term stroke prevention in the setting of atrial fibrillation. Guideline-directed medical therapy (GDMT) for heart failure with reduced ejection fraction (HFrEF) was optimized, incorporating sacubitril/valsartan, spironolactone, and dapagliflozin.

A multidisciplinary heart team conference, involving specialists in cardiology, cardiac surgery, and interventional radiology, was convened to discuss definitive management strategies. While medical therapy provided hemodynamic stabilization, it did not address the underlying structural defect. Percutaneous closure of the fistula was considered the preferred first-line approach due to its minimally invasive nature. This could potentially involve coil embolization or the deployment of an occlusion device, contingent upon favorable anatomical characteristics determined by imaging. Surgical repair, encompassing aneurysm resection or exclusion and direct fistula closure, was discussed as a definitive but more invasive alternative. This option carried a higher estimated perioperative risk, particularly given the patient's impaired left ventricular function.

After extensive counseling regarding the nature of his condition, the available treatment options, and the associated procedural risks, the patient expressed a preference to postpone any invasive intervention, wishing for more time for reflection before making a final decision.

Discussion

Coronary-cameral fistulas (CCFs) are rare vascular anomalies connecting a coronary artery to a cardiac chamber, bypassing the normal capillary network. While often asymptomatic, large CCFs can cause significant hemodynamic issues, including heart failure and arrhythmias. The coexistence of a giant coronary aneurysm, as seen in this case, exacerbates these effects, increasing risks of rupture, thrombosis, and volume overload [5].

This case highlights the diagnostic and management challenges of giant coronary aneurysms with CCFs. The pathophysiology involves 'coronary steal' and chronic volume overload, leading to chamber dilation, pulmonary hypertension, and biventricular dysfunction, increasing susceptibility to arrhythmias like atrial fibrillation [6]. Multimodal imaging, including CCTA, is crucial for diagnosis and planning [7]. Cardiac MRI, though not feasible in this case, offers valuable insights into shunt volume and myocardial tissue [8].

Therapeutic management focuses on closing the fistula, managing the aneurysm, reducing thromboembolic risk, and optimizing heart failure treatment. Percutaneous closure is less invasive, but surgery may be necessary for complex cases, carrying higher perioperative risks, especially in patients with pre-existing ventricular dysfunction [9,10]. A multidisciplinary heart team approach is essential for optimal management. This case underscores the importance of considering underlying structural heart disease in patients with unexplained heart failure or arrhythmias.

Conclusion

Prompt diagnosis and tailored management of coronary-cameral fistulas with aneurysms are crucial. Multidisciplinary collaboration and advanced imaging guide optimal care in these complex cases.

References

1. Tekeli Sengul S, Karasu BB. (2022). Prevalence and characteristics of coronary artery fistula in adults: coronary angiographic analysis of 18,106 patients. Kardiologiia. 62(5):62-66.
2. López B, Batallanos M. (2023). Coronary artery fistulas as a rare cause of heart failure and ventricular arrhythmia, associated with multiple large vessel fistulas. Radiol Case Rep. 18(5):1848-1851.
3. Bararu-Bojan I, Badulescu OV, Badescu MC, Vladeanu MC, Plesoianu CE, et al. (2024). New Insights into the Pathophysiology of Coronary Artery Aneurysms. Diagnostics (Basel). 14(19):2167.
4. Qarajeh, R, Qureini, A, Thompson, R. et al. (2020). Acute Heart Failure From Coronary Cameral Fistula: Diagnostic Challenge and Therapeutic Opportunity. *J Am Coll Cardiol Case Rep.* (15) 2368–2371.e1.
5. Crawley PD, Mahlow WJ, Huntsinger DR, Afiniwala S, Wortham DC. (2014). Giant coronary artery aneurysms: review and update. Tex Heart Inst J. 41(6):603-608.
6. Yun G, Nam TH, Chun EJ. (2018). Coronary Artery Fistulas: Pathophysiology, Imaging Findings, and Management. Radiographics. 38(3):688-703.
7. Sharifkazemi M, Mohseni-Badalabadi R, Hosseinsabet A, Hajizeinali A. (2022). Case report: Multimodal imaging diagnosis of a giant coronary artery fistula: A report of two cases. Front Cardiovasc Med. 9:986078.
8. Rajiah P, Kanne JP. (2011). Cardiac MRI: Part 1, cardiovascular shunts. AJR Am J Roentgenol. 197(4):W603-620.
9. Al-Hijji M, El Sabbagh A, El Hajj S, AlKhouli M, El Sabawi B, et al. (2021). Coronary Artery Fistulas: Indications, Techniques, Outcomes, and Complications of Transcatheter Fistula Closure. *JACC Cardiovasc Interv.* 14(13):1393-1406.
10. Guerrero Becerra AF, Palacio AM, Camacho J, Sandoval N. (2020). Surgical management of a giant right coronary artery aneurysm with coronary arteriovenous fistula: case report. *Eur Heart J Case Rep.* 4(5):1-6.

DOI:10.31579/2692-9759/172