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Chest Pain Due to Anomalous Origin of the Left Circumflex Artery From the Opposite Sinus of Valsalva in a 70-Year-Old Woman

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

EF Tian Luo
B Kang Luo
D JunBing Lin
A Qiang Huang

Second Affiliate Hospital of Guangzhou Medical University, Guangzhou, Guangdong, PR China

Corresponding Author: Qiang Huang, 250 Changgang East Road, Haizhu District, Guangzhou, Guangdong Province, China, Phone: 13822284962, e-mail: firsthq@163.com

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Patient: Female, 70-year-old
Final Diagnosis: Anomalous origin of the left circumflex artery from the opposite sinus of Valsalva
Symptoms: Dizziness • exertional chest pain
Clinical Procedure: —
Specialty: Cardiology

Objective: Rare disease

Background: An anomalous origin of a coronary artery from the opposite sinus of Valsalva (ACAOS) is a rare congenital coronary abnormality that is usually asymptomatic throughout life. However, an anomalous coronary artery arising from an atypical aortic location can lead to myocardial ischemia, exertional symptoms, or even sudden cardiac death. Therefore, early recognition and risk stratification are essential. Clinical management of ACAOS should be highly individualized and guided by detailed anatomical features, clinical symptoms, and evidence of ischemia. This report describes an older woman who presented with new-onset chest pain as the first clinical manifestation of previously undiagnosed ACAOS.

Case Report: A 70-year-old woman presented with 5 days of progressive chest tightness and 20 days of recurrent dizziness associated with poorly controlled hypertension. Initial conventional medical therapy provided inadequate symptom relief. Subsequent coronary angiography revealed an anomalous left circumflex artery originating independently from the right sinus of Valsalva, with 3 separate coronary ostia and concurrent clinically significant atherosclerotic stenosis. She underwent uncomplicated percutaneous coronary intervention of the right coronary artery, achieving successful revascularization and complete resolution of her presenting symptoms.

Conclusions: This report describes a rare case of ACAOS presenting with de novo chest pain in an older woman, highlighting the critical importance of accurate anatomical characterization and tailored, individualized management for optimal clinical outcomes.

Keywords: cardiology • congenital abnormalities • coronary artery disease • coronary vessel anomalies • review • atherosclerosis • coronary angiography • tomography, X-ray computed

Full-text PDF: https://www.amjcaserep.com/abstract/index/idArt/952577

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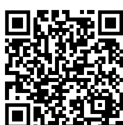

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Introduction

Coronary artery anomalies are congenital developmental abnormalities of the coronary arteries and are typically classified according to their origin, course, and termination [1]. Among these categories, anomalies of origin are most common [2]. They generally involve abnormal origins of the 3 major coronary arteries. In the normal population, the right coronary artery (RCA) and left main coronary artery arise from the sinuses of Valsalva at the aortic root: the RCA originates from the right coronary sinus and courses within the right atrioventricular groove, whereas the left main coronary artery arises from the left coronary sinus, passes behind the pulmonary artery, and then divides into the left anterior descending artery and left circumflex (LCx) artery [3].

Anomalous origin of a coronary artery from the opposite sinus of Valsalva (ACAOS) is the most common clinically significant coronary anomaly [4]. Population-based studies have revealed a prevalence of 1.5% to 6.3% among patients undergoing coronary angiography [4]. However, this population is subject to substantial selection bias, suggesting that the prevalence of ACAOS in the general population is lower.

Most patients with ACAOS are asymptomatic; only high-risk subtypes are associated with myocardial ischemia, arrhythmias, or sudden cardiac death, particularly in young adults and athletes [5]. Anomalous vessels can follow malignant courses, such as interarterial or intramural pathways, or arise from slit-like ostia; these factors increase the risk of ischemia during exertion [6,7].

Anomalous origin of the LCx from the right sinus of Valsalva is a rare subtype of ACAOS. This variant is often asymptomatic and typically becomes clinically apparent only in later adulthood, presenting with chest pain or being detected incidentally [8,9]. Diagnosis requires coronary computed tomographic angiography (CTA) and coronary angiography to define the anatomy and guide management [10]. Treatment is individualized according to symptoms, myocardial ischemia, and anatomical risk features [11,12]. This report describes an older woman who presented with chest pain as the first clinical manifestation of ACAOS [13-15].

Case Report

A 70-year-old woman was admitted with a 5-day history of persistent, worsening precordial chest tightness that was unrelieved by rest. She also reported a 20-day history of recurrent dizziness; each episode lasted approximately 30 minutes and resolved with rest. During these episodes, her blood pressure reached 200/100 mm Hg. She had no history of diabetes mellitus or smoking. Previous treatment with nifedipine and atorvastatin improved her dizziness but worsened the chest tightness.

On admission, physical examination revealed a blood pressure of 150/90 mm Hg and a heart rate of 80 bpm. Electrocardiography showed isolated QT interval prolongation without ST-T changes suggestive of myocardial ischemia (**Figure 1**). Transthoracic echocardiography demonstrated mild mitral and tricuspid regurgitation, with a left ventricular ejection fraction of 65% and preserved global function (**Figure 2**). Chest radiography revealed no cardiomegaly, normal pulmonary vascular markings, and no acute pulmonary infiltrates (**Figure 3**). Laboratory testing revealed mild hypokalemia (3.1 mmol/L), which was corrected medically.

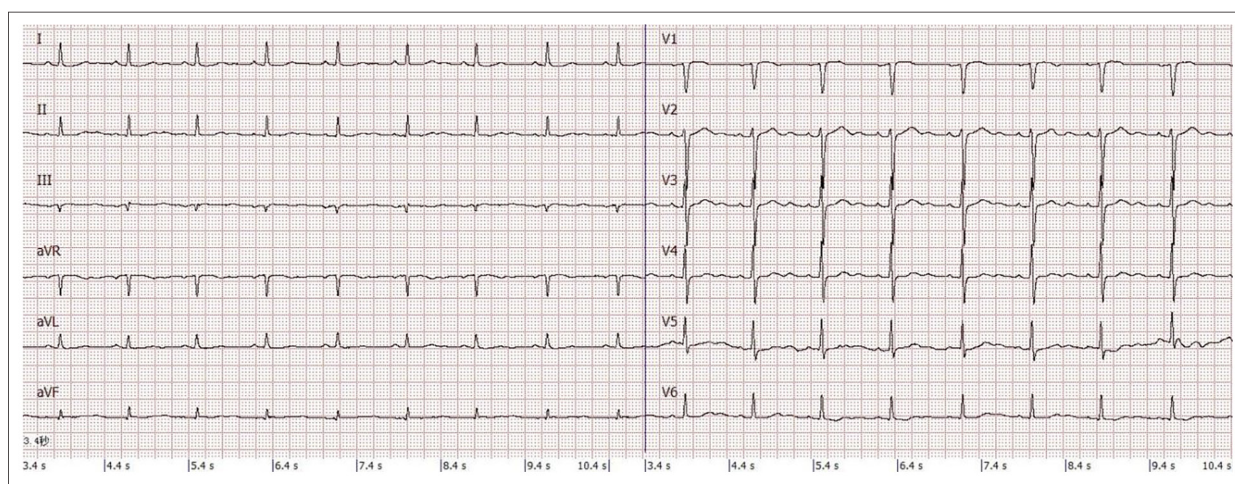

Figure 1. Electrocardiogram of the 70-year-old patient showing isolated QT interval prolongation without significant ST-segment elevation or depression suggestive of acute myocardial ischemia. Isolated QT interval prolongation is evident in lead V5 (blue arrow), with a heart rate-corrected QTc interval of 486 ms.

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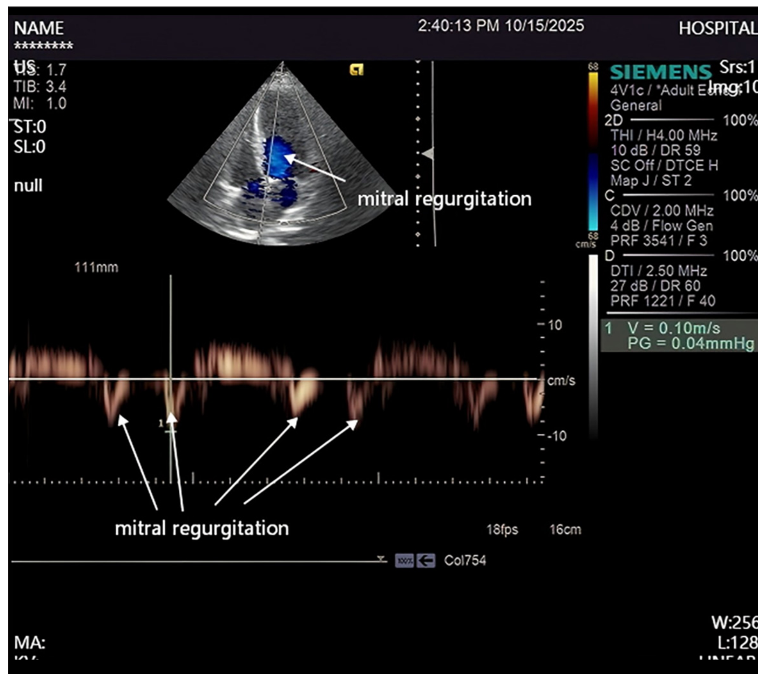

Figure 2. Echocardiographic images demonstrating mild mitral and tricuspid regurgitation, preserved left ventricular systolic function (left ventricular ejection fraction = 65%), and no regional wall motion abnormalities.

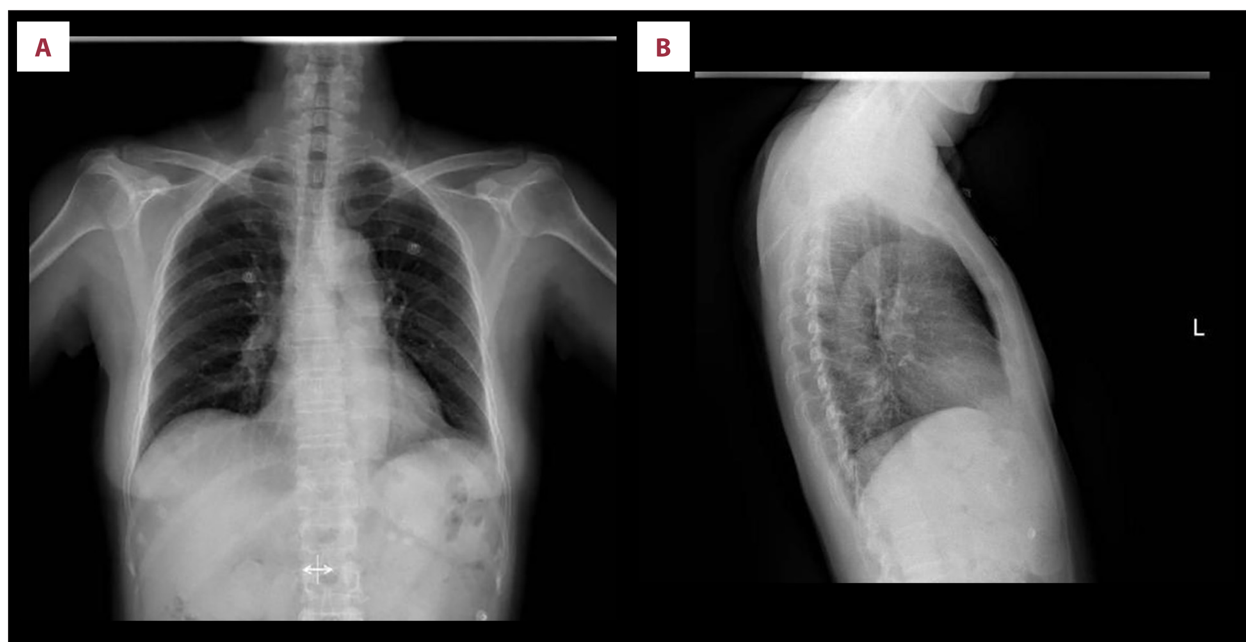

Figure 3. (A, B) Chest radiographs demonstrating no cardiomegaly, normal pulmonary vascular markings, and no acute pulmonary infiltrates.

After an insufficient response to medical therapy, coronary angiography was performed with informed consent. Coronary angiography demonstrated right coronary dominance (Figure 4A, 4B). The left main coronary artery was absent. The LCx artery originated independently from the right sinus of Valsalva and coursed between the aortic root and pulmonary vein root, without high-risk features such as an acute takeoff angle or slit-like ostium. Clinically significant stenosis (up to 85%) was present in the left anterior descending artery, LCx artery, and mid-to-distal RCA.

After shared decision-making with the patient and her family, optical coherence tomography, percutaneous transluminal coronary angioplasty, and percutaneous coronary intervention of the RCA were successfully performed. Postoperative distal RCA flow was TIMI grade 3 (complete perfusion) (Figure 4C),

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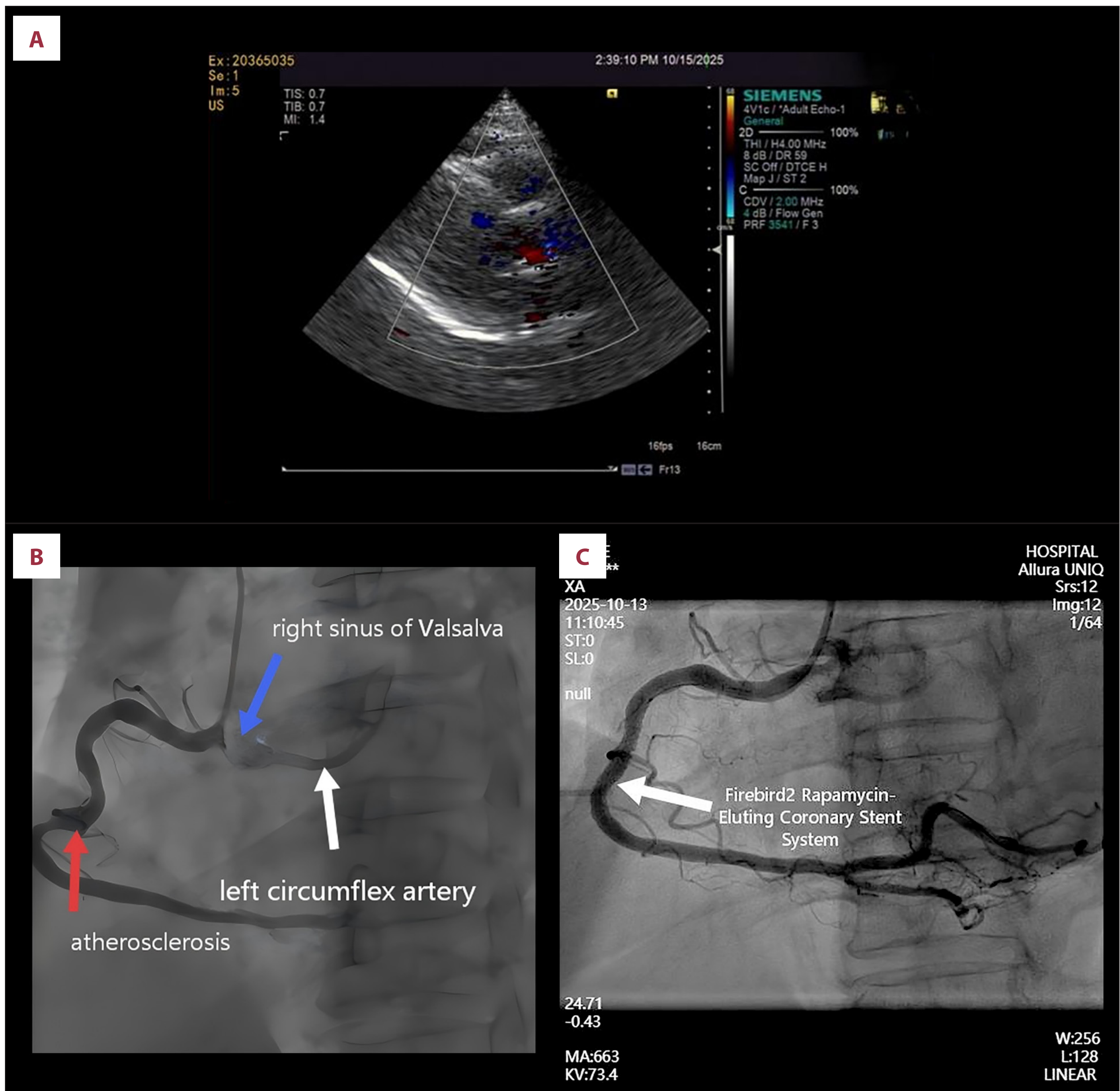

Figure 4. (**A-C**) Invasive coronary angiography demonstrating anomalous origin of the left circumflex (LCx) artery from the right sinus of Valsalva. In Figure **4A and 4B**, the left main coronary artery continues directly as the left anterior descending artery without giving rise to the LCx artery; severe stenosis is present in the mid-segment of the right coronary artery. Figure **4C** shows the coronary angiographic image after treatment. The arrow indicates the Firebird2 Rapamycin-Eluting Coronary Stent System, and the right coronary artery is well expanded following stent implantation.

and the chest tightness resolved. Dual antiplatelet therapy (aspirin plus ticagrelor) and optimized antihypertensive treatment were continued. At the 1-month follow-up, the patient remained free of chest pain, and her blood pressure was controlled at approximately 140/75 mm Hg.

Discussion

Whether anomalous coronary arteries in patients with ACAOS are linked to an increased risk of atherosclerosis remains controversial. Early matched controlled studies by Click et al suggested that anomalous circumflex arteries had a higher prevalence of significant stenosis than normal coronary arteries ($P = 0.02$) [16]. Sidhu et al also reported that moderate-to-severe coronary artery disease was more common in anomalous vessels than

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in normal vessels (49.12% vs 33.21%, $P=0.003$) [17]. However, Jiang et al found no significant difference in stenosis severity between anomalous and normal arteries ($P=0.8$), although patients with anomalous circumflex arteries were older at diagnosis and had more severe overall coronary stenosis (odds ratio = 2.7, 95% confidence interval: 2.2-3.4, $P<0.0001$) [18]. Similarly, Şahin et al found greater atherosclerotic involvement in anomalous coronary arteries ($P=0.005$), but no significant differences in atherosclerotic burden according to anomaly subtype ($P=0.220$) [19]. Overall, current evidence remains inconsistent. Large-scale, well-controlled studies are needed to determine whether anomalous circumflex arteries predispose patients to atherosclerosis after adjustment for age, sex, cardiovascular risk factors, and selection bias in angiographic or coronary CTA cohorts.

This case shows that ACAOS can initially present with chest pain in older patients and may pose specific challenges for coronary angiography and intervention. Our patient had an anomalous LCx artery originating from the right sinus of Valsalva with 3 separate coronary ostia, an unusual subtype that is rarely symptomatic before older age. Unlike previous reports of ACAOS in younger individuals, this case is notable because symptoms first developed at 70 years of age, consistent with reports that some ACAOS variants remain clinically silent until late adulthood [20]. Similar to the case reported by Rigatelli and colleagues [20], our patient lacked high-risk anatomical features, such as interarterial or intramural courses, which may have contributed to the delayed clinical presentation.

ACAOS complicates coronary angiography, increasing procedural difficulty, duration, and contrast use [20,21]. Preprocedural coronary CTA can delineate the coronary anatomy and reduce technical difficulty during intervention [10]. This was a key consideration in the present case. Percutaneous coronary intervention instead of surgery was justified given the absence of high-risk anatomical features and presence of focal atherosclerotic disease. Current expert recommendations support individualized management, with percutaneous coronary intervention favored for stable obstructive disease and surgical unroofing or reimplantation reserved for patients with high-risk anatomy or inducible ischemia [11,12]. This case highlights the importance of considering ACAOS in older patients with unexplained chest pain and emphasizes that accurate anatomical characterization is essential for safe and successful management.

Conclusions

This case represents an exceedingly rare presentation of ACAOS in an older woman with chest pain caused by an anomalous LCx artery arising from the right sinus of Valsalva in the setting of atherosclerotic coronary artery disease. Symptomatic presentation may occur late in life, even in the absence of high-risk anatomical features. Preoperative coronary CTA can improve procedural success by accurately delineating coronary anatomy. Management should be individualized according to the patient's symptoms and anatomical characteristics.

Institution Where Work Was Done

Second Affiliate Hospital of GuangZhou Medical University, Guangzhou, Guangdong, PR China.

Patient Consent

The patient provided informed consent for publication of this report.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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References:

1. Gentile F, Castiglione V, De Caterina R. Coronary artery anomalies. Circulation. 2021;144(12):983-96
2. Kanagala SG, Gupta V, Dunn GV, et al. Narrative review of anomalous origin of coronary arteries: Pathophysiology, management, and treatment. Curr Cardiol Rev. 2023;19(6):427-38
3. Gać P, Żórawik A, Poręba R. A single coronary artery originating from the right coronary sinus with a typical course of the right coronary artery and the interarterial course of the left main, left anterior descending, and left circumflex as an example of a rare case of high-risk coronary anomaly. Diagnostics (Basel). 2022;12(1):167
4. Malik MB, Zeltser R. Isolated coronary artery anomalies. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan [updated 2023 Jun 12]. Available from: https://www.ncbi.nlm.nih.gov/sites/books/NBK555974/
5. Ratti A, Prestini B, Conte E, et al. Anomalous origin of left circumflex artery from the right sinus of Valsalva: Clinical outcomes in a consecutive series of master athletes. Clin Cardiol. 2023;46(9):1097-105
6. Angelini P. Coronary artery anomalies. Circulation. 2007;115(10):1296-305
7. Angelini P, Uribe C. Anatomic spectrum of left coronary artery anomalies and associated mechanisms of coronary insufficiency. Catheter Cardiovasc Interv. 2018;92(2):313-21
8. Sidhu NS, Wander GS, Monga A, Kaur A. Incidence, characteristics and atherosclerotic involvement of coronary artery anomalies in adult population undergoing catheter coronary angiography. Cardiol Res. 2019;10(6):358-68
9. Şahin T, Ilgar M. Investigation of the frequency of coronary artery anomalies in MDCT coronary angiography and comparison of atherosclerotic involvement between anomaly types. Tomography (Ann Arbor, Mich). 2022;8(3):1631-41
10. Gräni C, Kaufmann PA, Windecker S, Buechel RR. Diagnosis and management of anomalous coronary arteries with a malignant course. Interv Cardiol Rev. 2019;14(2):83-88
11. Lanjewar CP, Kumar D, Sabnis GR, et al. Anomalous origin of coronary artery from the opposite aortic sinus of Valsalva: A single center experience with a therapeutic conundrum. Indian Heart J. 2021;73(3):289-94

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12. Brothers JA, Frommelt MA, Jaquiss RDB, et al. Expert consensus guidelines: Anomalous aortic origin of a coronary artery. J Thorac Cardiovasc Surg. 2017;153(6):1440-57
13. Liberthson RR, Dinsmore RE, Fallon JT. Aberrant coronary artery origin from the aorta: Report of 18 patients, review of literature and delineation of natural history and management. Circulation. 1979;59(4):748-54
14. Clark RA, Marler AT, Lin CK, et al. A review of anomalous origination of a coronary artery from an opposite sinus of Valsalva (ACAOS) impact on major adverse cardiovascular events based on coronary computerized tomography angiography: A 6-year single center review. Ther Adv Cardiovasc Dis. 2014;8(6):237-41
15. Altayyar RM, AlNasser FO, Ghani MA. Transcatheter aortic valve implantation with anomalous left main origin from right coronary cusp: A case report. Am J Case Rep. 2025;26:e948995
16. Click RL, Holmes DR, Vlietstra RE, et al. Anomalous coronary arteries: location, degree of atherosclerosis and effect on survival—A report from the coronary artery surgery study. J Am Coll Cardiol. 1989;13(3):531-37
17. Jiang MX, Brinza EK, Ghobrial J, et al. Coronary artery disease in adults with anomalous aortic origin of a coronary artery. JTCVS Open. 2022;10:205-21
18. Driesen BW, Warmerdam EG, Sieswerda GT, et al. Anomalous coronary artery originating from the opposite sinus of Valsalva (ACAOS), fractional flow reserve- and intravascular ultrasound-guided management in adult patients. Catheter Cardiovasc Interv. 2018;92(1):68-75
19. Bigler MR, Kadner A, Räber L, et al. Therapeutic management of anomalous coronary arteries originating from the opposite sinus of Valsalva: Current evidence, proposed approach, and the unknowing. J Am Heart Assoc. 2022;11(20):e027098
20. Rigatelli G, Dell'Avvocata F, Van Tan N, et al. Congenital coronary artery anomalies silent until geriatric age: Non-invasive assessment, angiography tips, and treatment. J Geriatr Cardiol. 2015;12(1):66-75
21. Yang M, Bloomfield GC, Case BC, et al. Procedural characteristics of coronary angiography in patients with anomalous aortic origin of a coronary artery. Cardiovasc Revasc Med. 2025;77:7-11

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