



The Left Turn from the Right Side: A Circumflex Artery Arising from the Right Sinus

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ARTICLE INFO	ABSTRACT
Published Online: 28 September 2026	Coronary artery anomalies remain uncommon yet clinically relevant findings, with anomalous origin of the left circumflex artery from the right sinus of Valsalva representing one of the more frequently encountered variants. We describe a 44-year-old woman with obesity, uncontrolled diabetes and hypertension who presented with progressive exertional dyspnea. Transthoracic echocardiography demonstrated elevated left-ventricular filling pressures and a high probability of pulmonary hypertension; right-heart catheterization confirmed moderate post-capillary pulmonary hypertension secondary to longstanding hypertension. Coronary angiography performed during the same session unexpectedly revealed a small-caliber right coronary artery and a separate circumflex artery arising from the right sinus. Subsequent coronary computed tomography angiography confirmed the anomalous origin, a posterior retro-aortic course and an inter-atrioventricular trajectory without evidence of compression or ischemia. Stress echocardiography was negative for inducible ischemia. Recognition of this anomaly is essential to avoid procedural complications during angiography, percutaneous intervention or cardiac surgery, even when the variant itself proves benign.
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INTRODUCTION

Coronary artery anomalies (CAA) are uncommon, with a prevalence of approximately 1% in the general population. While most are discovered incidentally and remain asymptomatic, some anomalies can have clinical significance, including altered coronary hemodynamics, increased risk of atherosclerosis, or sudden cardiac death. CAAs may also complicate coronary angiography or cardiac surgery if unrecognized. (1) (2)

Normally, the left coronary artery (LCA) arises from the left sinus of Valsalva and bifurcates into the left anterior descending (LAD) and left circumflex (LCx) arteries, while the right coronary artery (RCA) originates from the right sinus of Valsalva (RSV).

Anomalous origin of the LCx from the RSV or RCA is a rare but well-documented variant, typically considered benign but important to recognize during coronary procedures. (3)(4)(5)

We report a case of an anomalous LCx artery arising from the RSV, discovered incidentally during evaluation of a 44-year-

old woman presenting with exertional dyspnea. We also review the literature regarding the incidence and clinical relevance of this anomaly.

CASE REPORT

A 44-year-old female with obesity and a previous medical history of uncontrolled diabetes and hypertension.

The patient presented to our department for exertional dyspnea that had been progressing for the past 5 months.

Her Physical examination and EKG were normal.

Transthoracic Echocardiogram (TTE) showed a normal-sized left ventricle with no regional wall motion abnormalities, elevated left ventricular filling pressures: E/A= 1.4, E/E'= 13 (Figure 1), a non-dilated right ventricle with preserved systolic function and a high probability of pulmonary hypertension: Tricuspid regurgitation (TR) flow at 4.02 m/s (Figure 2).

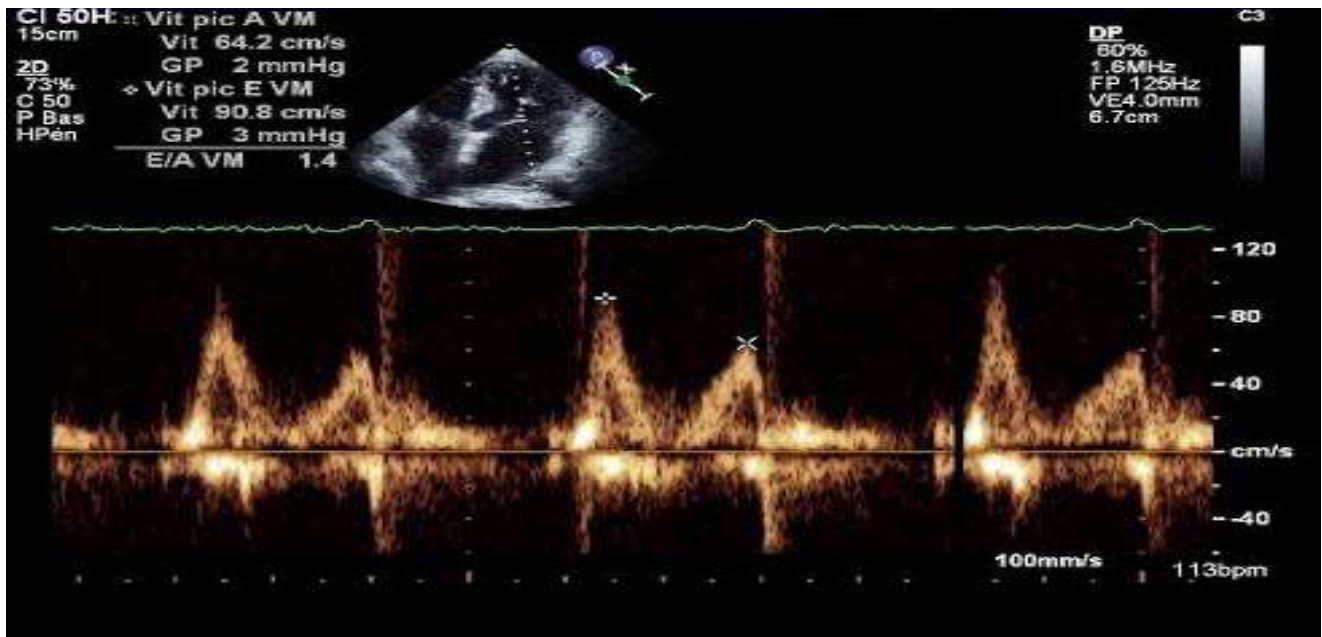


Figure 1: TTE showing a Type II mitral flow.

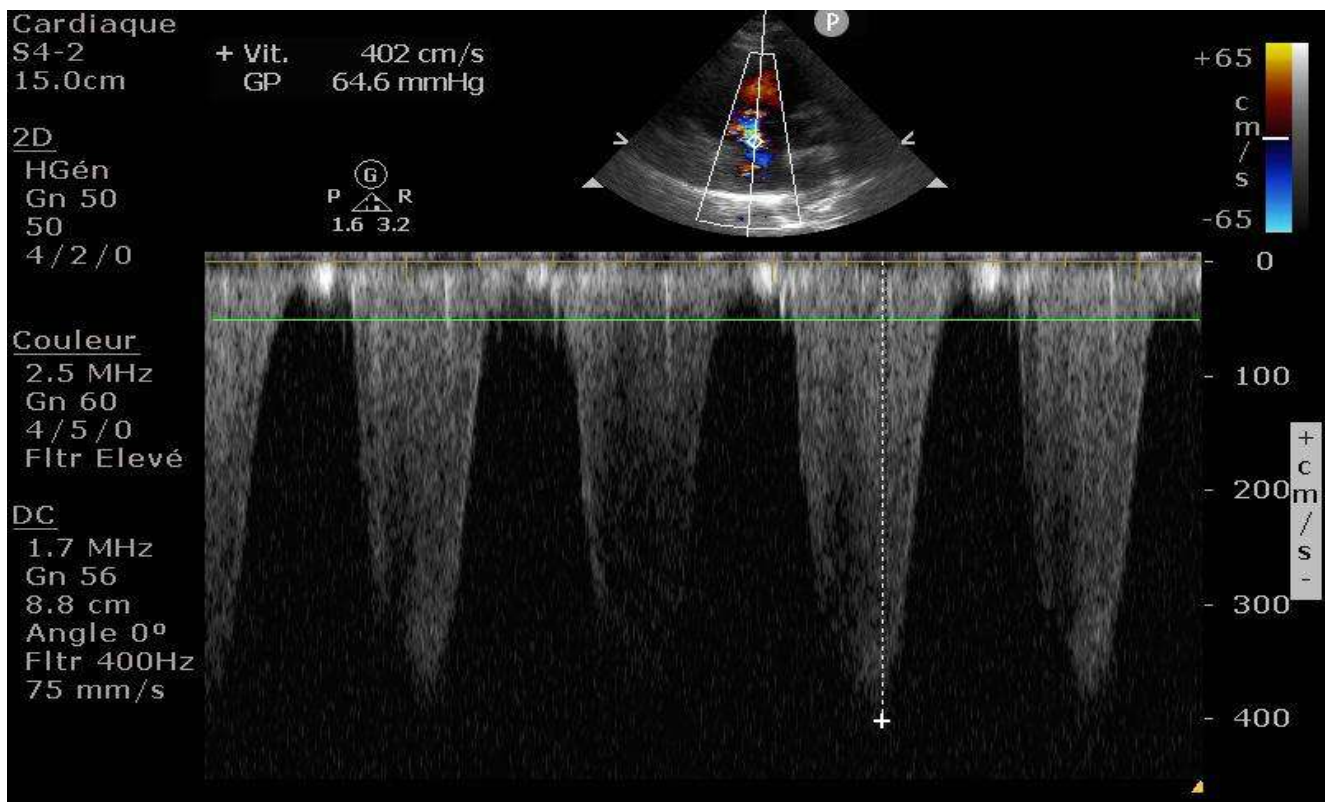


Figure 2: TTE showing A TR Flow at 4.02 in continuous doppler: High pulmonary hypertension probability.

Given the TTE findings, Patient underwent Right heart catheterization that found a moderate post-capillary pulmonary hypertension, probably caused by her uncontrolled hypertension so we decided to treat her acute

heart failure with preserved ejection fraction and optimize her blood pressure treatment and the patient's condition improved during follow up. (Figure 3)

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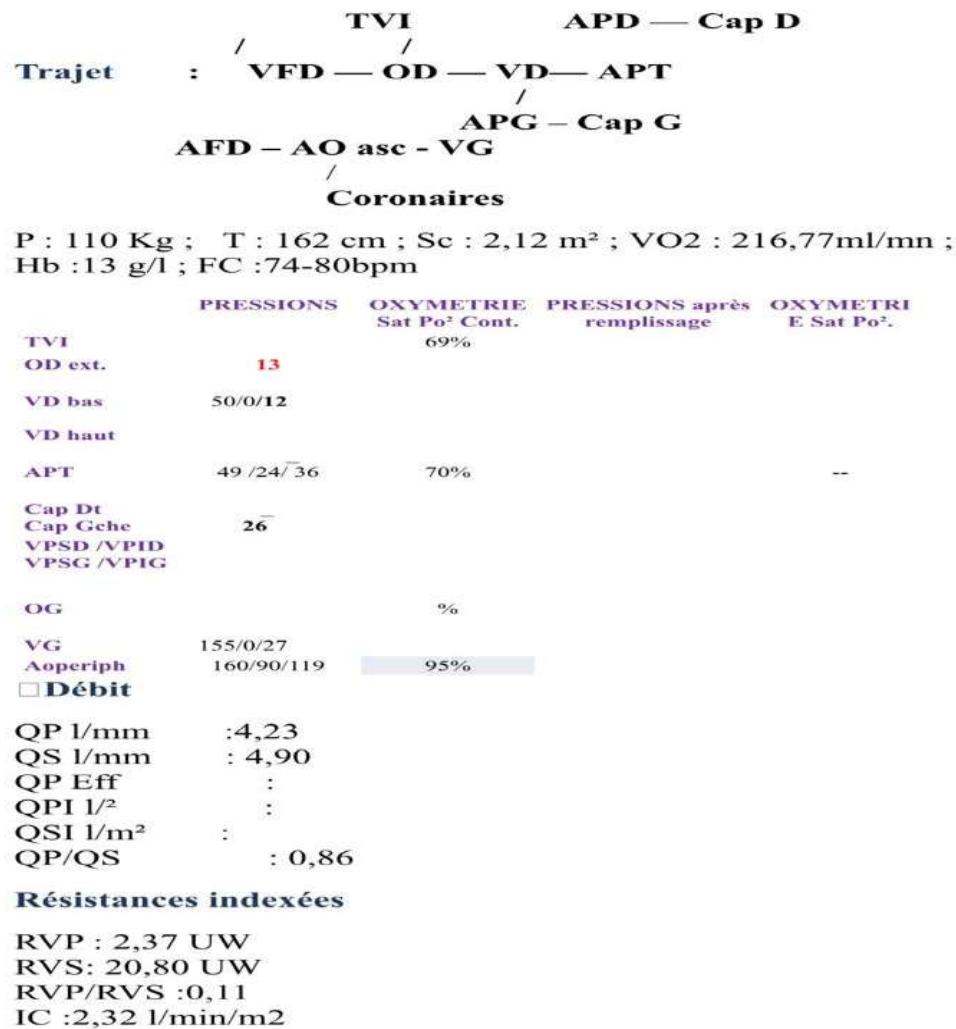


Figure 3 : Right heart Catheterization parameters showing A moderate Post-capillary pulmonary hypertension.

During the right heart catheterization, we decided to complete with coronary angiography that revealed the presence of a circumflex artery arising from the RSV. (Figure 4) (Figure5)



Figure 4: an LAO coronary angiography view showing a small caliber right coronary artery originating from the RSV.

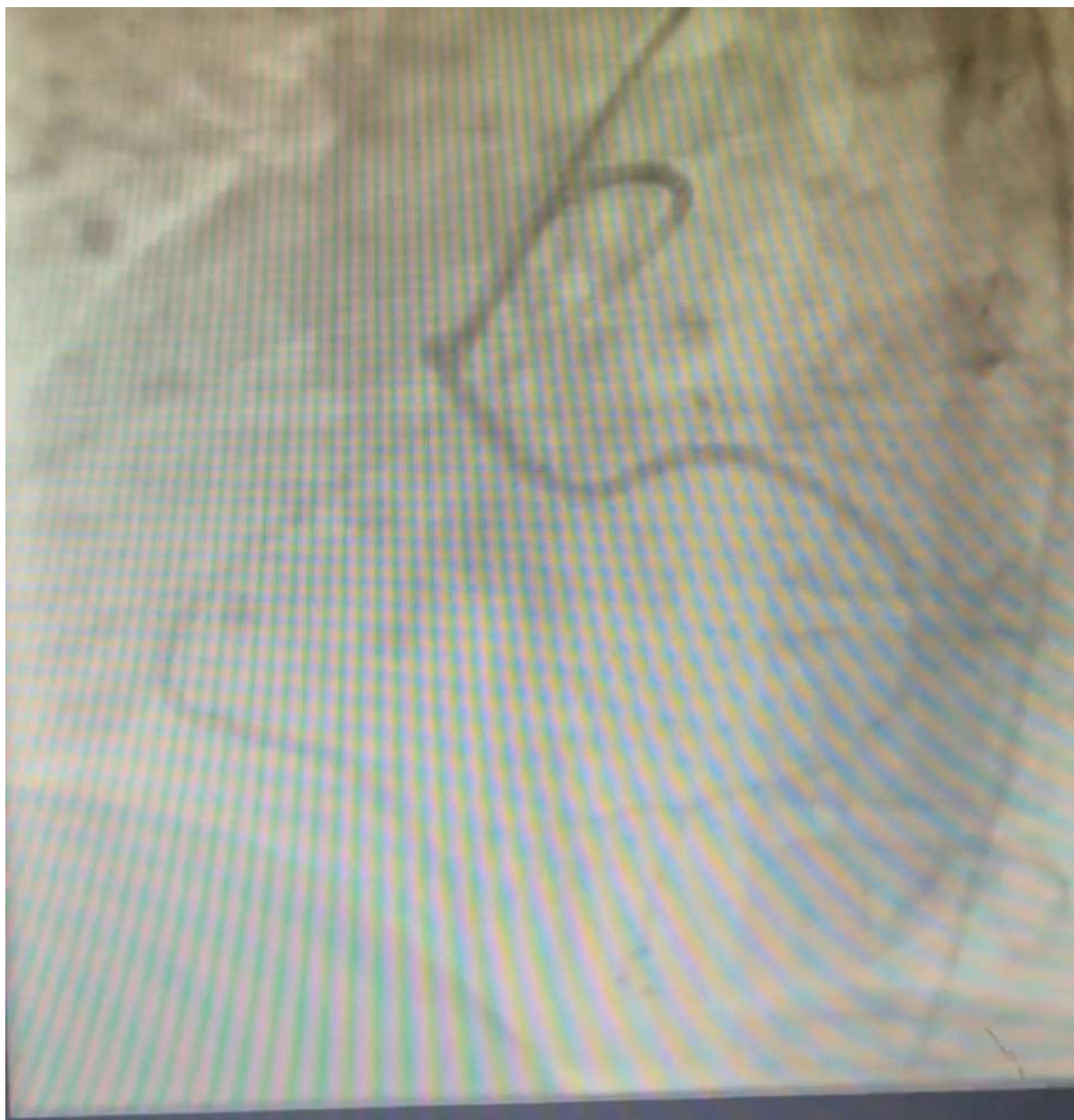


Figure 5: A LAO coronary angiography view showing a circumflex artery arising from the RSV.

We completed with a coronary computed tomography angiography (CCTA) that revealed a circumflex Coronary artery arising from the RSV. (Figure6) (Figure 7) (Figure 8) (Figure 9)

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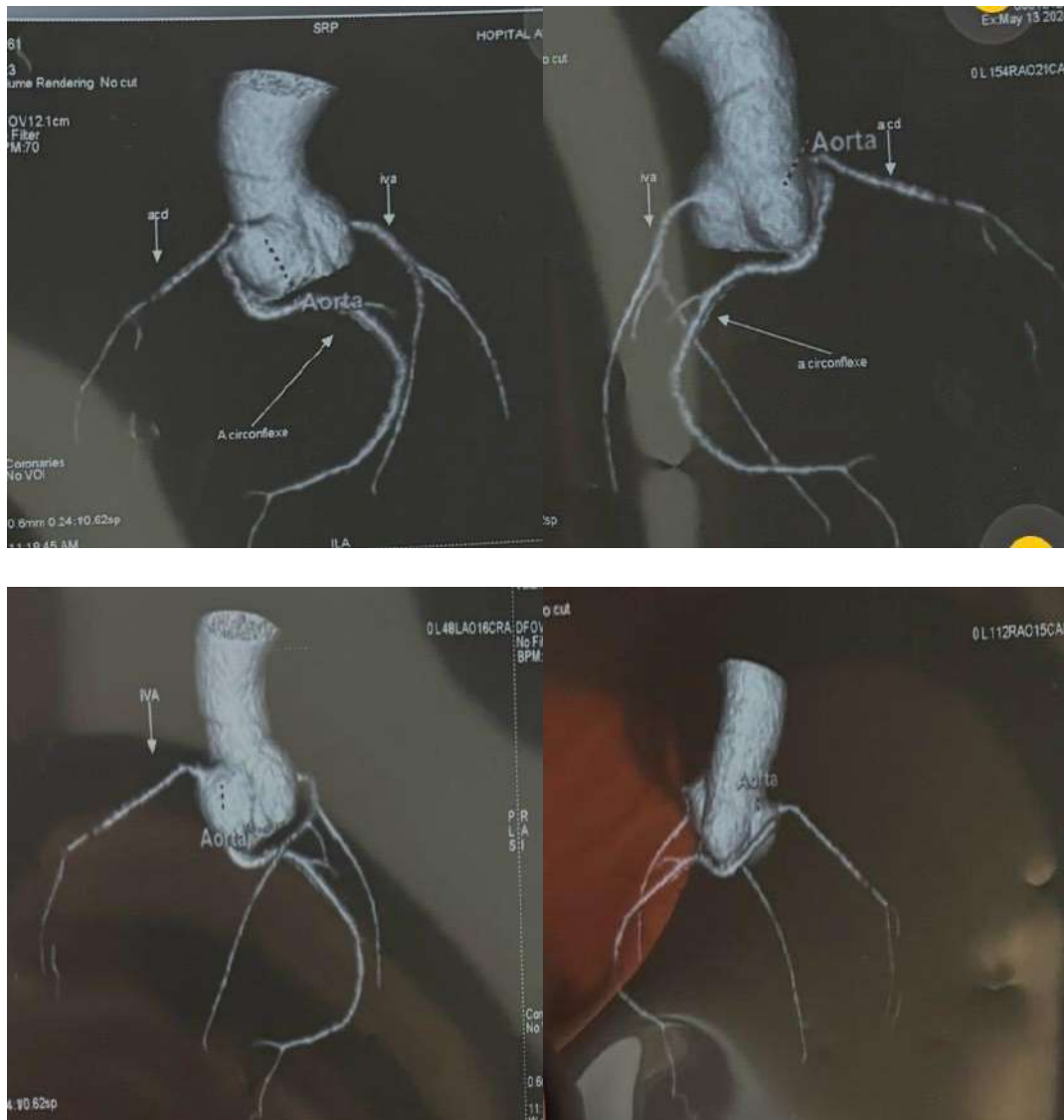


Figure 6,7,8,9: Different CCTA views showing a circumflex coronary artery arising from the right sinus with a posterior course followed by an interatrioventricular trajectory.

A stress TTE was performed showing no signs of ischemia.

DISCUSSION

Ectopic origin of the circumflex (Cx) artery from RSV or the right coronary artery (RCA) was first described by Antopol and Kugel in 1933, with a reported prevalence of 0.4–0.8% in angiographic series. (8)(9)

It is one of the most common CAAs, its true prevalence remains difficult to establish. (6)

Reported incidence rates of ALCx vary, ranging from 0.15% to 0.67%, Although rates as high as 16.2% have been observed in patients with transposition of the great arteries. (1)(6)

Page et al. reviewed coronary angiograms of 2,996 patients and identified 20 cases of ALCx, corresponding to an incidence of 0.67%, which is frequently cited in recent literature. (6) Similarly, Yamanaka and Hobbs screened 126,595 patients undergoing coronary angiography and found

1,686 with CAAs, of which 467 were ALCx, yielding an incidence of 0.37%. (7)

2,3: 8 et 9

4,6 : 10 et 11

7 : 12

8 : 13

1 : 14

9 : 15

10 : 16

The anomalous Cx may arise as a proximal branch of the RCA from a common ostium or a separate orifice, and it consistently follows a retroaortic course to reach its usual position in the left atrioventricular sulcus. (9)

Although typically benign and asymptomatic, this anomaly has been associated with ischemia, myocardial infarction, and sudden cardiac death. (10) (11)

These complications may result from repeated compression by a dilated aortic root, slit-like ostia, or acute angulation due to the retroaortic course. (12)

In our patient, the Cx originated from a slit-like ostium without acute angulation nor myocardial ischemia at the stress TTE.

Intraoperative complications have also been reported. The retroaortic course may complicate proximal Cx grafting during coronary bypass surgery. Valve procedures, including aortic and mitral valve replacement, risk compression of the Cx lumen by prosthetic rings. (13)

Identification of an anomalous retroaortic Cx is particularly important in aortic root surgery to avoid injury during dissection or root enlargement. (14)

CAAs are typically diagnosed by angiography, although defining the precise vessel course can be challenging. (15)

TEE and CCTA are valuable semi-invasive and noninvasive tools for anatomical assessment. Recent studies have shown that 2D and 3D TEE can effectively identify the anomalous origin of the Cx from the RSV. (16) (14)

In our case, CCTA revealed the Cx is arising from the RSV with a posterior course and an atrio-ventricular trajectory without signs of myocardial ischemia.

CONCLUSION

The anomaly that we discussed, also known as one of the most frequent CAAs although its true prevalence is still to be determined. It presents most of the time as benign but it is important for cardiologist and cardiac surgeons to be aware of it.

As lack of awareness can affect diagnosis and lead to adverse treatment outcomes. The main goal of this case report is to underline that CAAs exist and should be kept in mind.

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