



CLINICAL IMAGE

RAC Sign Detected in Transthoracic Echocardiography in a Patient with Acute Anterior Myocardial Infarction

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Keywords: Acute myocardial infarction, coronary artery anomalies, RAC sign

Initially described in 2018, as a transthoracic echocardiographic (TTE) finding, the retro-aortic anomalous coronary artery (RAC) sign is characterized by the appearance of a distinctly echogenic tubular structure on an echocardiogram, located on the atrial side of the atrioventricular (AV) groove.¹ With an estimated prevalence of about 0.39%, the most prevalent anomaly is the anomalous origin of the left circumflex coronary artery (LCx) from the right sinus of Valsalva.² A 66-year-old female was admitted to our cardiology department with crushing, substernal chest pain. An electrocardiography revealed a sinus rhythm and T-wave inversions in the precordial derivations. TTE demonstrated regional hypokinesia in the anterior and apical segments of the left ventricle. The four-chamber apical views indicated a tubular structure with hyperechoic walls along the atrial aspect of the AV groove. A variant of the RAC sign involves the LCx (Figure 1). Researchers have recently characterized this observation as the RAC sign on TTE.¹ Medical treatment was initiated, and the patient was immediately transferred to the catheter laboratory. Coronary angiography (Figure 2) demonstrated a complete occlusion of the left anterior descending (LAD) artery distal to the diagonal 1 branch. As anticipated, the LCx was not visualized within the left coronary system. The right coronary artery was normal, and the LCx was found to originate from a separate ostium situated adjacent to the right aortic sinus (Figure 3). Subsequently, the LAD total occlusion was successfully traversed using a floppy guide wire. Balloon angioplasty was performed, followed by successful deployment of a drug-eluting stent at the lesion site. No procedural complications were observed at the conclusion of the intervention. After the patient's condition stabilized, a multislice computed tomography (MSCT) cardiac angiography was performed to delineate the LCx course. MSCT coronary angiography revealed an anatomical variant of the left circumflex artery. The artery originated from the right coronary cusp, coursed posterior to the aorta

within the left AV groove, and terminated at the lateral wall of the left ventricle (Figure 4). The patient was discharged without any adverse cardiac events.

A retro-aortic course of the coronary artery is generally considered a benign anatomic variant; however, cases of cardiovascular events, including myocardial infarction and sudden cardiac death, have been reported in literature.³⁻⁵ This echocardiographic sign (RAC) is strongly associated with the detection of retro-aortic coronary anomalies on cardiac CT imaging.¹ Given its high specificity (93.9%), cardiologists can reliably document its presence on TTE as a strong indicator of an anomalous coronary artery in echocardiography reports.^{1,3} The clinical significance of the RAC sign remains uncertain.⁶ Cases of iatrogenic occlusion of the abnormal LCx due to inadvertent suture placement have been reported, particularly during valve surgeries, which are frequently performed in the current clinical practice.⁷ Some authors have even advocated routine coronary angiography in all patients undergoing aortic valve surgery, regardless of age, to detect this anomaly and facilitate a well-planned, multi-step surgical approach.⁸ Over the past decade, with the advent of percutaneous bioprosthetic aortic valve implantation [transcatheter aortic valve implantation (TAVI), transcatheter aortic valve replacement], the risk of compression of the aberrant LCx by the bioprosthetic valve has become a recognized concern. Only a few cases of TAVI involving an anomalous LCx artery have been reported.^{9,10} Some operators have utilized protected coronary catheters with a guideliner to prevent TAVI-related complications involving compression of the anomalous LCx.¹⁰ The level of the retroaortic course of the anomalous LCx may serve as a predictor of coronary compression during TAVI procedures. Interventional cardiologists should remain vigilant for coronary artery anomalies to minimize procedural delays and reduce additional radiation exposure.

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Cite as: Demir M. RAC sign detected in transthoracic echocardiography in a patient with acute anterior myocardial infarction. *Inter Cardio Pers*. [Epub Ahead of Print]

Received: 22.09.2025

Accepted: 04.11.2025

Epub: 11.11.2025



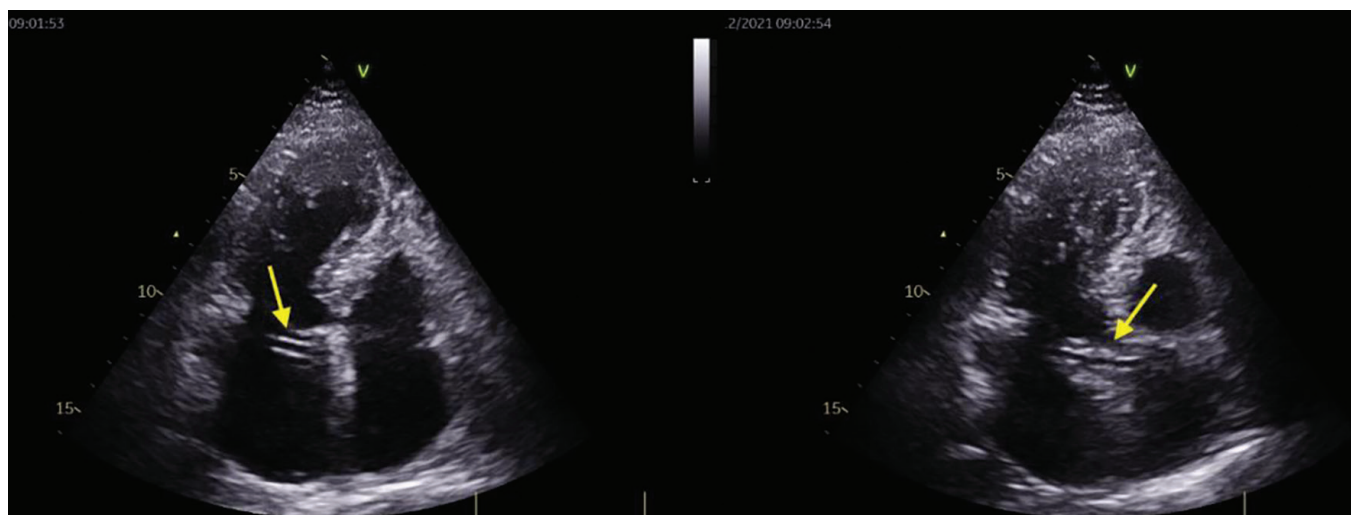


Figure 1. Transthoracic echocardiographic demonstrating the retro-aortic anomalous coronary artery sign (yellow arrow) in a typical apical four-chamber view

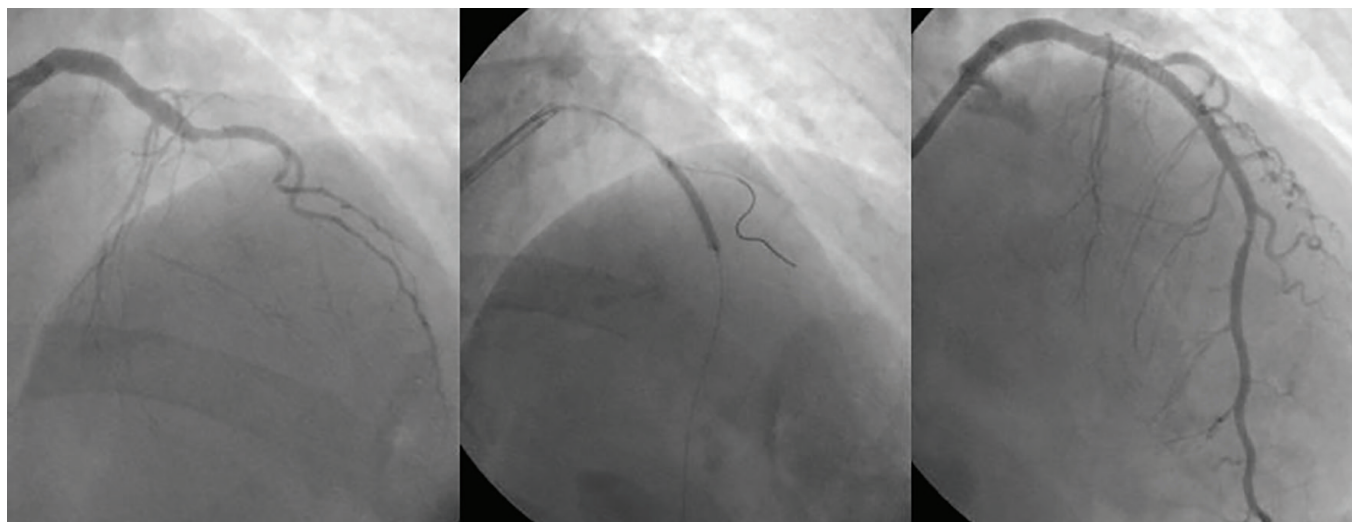


Figure 2. Coronary angiography (apical view) showing complete occlusion of the left anterior descending artery distal to the diagonal 1 branch. The lesion was successfully traversed using a floppy guidewire, followed by balloon angioplasty and stent deployment. As expected, the left circumflex coronary artery was not visualized within the left coronary system

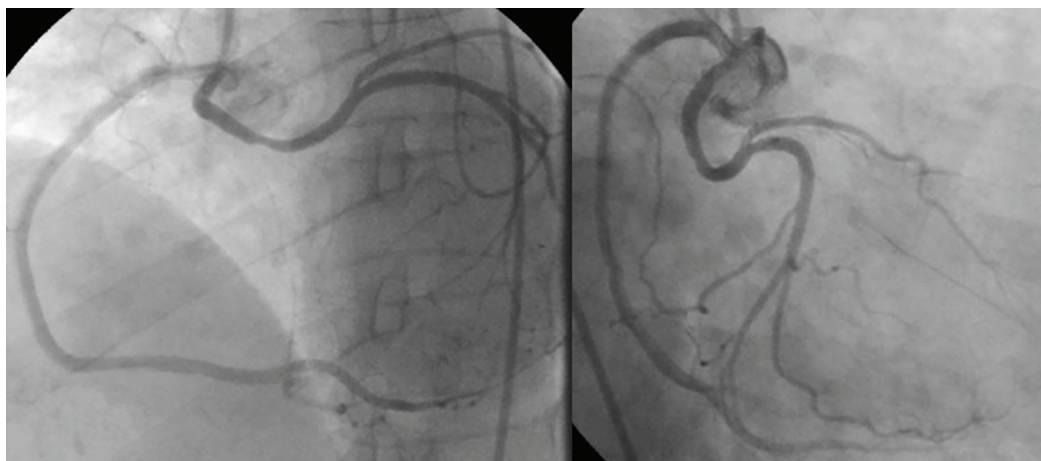


Figure 3. The retro-aortic anomalous coronary artery appeared normal. The left circumflex coronary artery was found to originate from a separate ostium located adjacent to the right aortic sinus

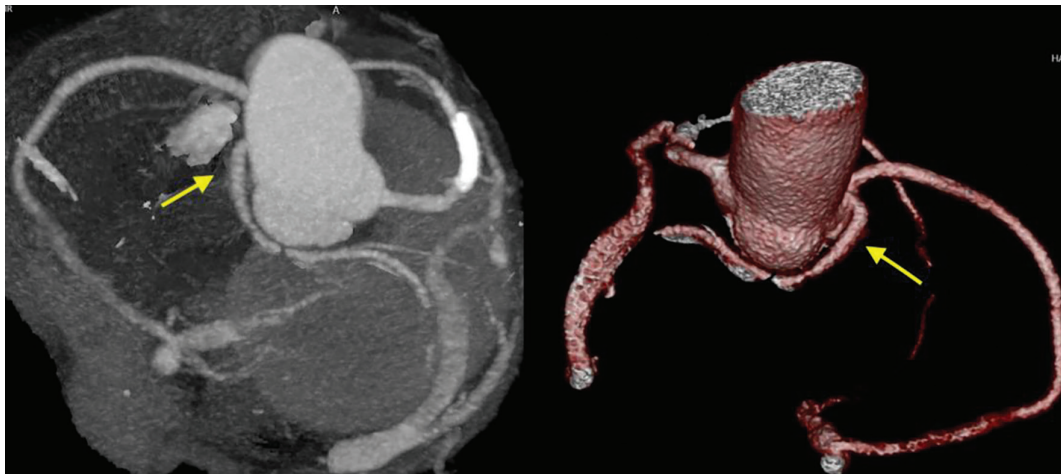


Figure 4. Multislice computed tomography coronary angiography revealed an anatomical variant of the left circumflex coronary artery, originating from the right coronary cusp and coursing posterior to the aorta within the left atrioventricular groove

Informed Consent: Written informed consent was obtained from the patient.

Financial Disclosure: The author declared that this study received no financial support.

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