Anomalous origin of left circumflex coronary artery: An easy ‘pick’ on transthoracic echocardiography

Keyur Vora, Alok Ranjan

ABSTRACT
Abstract is not required for Clinical Images
CASE REPORT

A 52-year-old male with a personal history of smoking and systemic arterial hypertension since two years presented with what he described as a squeezing pain in the left side of his chest. He also had associated dizziness and diaphoresis. An initial electrocardiogram (ECG) revealed acute inferior wall infarction with sinus bradycardia. As per the institutional protocol, a transthoracic echocardiography was performed prior to coronary angiography. Transthoracic 2D-echocardiography was consistent with inferior wall myocardial infarction and no significant mitral regurgitation.

Remarkably, in apical five-chamber view, a prominent vessel was seen; arising from right side of aortic root; entering into left atrioventricular (AV) groove (Figure 1A–B; blue arrows). Part of this vessel was also apparent in apical two chamber view and in parasternal long axis views (Figure C; red dotted lines, red arrow and D; green arrow). An anomalous origin of coronary artery was diagnosed. The course of the vessel towards left AV groove was suggestive of left circumflex coronary artery (LCX). In parasternal short axis (PSAX) view, left main coronary artery (LMCA) is arising from left coronary sinus as shown on parasternal short axis view (orange arrow), RCA is arising from right coronary sinus as shown on parasternal short axis view (yellow arrow), and (E) Origin of coronary arteries. Left main coronary artery (LMCA) is arising from left coronary sinus as shown on parasternal short axis view (orange arrow), RCA is arising from right coronary sinus as shown on parasternal short axis view (yellow arrow), and (F) Anomalous artery on coronary angiogram. Anomalous origin of left circumflex coronary artery is depicted on conventional coronary angiogram (white arrow).

DISCUSSION

Anomalous origin of LCX from right coronary sinus is the most common congenital variant with prevalence of 0.18–0.67% [1]. An aberrant but normal LCX arising from the right coronary sinus (common or separate ostium with the RCA) has no clinical significance per se, and it does not predispose the LCX to a higher incidence of obstructive disease [2]. Although the LCX anomaly
is classified as benign and asymptomatic, it can cause myocardial ischemia, and in some cases sudden death, myocardial infarction, and angina pectoris in the absence of atherosclerotic lesions. These manifestations might be due to repeated compression of the anomalous artery by a dilated aortic root or to unusual angling as a result of the retroaortic course of the LCX, which can compress the coronary ostium and restrict blood flow.

On the other hand, the presence of obstructive disease, however, especially in a vessel of large distribution, makes it mandatory that the anomaly be recognized and angiographically demonstrated, especially in acute myocardial infarction. Sometimes, in acute myocardial infarction, no evidence of an occluded coronary artery can be seen during angiography. This might lead to a large spectrum of differential diagnoses to explain the acute chest pain or the electrocardiogram modification [3]. The absence of an epicardial vessel or its branch, which is anatomically supposed to supply a myocardial ischemic area identified at the left ventriculography, suggests that an anatomical variation of the normal coronary tree (i.e. the aberrant artery) has to be actively searched.

Computed tomography angiography (CTA) is more useful than conventional angiography. Three dimensional information of the course of the coronary arteries in relationship to the great vessels and the origin are clearly detected by CTA. The transthoracic echocardiography is most limited in such cases as it can only detect part of the anomalous course of the artery. Usually, the origins of coronary arteries from its respective coronary sinuses are relatively easy to detect on transesophageal echocardiography. The subsequent course of artery is even more difficult and most of the times only a proximal part of the course is detected on TTE. The distal course and intramural course of the artery are not seen on TTE. The role of TTE is even more limited in adult as compared to children in detecting coronary abnormalities.

Transesophageal echocardiography may be more useful in detecting the origin and the proximal part of coronary arteries but the subsequent course is even more difficult to detect. Transesophageal echocardiography offers several advantages that may potentially overcome the technical problems associated with the transthoracic approach, including closer proximity of the transducer to the proximal coronary arteries and avoidance of anterior chest wall structures that cause degradation of the ultrasonic signal. This allows the routine use of higher frequency transducers and thus better spatial resolution and more detailed image quality. With these advantages, TEE is only helpful in detecting proximal coronary abnormalities [4].

**CONCLUSION**

In conclusion, our imaging experience highlights the significance of evaluation of coronary arteries on emergency echocardiography study and proactive preparation for uneventful interventional procedures. Careful evaluation of coronary arteries on echocardiography is inexpensive, quick and time saving modality as well as contrast and radiation exposure is saved. Such a high level of anticipation can be extremely useful information for emergency percutaneous coronary interventions (PCI). The reliable anticipation and identification is of paramount importance to the interventional cardiologists. Appropriate anatomical and technical understanding is vital for a successful interventional treatment of anomalous coronary arteries.

**Keywords:** Anomalous Coronary Artery, Acute Coronary Syndrome, Transthoracic Echocardiography

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**Guarantor**

The corresponding author is the guarantor of submission.

**Conflict of Interest**

Authors declare no conflict of interest.

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ABOUT THE AUTHORS

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**Keyur P. Vora** is an Internist and Imaging Cardiologist at CARE Institute of Medical Sciences, India. He holds MS Bioinformatics degree from Georgia State University, Atlanta as well as Postdoctoral Research Fellowship from Emory University/CDC, Atlanta USA. His research interests include echocardiography, Cardiac CT, Cardiac MR studies and computational medicine projects. E-mail: drkeyurvora@gmail.com

**Alok Ranjan**, Department of Cardiology, CARE Hospitals, the Institute of Medical Sciences, Surat, Gujarat, India.

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