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Congenital Absence of Left Main Trunk – CCTA Evaluation of a Patient with Ischemic Heart Disease

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ABSTRACT

Coronary artery anomalies represent a heterogeneous group of congenital diseases with various clinical presentations. Over time, the subject of coronary anomalies has been constantly changing in terms of definition, morphology, clinical manifestations, prognosis, and treatment. We present the case of a male patient, aged 53, with coronary artery disease and a medical history of high blood pressure and diabetes mellitus, who had undergone a coronary computed tomography angiography during the one-year follow-up after a percutaneous coronary intervention with drug-eluting stent implantation for a critical stenosis in the middle segment of the left anterior descending artery. Axial images revealed a separate origin of the left anterior descending and circumflex arteries from the left aortic coronary sinus, with the absence of the left main coronary artery.

Keywords: coronary artery anomalies, CCTA, angiography

INTRODUCTION

Congenital coronary artery anomalies represent a rare clinical encounter, with a reported incidence of 0.3–5.6%. Their clinical manifestation can vary from totally asymptomatic to sudden cardiac death due to malignant arrhythmias or coronary heart disease (CHD).[1,2] Prior to the frequent use of coronary computed tomography angiography (CCTA), invasive angiography was the gold standard imaging modality for the detection of coronary anomalies. Cardiac catheterization has several disadvantages compared to computed tomography (CT) imaging, primarily due to the invasive nature of the procedure, but also due to various complications at the puncture site, allergic reactions to the contrast agent used, or contrast nephropathy.

Currently, CCTA is widely used in many centers, having an increased sensitivity in evaluating coronary artery anatomy, similarly to invasive angiography. Image acquisition uses ECG-gating, at a recommended heart rate as low as possible, in order to remove any movement artifacts. If the heart rate is too high for

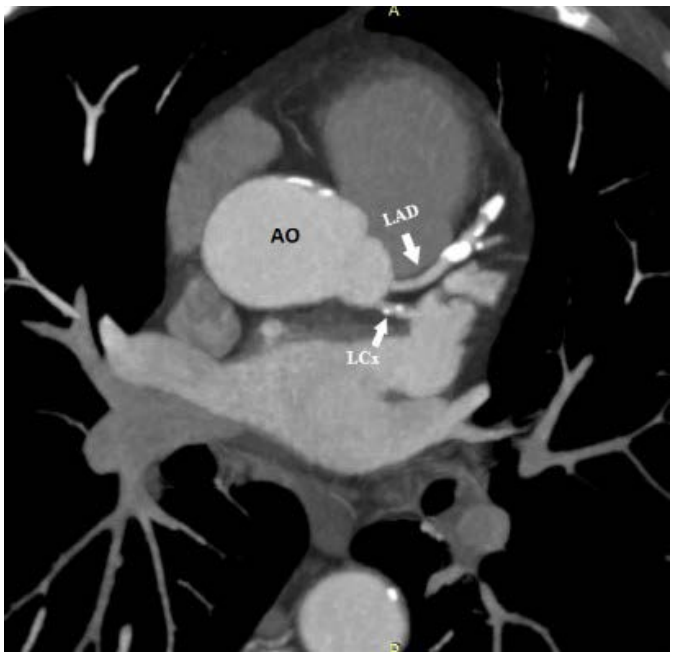

FIGURE 1. Axial CCTA shows separate origins of the LAD and LCX

a proper examination, negative chronotropic drugs, such as beta blockers, are used in most cases.[3] CCTA ensures an accurate characterization of the coronary artery anatomy and the relationship of the coronary arteries with the surrounding structures. This noninvasive imaging modality also allows a three-dimensional reconstruction of the heart and its vascularization.[4]

CASE PRESENTATION

We report the case of a 53-year-old male patient with CHD, and a medical history of high blood pressure and diabetes mellitus. The patient had undergone a percutaneous coronary revascularization procedure with a drug-eluting stent (DES) implantation at the level of the left anterior descending artery (LAD) one year prior to the current presentation. A transthoracic echocardiography was performed and revealed a left ventricular ejection fraction of 50% with septal hypokinesis. During the one-year follow-up, the patient underwent a CCTA examination, for evaluation of the stent patency and evolution of associated coronary atherosclerotic plaques. The CCTA examination revealed adequate contrast enhancement of the stent placed in the middle segment of the LAD, with a plaque at the proximal stent edge causing a 50% luminal narrowing, and the left circumflex artery (LCX) with a 30% stenosis. Furthermore, CCTA axial images revealed a separate origin of the LAD and LCX arteries from the left aortic coronary sinus of Valsalva, along with an absent left main coronary artery (LMCA) (Figure 1). The volume-rendered images of the anterior and superior view show the LAD and LCX arteries, which separately bifurcate from the left coronary cusp.

The patient has provided written informed consent and agreed to publication of his data and medical imaging acquisition, and the publication of the case was approved by the Ethics Committee of Cardiomed Medical Center.

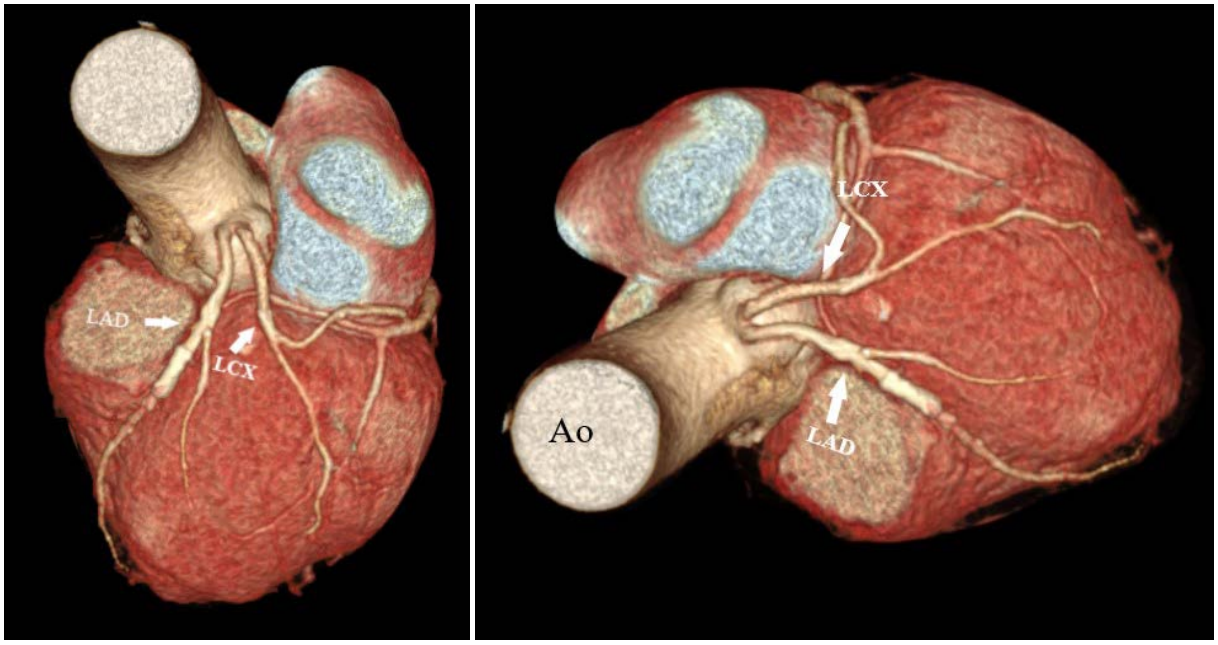

FIGURE 2. 3D reconstruction technique images from the anterior view (left) and superior view (right), showing the absence of the LMCA, as well as the separate origins of the LAD and LCX

DISCUSSIONS

Prior to the widespread use of CCTA, invasive angiography was the first diagnostic standard for coronary abnormalities. Numerous studies have shown that CCTA is superior to cardiac catheterization in terms of costs, possible complications, prognosis, therapeutic guidance, and detection and definition of coronary abnormalities.[5] Besides allowing a noninvasive assessment of the coronary artery anatomy, CCTA has the advantage of three-dimensional reconstruction, presenting in a more detailed manner the relationship of the heart with the adjacent structures.[6]

The presented case underlined the importance of performing a CCTA examination during the one-year follow-up after stent implantation. The CCTA images showed in detail the correct positioning of the stent at the mid-LAD level and its patency, and the absence of left main trunk with split origin of the LCX and LAD from the left aortic coronary sinus of Valsalva.

Interestingly, this anomalous origin of the LAD and LCX arteries had not been reported during the invasive coronary angiography examination conducted one year prior to the current presentation. The probable reason for lacking the description of this origin anomaly may be due to the initial belief that the LCX presented total chronic occlusion at its origin. Nevertheless, in addition to providing information in regard to stent patency, CCTA can also provide a three-dimensional reconstruction of the coronary tree, thus offering an accurate anatomical view of vessel trajectory and anomalies.

CONCLUSIONS

Coronary artery abnormalities have a broad spectrum of clinical presentations, varying from completely asymptomatic to presenting as an acute event such as myocardial infarction or fatal arrhythmias. CCTA allows the identification and definition of coronary anomalies, as well as accurate detection of coronary atherosclerotic disease or stent patency evaluation. Thus, CCTA is a valuable follow-up method for patients with a history of ischemic heart disease or coronary revascularization procedures, but also for the assessment of coronary artery anomalies.

CONFLICT OF INTEREST

Nothing to declare.

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