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A case of an acute coronary syndrome associated with anomalous origin of the left main coronary artery, with a right coronary sinus origin

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Abstract

We present a case whose left main coronary artery (LMCA) arose from the right sinus of Valsalva, which is a very rare congenital anomaly. In a 48-year-old male, coronary angiographic (CAG) examination revealed LMCA arising from the right sinus of Valsalva. Although this kind of anomaly has generally been accepted to have a benign course, it may cause sudden death. In this case report, we present a patient who was admitted to our clinic with Acute Coronary Syndrome (ACS) and was found to have LMCA originating from the right sinus of Valsalva in the CAG. A percutaneous coronary angioplasty was performed with stent placement in the critical stenosis in the left anterior descending (LAD) coronary artery.

Keywords: Congenital coronary anomaly, Left main coronary artery, Acute coronary syndrome

Introduction

Anomalies of the coronary arteries (CAA) are found incidentally in 0.6% to 1.5% of patients undergoing CAG. Ectopic outlet anomalies, in which coronary arteries originate from a part of the aorta or pulmonary artery other than the sinus Valsalva, are the most common anomalies in CAA [1]. It is exceedingly rare for the LMCA to originate from the right sinus Valsalva and its incidence is about 1-3%. It may be completely asymptomatic or present with angina pectoris, acute coronary syndrome, and even sudden cardiac death [2].

In this case report, we present a patient who was admitted to our clinic with the diagnosis of acute coronary syndrome and found to have the LMCA originating from the right sinus Valsalva in coronary angiography. A percutaneous coronary angioplasty was performed with stent placement in the critical stenosis in the left anterior descending (LAD) coronary artery.

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Case presentation

A 48-year-old male patient was admitted to the emergency department with a complaint of chest pain which began 3 hours ago. There were no risk factors for coronary artery disease. In physical examination, his blood pressure was 150/90 mmHg and his heart rate was 87/min. There were no pathological findings in his electrocardiography and telegraphy. In the echocardiographic examination of the patient, no pathology was observed except hypokinesia in the left ventricular anterolateral wall apical segment and mild tricuspid regurgitation. Left ventricular ejection fraction (LVEF) was 50%. In laboratory parameters, troponin values were high (82 ng/mL), while other parameters were normal. The patient was hospitalized with acute coronary syndrome and coronary angiography was performed.

CAG was performed via a percutaneous approach from the right femoral artery using the Judkins technique. First, imaging the left coronary system was tried, but when the left coronary system could not be visualized, a right coronary artery injection was performed. It was observed that the LMCA and the right coronary artery (RCA) originated from the right sinus Valsalva with separate ostia. LMCA was viewed with the left Amplatz II catheter. An eccentric lesion causing 70-90% occlusion was observed in the middle segment, and another one causing 70-90% was detected in the LAD. RCA and circumflex (Cx) arteries were normal (Figure 1). Then, with the consent of the patient, a 2.75x24 mm stent was placed in the mid-LAD lesion, and the distal stenosis was treated with a 2.5x16 mm stent, resulting in good TIMI3 flow (Figure 2).

Figure 1: Conventional Angiography A: RCA emerging from the right coronary cusp B: LMCA emerging from the right coronary cusp, Amplatz 2 catheter (red arrow), LAD lesions (yellow arrow)

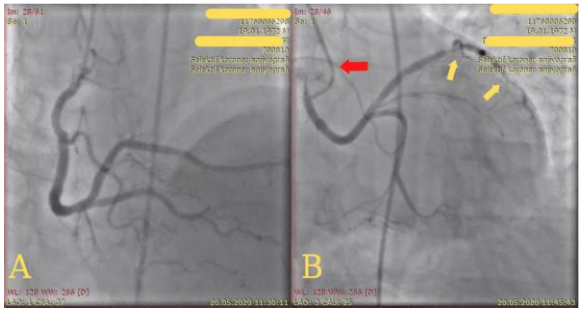
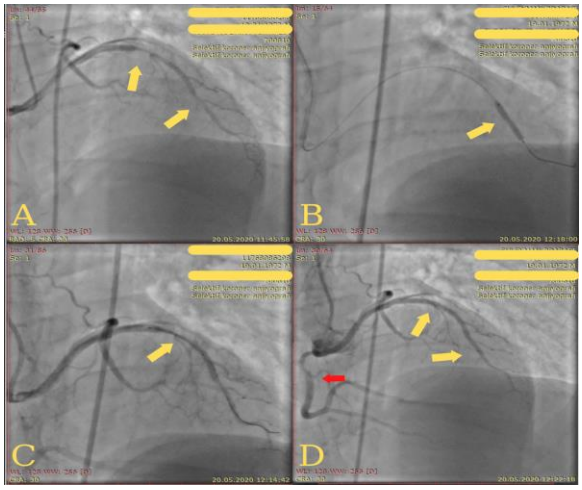
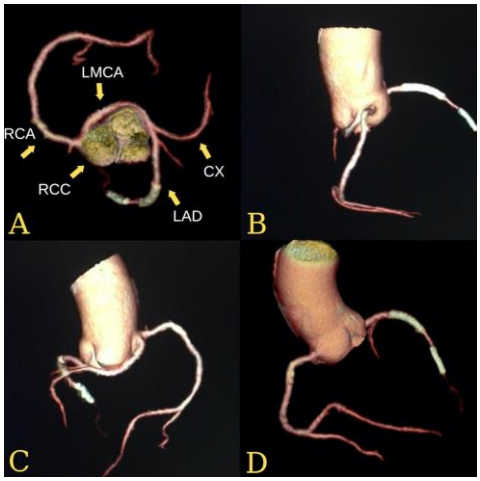


Figure 2: A: LAD lesions (yellow arrow), B: Successful stent procedure to LAD distal lesion (yellow arrow), C: Successful stent procedure to LAD proximal lesion (yellow arrow), D: Final view of RCA, CX, and LAD.



In our case, multi-slice computed tomography (CT) angiography was performed for a more detailed examination to determine the course of the left main body and whether there was any other accompanying cardiac anomaly. No other congenital coronary anomalies were detected in the multi-slice CT and the LMCA was observed to pass posterior to the aorta (Figure 3). The patient was in good condition in the post-interventional period, followed up for 3 days, and discharged without complications. He had an uneventful 6-month follow-up period.

Figure 3: Coronary multi-slice tomography image A: LMCA and RCA originating from the right cusp B: LMCA and RCA originating from separate ostia C: The course of LMCA from posterior to the aorta D: Anterior view of the aorta



Discussion

CCAs are extremely rare and usually detected incidentally in the autopsies of healthy individuals, with CAG, during surgical operations, or CT angiography [3].

The incidence of the LMCA arising from the right coronary sinus Valsalva was 0.17% in the study of Yamanaka and Hobbs on 126.595 patients, 0.15% in the study of Angelini et al. [4], and 0.03% in the Turkish population. Although it is one of the rare congenital CAA, it is a potentially serious anomaly of origin because of its association with sudden death.

Anomalous origin of LMCA from right sinus Valsalva is divided into 5 subgroups and classified according to its relationship with aortic root, pulmonary truncus, and course towards the left. 1-Posterior: LMCA courses posterior to the aorta, 2-Anterior: LMCA courses anterior to the pulmonary artery, 3-Intraseptal: LMCA courses through the interventricular septum, 4- Interarterial: LMCA courses between the aorta and pulmonary artery, 5-Combined: The anterior and septal types or posterior and septal types are seen together. Although the first three types are generally benign, cases with angina, effort-induced syncope, and myocardial infarction have been reported. Type 4 is the most dangerous. The presence of coronary artery disease with an abnormal course of LMCA is important in determining the treatment strategy, and there is no specific treatment modality. Prophylactic surgery is recommended in type 4 cases [2]. In our case, the LMCA originated from the right sinus Valsalva and coursed from the posterior of the aorta (type 1), which is generally considered benign.

Other congenital coronary anomalies are found in 10.1% of those with CCA. Among these, mitral valve prolapses, bicuspid aorta, and great artery transposition are the most common [5]. Multi-slice CT angiography can be useful in

identifying congenital coronary anatomy in addition to CAA, better defining coronary anatomy, and if necessary, guiding the treatment strategy [6].

Although the anomalous origin of LMCA from the right sinus Valsalva is an exceedingly rare coronary anomaly, it can lead to serious clinical consequences depending on its type. In these cases, multi-slice CT angiography can be used in addition to CAG, because type 4 can cause sudden cardiac death.

Conclusion

We presented a case of acute coronary syndrome in which the left coronary system originated from the right sinus Valsalva with an ostium separate from RCA. The retro-aortic course of LMCA is generally a benign variant. Although there is no presentation with sudden cardiac death, it may present with atherosclerosis which develops with age.

PCI is the preferred strategy in patients with acute coronary syndrome, but it should be kept in mind that tomographic identification of the origin is vital in patients with anomalous origin of coronary arteries.

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