

Anomalous Right Coronary Artery Originates from the Distal of Left Circumflex Coronary Artery

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Introduction

Coronary artery anomalies (CAAs) are present at birth, but are usually asymptomatic and are found during coronary angiography or multi-slice computed tomography (MSCT) detection. Their prevalence is less than 1.3% based published series [1-4]. The most common coronary anomaly is separate origination of the left anterior descending coronary artery (LAD) and left circumflex coronary artery (LCX) from left sinus of Valsalva. The second most common anomaly is origination of the LCX artery from the right coronary artery (RCA) or right sinus of Valsalva. Herein, we present two cases that the anomalous RCA arises from the distal of left circumflex coronary artery. It is belonging to single coronary artery (SCA). The case is rare. we bring forth these cases in an attempt to highlight their significance, and make cardiologist understood what important the anomalies are.

Case Presentation

Case 1: A 42-year-old man presented with a history of progressive angina pectoris of 3 months duration. He had a ten-year history of diabetes mellitus and hypertension. Electrocardiography and echocardiography examination is normal. Coronary angiogram was performed through trans-radial access. An angiogram demonstrated a single coronary artery: the anomalous right coronary artery (RCA) partly originated from the mid of left anterior descending coronary artery (LAD) and another part arose from the distal of left circumflex artery (LCX). There was 80-90% stenosis in the proximal of the anomalous RCA segment, and the left anterior descending coronary artery (LAD), LCX were patent (Figure 1A-B). A 6Fr left EBU 3.5 guiding catheter was engaged to the left coronary system to perform percutaneous coronary intervention (PCI) on the anomalous RCA and two stents were deployed. The final angiographic result was excellent.

Before the coronary angiography, a 64-slice computed tomography (MSCT) of the heart was performed on a 64-slice machine (Philips 64 Slice, Philips, Netherland). The results showed the anomalous right coronary artery part originating from the mid of the left anterior descending coronary artery, and another part arising from the distal of left circumflex coronary artery (Figure 1B-D). There was severe stenosis in the proximal of the anomalous right coronary artery. The anomalous RCA was classified as single coronary anomaly, L-I subtype.

Case 2: A 67-year-old woman presented progressive chest pain after physical exertion for 1 months, she was admitted to our hospital on November 6th 2008. She suffered from diabetic mellitus, hyperlipidemia and hypertension for eight years. Coronary angiogram was performed

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through trans-radial access. An angiogram demonstrated a single coronary artery anomaly: the anomalous right coronary artery originating from the distal of left circumflex coronary artery, and there was 90% stenosis the proximal of obtuse marginal branch segment. The left anterior descending artery (LAD) and the left circumflex artery (LCX) are patent (Figure 2A and 2B). In LAO projection there was no coronary artery found on the ostium of right sinus (Figure 2C). Based on the findings, percutaneous coronary intervention (PCI) was performed one stent was implanted on the proximal of obtuse marginal branch segment (Figure 2D). The final angiographic result was excellent after PCI procedure. She was free of chest pain during a 6-year follow-up.

Discussion

The most common an anomalous right coronary artery (RCA) is that originates from the aortic trunk of ascending artery or left sinus of Valsalva. The two cases we presented are the anomalous RCA arises from the distal of left circumflex coronary artery. It is belonging to single coronary artery (SCA) [1]. The anomalous coronary artery is first designated with "R" or "L" depending upon whether the ostium is located in the right or left sinus of Valsalva. It is then designated as group I, II, III. Group I has anatomical course of either a right or left coronary artery. Group II anomalies arise from the proximal part of the normal right or left coronary artery, and cross the base of the heart before assuming the normal position of the inherent coronary artery. Group III describes the anomaly where the LAD and LCX arise separately from the proximal part of the normal right coronary artery. The two cases we presented is type L-I anomaly. The L-I pattern occurs where the right coronary artery is congenitally absent and the LCX is markedly dominant (Figure 1A-D and Figure 2A-D). The LCX artery provides the posterior descending branch and ascends in the right AV groove where it provides



Figure 1A: AP caudal view demonstrates the anomalous right coronary artery originating from the distal of left circumflex coronary artery and there is severe stenosis in the proximal of anomalous right coronary artery segment.

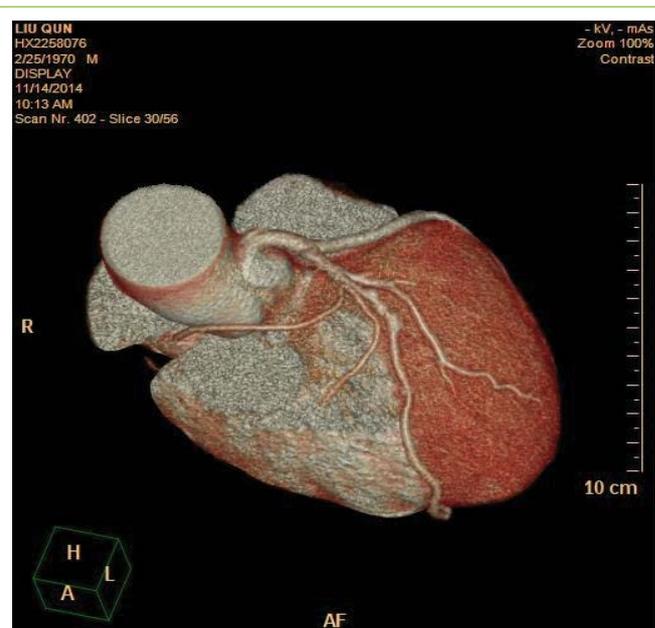


Figure 1B: Reconstructed three-dimensional image obtained by volume-rendering technique demonstrates part of the anomalous RCA course between aortic and pulmonary artery.

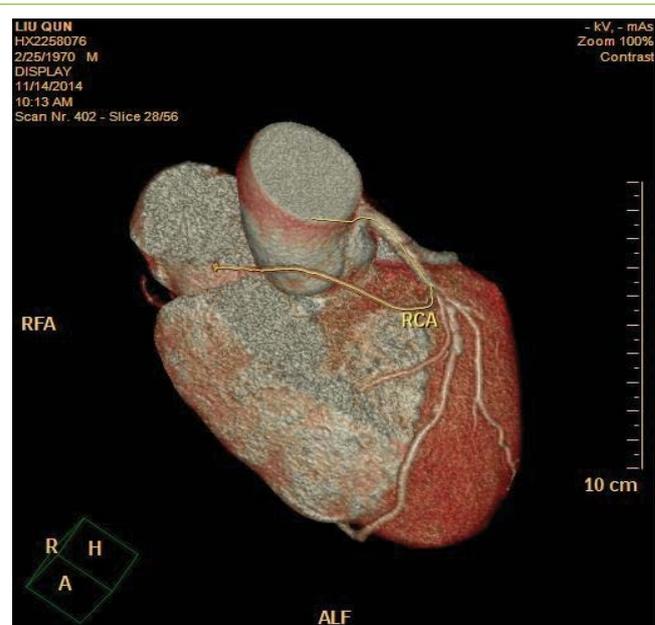


Figure 1C: Reconstructed three-dimensional image obtained by volume-rendering technique demonstrates part of the anomalous RCA originating from the mid of the left anterior descending coronary artery.

branches to the right atrium and right ventricle. The extremely rare Group I anomalies generally have a benign clinical course [2]. PCI was performed to the first obtuse marginal artery and one stent was deployed into it through trans-radial approach. The patient has none ischemic symptoms on physical exertion during 6-year follow-up.

Coronary anomalies are usually detected during coronary angiography. However, X-ray angiography is limited by its inability to provide information regarding the spatial orientation of the anomalous artery with regarding to the surrounding cardiovascular structures [3-4]. MSCT technique

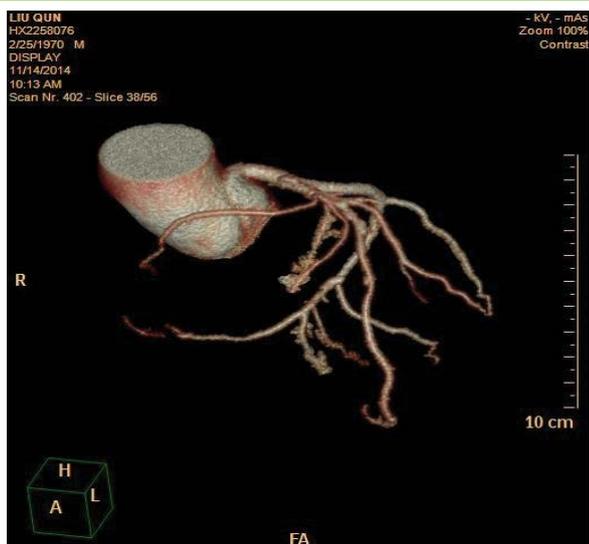


Figure 1D: Reconstructed three-dimensional image obtained by volume-rendering technique demonstrates another part of the anomalous RCA originating from the distal of the left circumflex coronary artery.

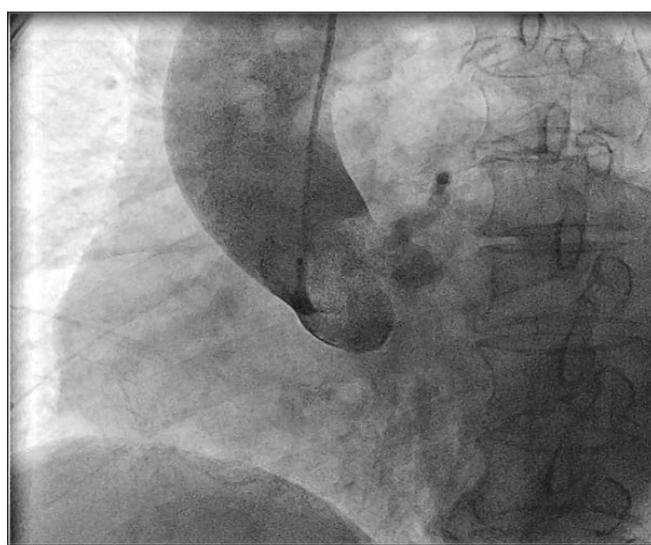


Figure 2C: LAO projection demonstrates no right coronary artery was found in non-selective angiogram.



Figure 2A: RAO caudal view demonstrates the anomalous right coronary artery originating from the distal of left circumflex coronary artery and there is severe stenosis in the proximal of obtuse marginal branch segment.



Figure 2D: The final angiographic result was excellent after PCI procedure was performed.

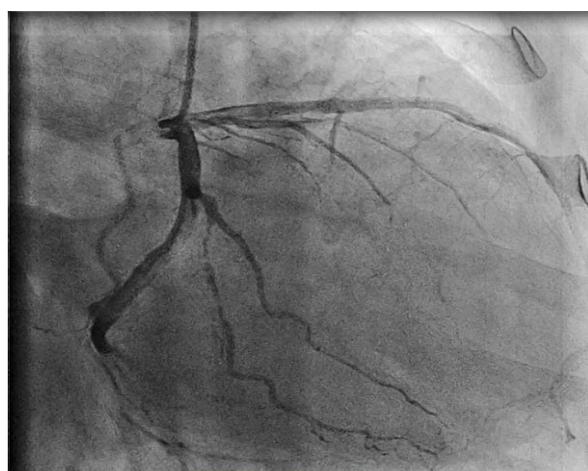


Figure 2B: RAO cranial view shows the anomalous right coronary artery and left anterior descending coronary artery are patent, and there is severe stenosis in the proximal of obtuse marginal branch segment.

has the potential to accurately visualize the coronary artery [5] and clearly demonstrate the surrounding cardiovascular structures of the anomalous coronary artery [6-8]. In the present case, the MSCT images clearly demonstrated the origin and course of the anomalous right coronary artery. So we bring forth these cases in an attempt to highlight their significance, and make cardiologist understood what important the anomalies are.

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