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Case Report

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Type B Left Circumflex Coronary Artery With Anomalous Origin Overlooked during Catheter Angiography

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Coronary artery anomalies are anatomical differences seen in approximately 1% of the population, and patients with this condition are mostly asymptomatic. The anomalous origin of the left circumflex artery from the right sinus of valsalva is one of the most common type of anomalies. The type B of this anomaly is relatively rare. There may be a difficulties in visualizing these abnormal vessels by catheter angiography. In this case, we observed an abnormal left circumflex artery that was not previously diagnosed by catheter angiography.

Keywords: Left circumflex coronary artery, anomalous, computed tomography (CT) angiography

INTRODUCTION

Coronary artery anomalies are vascular anatomical differences seen in less than 1% of the population. The more common abnormal anatomical changes may be classified as the variations of normal (1, 2).Coronary artery anomalies are classified in various ways. When classified anatomically, the ostium, the origin and course of the artery are examined (3). The retro-aortic course of the left circumflex (LCX) artery is considered to be one of the most common coronary artery anomalies with a frequency of up to 0.67% (1, 4-6).

In this case, we present the computed tomography (CT) angiographic images of a patient with Type B anomalous LCX artery, which is relatively rare. Especially, CT angiographic images are rare in the literature because this anomaly has been mostly detected by catheter angiography in studies with large patient populations.

CASE PRESENTATION

A 63 year-old female patient had angina pectoris caused by physical activity. She had been referred to the radiology clinic for cardiac CT angiography. Written consent was obtained from the patient before the examination. The examination was performed in the 256-detector multislice CT scanner (Somatom Definition Flash, Siemens Healthcare, Erlangen, Germany) with a cross-sectional thickness of 0.6250625 mm using the ECG gating method. The images were evaluated using syngo.via VB10B (Siemens Healthcare GmbH, Erlangen, Germany). Overall, 95 mL intravenous iodinated-contrast agent (iohexol, *Omnipaque 350* mg/mL, *GE Healthcare, Princeton, New Jersey*) was administered to visualize the coronary arteries. Catheter angiography was performed in another medical center abroad five months before the CT angiography examination in our clinic. The prior examination failed to show the abnormal LCX artery. CT angiography showed the LCX artery with thin calibration originating from the right sinus valsalva with the right coronary artery (RCA) (Figure 1). Retro-aortic course of the abnormal LCX artery was well visualized on both cross-sectional and volume-rendered images (Figure 2- 3). The origin of this artery was very close to that of RCA. Abnormal LCX artery was assessed as a branch that separated from the proximal of RCA. The proximal segment of the left main coronary artery (LMCA) was longer than anticipated and the bifurcation to LCX and left anterior descending (LAD) arteries was not seen (Figure 4). In this hypoplastic LCX artery case, the lateral wall of the left ventricle was vascularized by the well-developed diagonal branches of LAD and posterolateral branches of RCA.

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DISCUSSION

The anomalous origin of LCX artery and its retro-aortic course is usually considered as one of the benign anomalies of the coronary artery tree in the absence of atherosclerosis (I, 4). Non-visualization of the abnormal LCX artery in catheter angiography in this case did not result in any undesirable results for the patient. Because CT angiography showed no significant atherosclerotic changes in this thin-calibrated artery. However, the fact that coronary artery anomalies are not known before the operation, especially in patients undergoing cardiac valve surgery, may lead to iatrogenic damage to these arterial structures (3, 7). Suspicious findings in terms of abnormal LCX artery are the absence of its visualization, lack of perfusion in the left lateral wall, and a LMCA with a non-branching, long proximal segment after the injection of the contrast medium into LMCA in catheter angiography (4, 5). Contrast medium injections into RCA may sometimes not show an abnormal LCX artery, as in our patient. To avoid this, the tip of the catheter needs to be moved closer to the ostium or to the more posterior part of the sinus valsalva (4, 8). In a study ana-

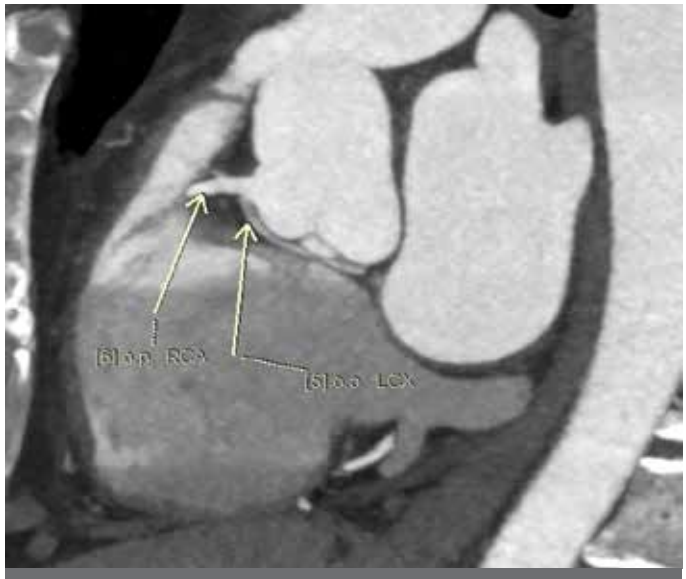

FIGURE I. On the sagittal oblique maximum intensity projection image, arrows, with names beside, indicate the RCA and anomalous LCX artery. LCX artery arises as the first branch of RCA from the proximal segment, very close to ostium

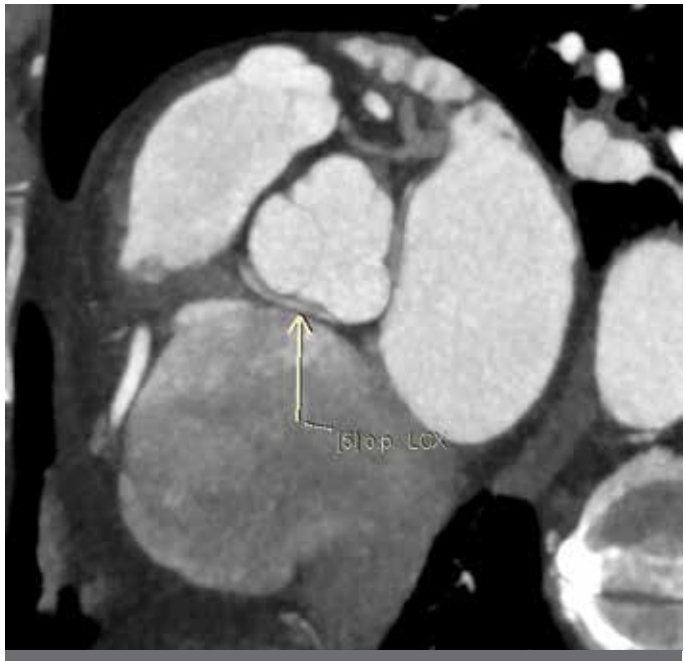

FIGURE 2. On the axial oblique maximum intensity projection image at the level of sinus valsalva, arrow, with name beside, shows the retro-aortic course of the anomalous LCX artery

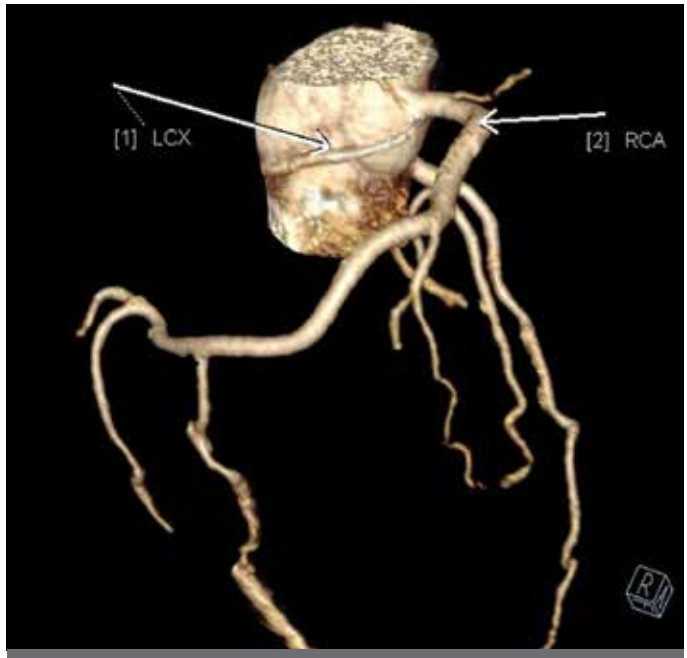

FIGURE 3. Arrows, with names beside, indicate the anomalous LCX artery and RCA originating from the right sinus valsalva on the right anterior view of volume-rendered image of coronary arteries (the heart is isolated automatically). Retro-aortic course of thin LCX artery may be seen clearly

FIGURE 4. Arrow, with name beside, indicates the LAD originating from the left sinus valsalva on the left posterior view of volume-rendered image of coronary arteries (the heart is isolated automatically). Note that the LMCA has a long and non-branching proximal segment

lyzing 20 abnormally originating LCX arteries, this anomaly was classified into three types (5). In type A, RCA and LCX have separate ostiums in right sinus of valsalva, whereas in type B, the LCX artery is a discrete branch of RCA. In type C, two arteries have a common ostium. The anomaly in our case matches to the type B. In our case, contrast filling in the abnormal LCX artery may have been prevented by the catheter itself because of location of origin as very close to the RCA ostium. In addition, a slight contrast enhancement may have not been recognized in the two-dimensional views because of its hypoplastic structure. It may be difficult to distinguish between the absence of LCX artery and the LCX artery with anomalous origin by catheter angiography in such types because in the case of hypoplastic LCX artery, the left ventricle lateral wall may be vascularized by branches from the RCA and LAD, as in the absence of LCX artery (7). As shown in our case, CT angiography is a non-invasive and successful imaging modality for detecting such troublesome or complex anomalies (9). In a published case, catheter angiography showed the LCX artery arising from the right sinus of valsalva; however, the proximal course of the artery was not assessed precisely and CT angiography was performed (10).

In conclusion, the frequency of the coronary artery anomalies may be higher than the rates determined by catheter angiography. CT angiography can be used as a first-line imaging method especially in young patients suspected of coronary artery anomalies and as a supplementary imaging method to be aware of iatrogenic hazards before cardiac surgery is performed.

Informed Consent: Written informed consent was obtained from the patient who participated in this study.

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