A 57-year-old man was referred for exertional chest pain and a mediastinal mass. Computed tomographic angiography (CTA) revealed a huge aneurysm arising from the left sinus of Valsalva (Figure 1, Video I in the online-only Data Supplement). The opening of aneurysm was 18 mm in its largest diameter. Because the left coronary arteries were stretched and narrowed, the chest pain was considered to be caused by the aneurysm. The right coronary artery and other cardiac structures were normal. In transthoracic echocardiography, there was mild aortic and mitral regurgitation. The transesophageal echocardiography also showed competent aortic valve and aneurysm. However, it was not clear whether the aortic valve annulus was intact or not (Video II in the online-only Data Supplement). To understand the anatomy of aortic root complex, including aortic valve, coronary ostium, and the aneurysm, we reconstructed the 3-dimensional images showing the inside of aorta, hence called an angioscopic view. The CTA angioscopic image confirmed that there was no involvement of the aortic valve or the left coronary ostium by the aneurysm (Figure 2). The image also indicated how much tissue was present between the opening of aneurysm and coronary ostium. Thus, we were able to plan surgical internal closure of the sinus of Valsalva aneurysm rather than aortic root replacement.

Surgery was performed by median sternotomy, cardiopulmonary bypass, and cardioplegic arrest. The operative findings were consistent with the CTA angioscopic image, and there was sufficient room for stitches (Figure 3). The aneurysm was opened and plicated. The thrombus was removed only partially to prevent a kink of the coronary artery. The sinus defect was closed with a piece of bovine pericardium. Great care was taken so as to not interfere with the left coronary ostium. The aortic valve commissuroplasty was performed to decrease aortic regurgitation. The recovery was uneventful. In CTA before discharge, the aneurysm was completely thrombosed and had decreased in size from 60 to 40 mm. The coronary arteries were less stretched and less narrowed (Figure 4). The echocardiography showed only trivial aortic and mitral regurgitation. The patient did not have any chest pain 3 months after surgery.

Figure 1. A, The cross-sectional image of computed tomographic angiography (CTA) showed the aneurysm (asterisk) and the left main coronary artery (yellow arrow). However, the amount of tissue between coronary ostium and the opening of aneurysm was not clearly addressed in this image. B, The conventional 3-dimensional CTA showed narrowed coronary arteries and the aneurysm.
Discussion

The sinus of Valsalva aneurysm rarely arises from left coronary sinus, because the pulmonary trunk and right ventricle support the left coronary sinus externally.\(^1\) When the aneurysm enlarges, it can cause coronary insufficiency, mitral valve obstruction or insufficiency, aortic valve regurgitation, and so on.\(^2\)\(^-\)\(^4\) The aortic root is a complex that comprises the aortic valve, sinus of Valsalva, and coronary artery ostia. Therefore, sinus of Valsalva aneurysm surgery often requires a complex operation rather than a simple patch repair. Although a surgical team should prepare for all possibilities in the operation room, it is good to know what the procedure will be. In this case, the conventional 3-dimensional CTA, axial images, and echocardiography showed the size of aneurysm and the vague relationships of the aortic root components, but it was still difficult to understand the internal surgical anatomy of the aortic root. By reconstructing a 3-dimensional angioscopic view, it was clear that we did not need to perform a coronary artery bypass, aortic valve replacement, or aortic root replacement. In conclusion, we think that the angioscopic images of CTA may help in surgical planning for complex aortic root pathology.

Disclosures

None.

References


Key Words: angioscopy • aorta • coronary computed tomographic angiography • valsalva sinus aneurysm
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Supplemental Material

**Movie clip 1.** Axial images of computed tomographic angiography showed partially thrombosed aneurysm from the left sinus of Valsalva.

**Movie clip 2.** In the transesophageal echocardiography, the function of aortic valve was normal. However, it could not address the aortic valve annulus and the left coronary ostium.