

IMAGES IN INTERVENTION

# A Rare Case of Anomalous Original Left Circumflex Artery Stenosis After Artificial Mitral Valve Replacement



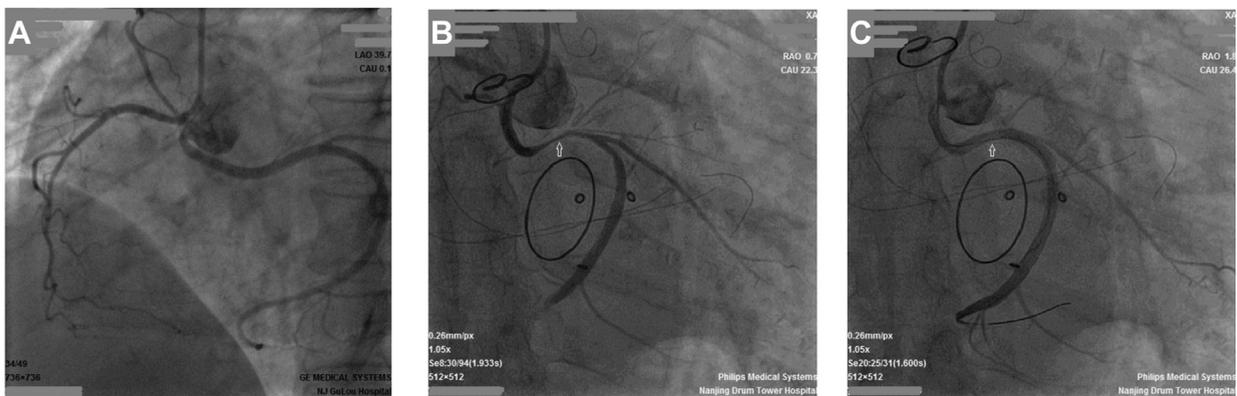
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A 72-year-old woman was admitted because of progressive 9-year chest tightness. Nine years ago, she underwent mitral valve replacement using a Hancock II porcine mitral valve bioprosthesis (size 27) (Medtronic, Minneapolis, Minnesota) for posterior mitral valve prolapse. Pre-operative coronary angiogram showed anomalous origin of left circumflex artery (LCx) without stenosis (**Figure 1A**,

**Online Video 1**). Post-operative echocardiography showed a left ventricular ejection fraction of 51%.

However, recent echocardiography showed a decreased left ventricular ejection fraction of 36% and segmentally weakened motion of the inferior and lateral wall. Single-photon emission computed tomography showed myocardial ischemia of the inferior and lateral wall. Diagnostic coronary angiogram

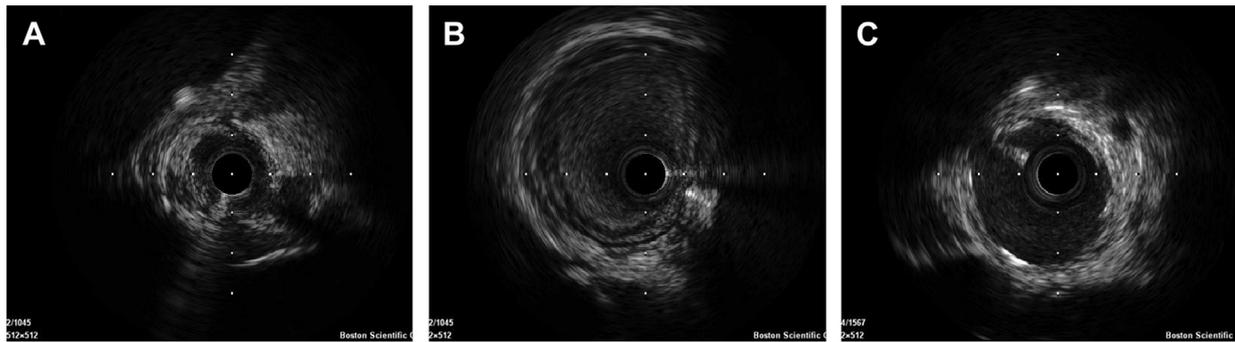
**FIGURE 1** Coronary Angiograms Showing Anomalous Origin of the LCx Before Mitral Valve Replacement Surgery, Before and After Percutaneous Coronary Intervention to the LCx Stenosis



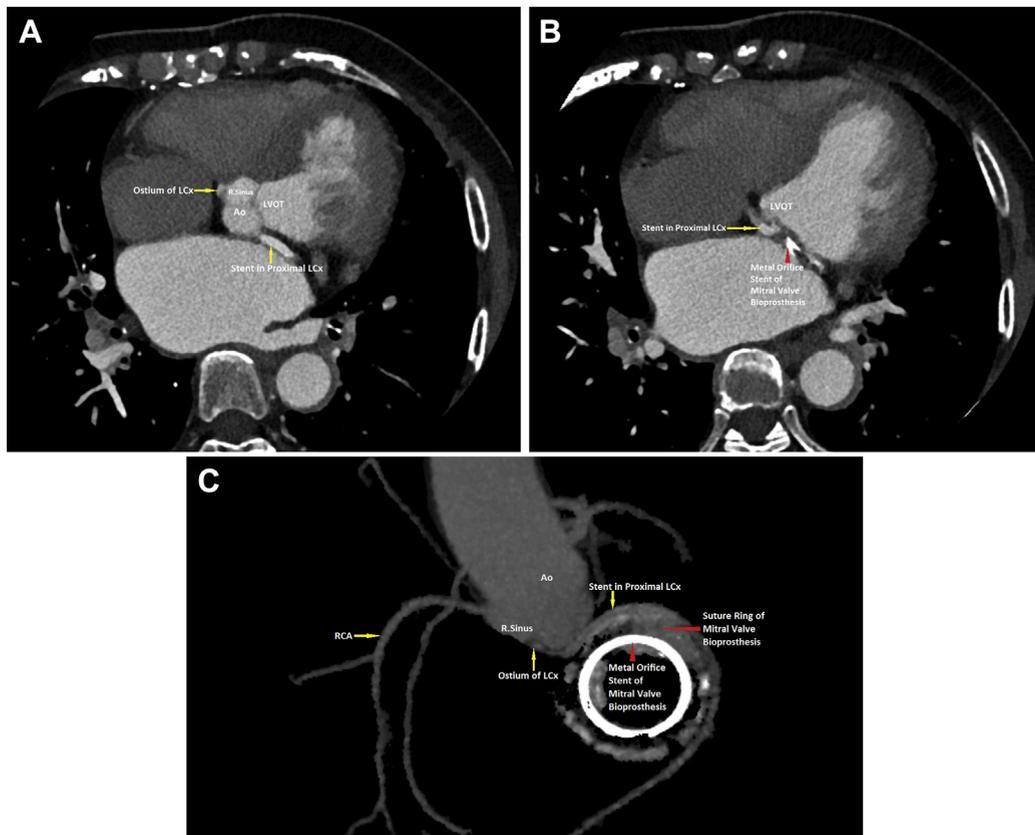
(**A**) Before mitral valve replacement surgery, coronary angiogram (left anterior oblique) shows an anomalous origin of the dominant left circumflex artery (LCx) from the right sinus of Valsalva. There is no stenosis in proximal LCx (**Online Video 1**). (**B**) Recent angiogram (posteroanterior caudal) shows a severe proximal LCx stenosis (**arrow**) (**Online Video 2**). (**C**) A similar angiographic view after percutaneous coronary stenting to the LCx shows a good result (**arrow**) (**Online Video 4**).

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**FIGURE 2** Coronary IVUS Before and After Percutaneous Coronary Intervention to the LCx Stenosis

(A) Intravascular ultrasound (IVUS) reveals a marked reduction of vessel lumen in the proximal left circumflex artery (LCx) lesion. There is no significant atherosclerotic plaque (Online Video 3). (B) IVUS shows a normal reference segment of the LCx. (C) IVUS after percutaneous coronary stenting to the LCx shows a good result (Online Video 5).

**FIGURE 3** CT Coronary Angiography Post-Percutaneous Coronary Intervention Showing the Course of the Anomalous LCx

(A) Computed tomography (CT) coronary angiographic image shows the anomalous origin of left circumflex artery (LCx) from the right sinus of Valsalva and the patent stent in proximal LCx. (B) Another CT angiographic image shows proximal LCx coursing posteriorly to aorta, then traveling between LVOT and mitral annulus. (C) CT angiography (3-dimensional reconstruction view) shows the LCx coursing tightly around the suture ring of mitral valve bioprosthesis. Ao = aorta; LVOT = left ventricular outflow tract; RCA = right coronary artery; R. Sinus = right sinus of Valsalva.

identified a severe proximal LCx stenosis with distal slow flow (**Figure 1B**, **Online Video 2**). Both the left anterior descending and right coronary arteries seemed normal. Then percutaneous coronary intervention was performed with a 6F catheter Amplatz L 1.0 guide catheter. After pre-dilation of stenosis with a  $2.5 \times 15$  mm balloon, intravascular ultrasound catheter detected a marked reduction of vessel lumen without significant atherosclerotic plaques (**Figure 2A and 2B**, **Online Video 3**). Then we delivered a  $3.5 \times 36$  mm drug-eluting stent to proximal LCx. Final angiogram (**Figure 1C**, **Online Video 4**) and intravascular ultrasound (**Figure 2C**, **Online Video 5**) showed a good result. Six days later, computed tomography coronary angiography showed that LCx ectopically originated from the right sinus of Valsalva, coursed posteriorly to the aorta, then traveled tightly around the mitral annulus (**Figure 3**). The patient performed well after discharge until now.

This is a rare case of anomalous original LCx stenosis after mitral valve replacement. We speculate that compression of the mitral valve bioprosthesis suture ring against surrounding tissues of the mitral annulus might cause the LCx stenosis. Long-term outcome of artificial mitral valve replacement in such patients should be followed up.

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**KEY WORDS** anomalous coronary artery, mitral valve replacement, percutaneous coronary intervention

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**APPENDIX** For supplemental videos and their legends, please see the online version of this article.