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Worsening Angina Two Years After Transcatheter Aortic Valve Implantation: Late Onset of Valsalva Obstruction

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Valsalva obstruction is a recognized complication of redo transcatheter aortic valve implantation (TAVI), but may occur in other scenarios.

An 88-year-old female underwent TAVI using a 26-mm Evolut PRO (Medtronic, Minneapolis, MN, USA) 2 years prior (native annulus perimeter: 63.6 mm, sinus: 29, 28, and 29 mm, right coronary artery [RCA] height: 15 mm, right coronary cusp [RCC] height: 20 mm; **Figure 1A, Supplementary Video 1**). She presented with worsening effort angina. Echocardiography revealed a mildly elevated pressure gradient. Computed tomography revealed uniform and circumferential low-density areas at the outflow, neo-sinus, and native sinus (**Figure 1B-D**). Given the patient's oral anticoagulant and the appearance of a low-density area, this was interpreted as a neo-intima on the transcatheter valve rather than a leaflet thrombus. Aortography showed impaired direct flow from the neo-sinus to the RCA, with collateral flow originating from the anterior interspace of the RCC to the RCA (**Figure 1E, Supplementary Video 2**). A guidewire was then passed through this space (**Figure 1C and F**; arrowhead indicated the anterior interspace). Intravascular ultrasounds revealed significant stenosis between the neo-sinus and the RCC (**Figure 1G**). Delivery of the coronary stent proved challenging, and the cell was opened using a semi-compliant balloon (**Figure 1H**). Following balloon dilation, collateral flow to the RCA increased, and angina moderately improved (**Figure 1I, Supplementary Video 3**).

Neo-intima formation can cause Valsalva obstruction.¹⁾ The pathophysiology, predisposing factor, and optimal treatment of excessive neo-intima remain largely unknown. If the patient presents refractory angina or additional left coronary occlusion, explant or coronary artery bypass grafting surgery might be required. When new-onset angina post-TAVI is encountered, Valsalva obstruction should be considered a possible diagnosis, and computed tomography can aid in the differential diagnosis.²⁾

Written informed consent was obtained from the patient.

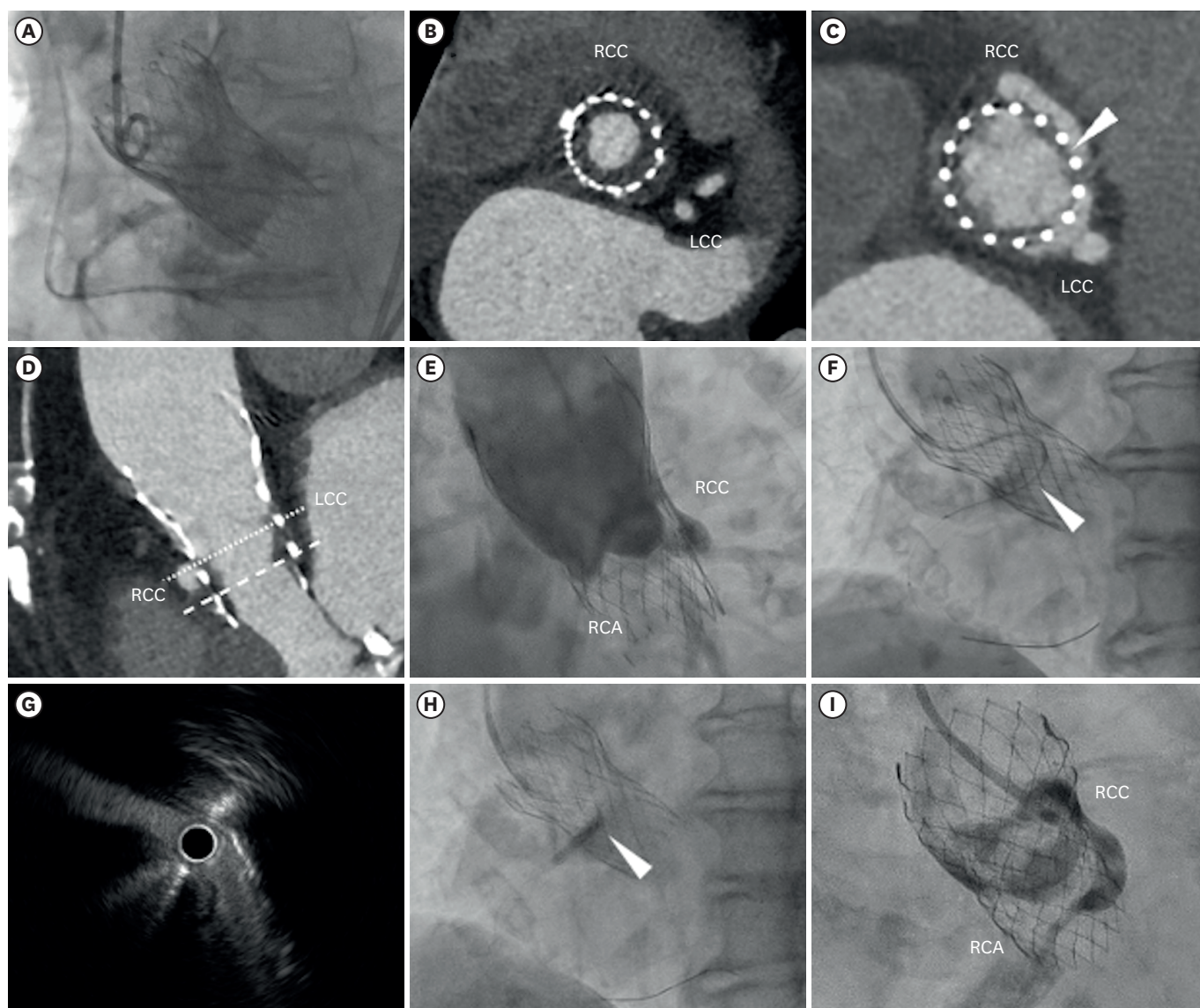


Figure 1. Valsalva obstruction. (A) Aortography just after valve implantation. (B-D) Computed tomography 2 years after valve implantation: (B, C) outflow and neo-sinus consistent to broken and dotted line, (D) long axis of the valve. (E-I) Catheter intervention to the right coronary artery: (E) guidewire cross, (F) ultrasounds finding indicating the narrowed anterior interspace, (G) ballooning. (E, I) Aortography before and after percutaneous coronary intervention. (A) Coplanar view. (E, I) Right anterior oblique view. (F, H) Left anterior oblique view.

Conflict of Interest

Ryosuke Higuchi is a clinical proctor of Edwards Lifesciences, and Itaru Takamisawa is an onsite proctor of Edwards Lifesciences, Medtronic and Abbott. The other authors have no disclosure.

Data Sharing Statement

The data generated in this study is available from the corresponding author upon reasonable request.

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SUPPLEMENTARY MATERIALS

Supplementary Video 1

Aortography just after valve implantation: Preserved right coronary artery flow (coplanar view).

Author Contributions

Conceptualization: Higuchi R; Investigation: Higuchi R; Supervision: Sakamoto K, Takamisawa I, Nanasato M; Writing - original draft: Higuchi R; Writing - review & editing: Higuchi R, Sakamoto K, Takamisawa I, Nanasato M.

Supplementary Video 2

Aortography before percutaneous coronary intervention: Precluded direct flow from the Neo-sinus to the right coronary artery (right anterior oblique view).

Supplementary Video 3

Aortography after percutaneous coronary intervention: Facilitated collateral flow (right anterior oblique view).

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