

MINI-FOCUS ISSUE: TRANSCATHETER INTERVENTIONS

INTERMEDIATE

IMAGING VIGNETTE: CLINICAL VIGNETTE

Fluttering Bioprosthetic Valve Leaflet Detected by Intravascular Ultrasound During Valve-in-Valve Transcatheter Aortic Valve Replacement



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ABSTRACT

We report fluttering bioprosthetic leaflet, assessed by intravascular ultrasound, during valve-in-valve transcatheter aortic valve replacement, successfully treated by using chimney stenting. Valve-in-valve transcatheter aortic valve replacement is still a challenging situation, particularly in cases with a shallow distance between leaflet and coronary ostium; a multimodality imaging approach helped manage this situation. **(Level of Difficulty: Intermediate.)** (J Am Coll Cardiol Case Rep 2021;3:910-2) © 2021 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

An 87-year-old woman was admitted to undergo transcatheter aortic valve replacement (TAVR) due to bioprosthetic valve failure (19-mm Trifecta [Abbott, Minneapolis, Minnesota]). Pre-procedural computed tomography images revealed 4.1 mm between the bioprosthetic valve and the left coronary artery (LCA) (**Figure 1A**), and we implanted a transcatheter heart valve with guidewire protection for LCA. After TAVR, the patient's blood pressure dropped to <90 mm Hg, accompanied by ST-segment elevation at the aVR lead (**Figure 1B**). Angiography showed radiopacity near the ostium of the LCA (**Figure 1C, Video 1**), which led us to suspect obstruction of the LCA. Intravascular ultrasound (IVUS) during emergent percutaneous coronary intervention showed coronary obstruction by fluttering leaflet of the bioprosthetic valve (**Figure 1D, Video 2**). After the chimney stenting, ST-segment elevation was improved, and IVUS showed a well-expanded stent (**Figure 1E, Video 3**). The patient was discharged without any other complication after 5 days of percutaneous coronary intervention. Post-procedural computed tomography images showed a well-expanded coronary stent extended from the left main trunk to the aorta (**Figure 1F**).

Coronary obstruction occurs in ~3% of valve-in-valve procedures, whereas externally stented bioprosthetic valves, such as Trifecta as in this case, have an increased risk of coronary obstruction (6.4%) (1). Virtual transcatheter heart valve-coronary distance is a useful parameter for predicting coronary occlusion; the virtual transcatheter heart valve-coronary distance in this case was 4.1 mm, which is categorized as intermediate risk of obstruction (2). Based on the data, we assumed that our case had a relatively high-risk of coronary obstruction, and therefore, the BASILICA (bioprosthetic or native aortic scallop intentional laceration to prevent iatrogenic coronary artery obstruction) technique might be another possible solution for this clinical

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

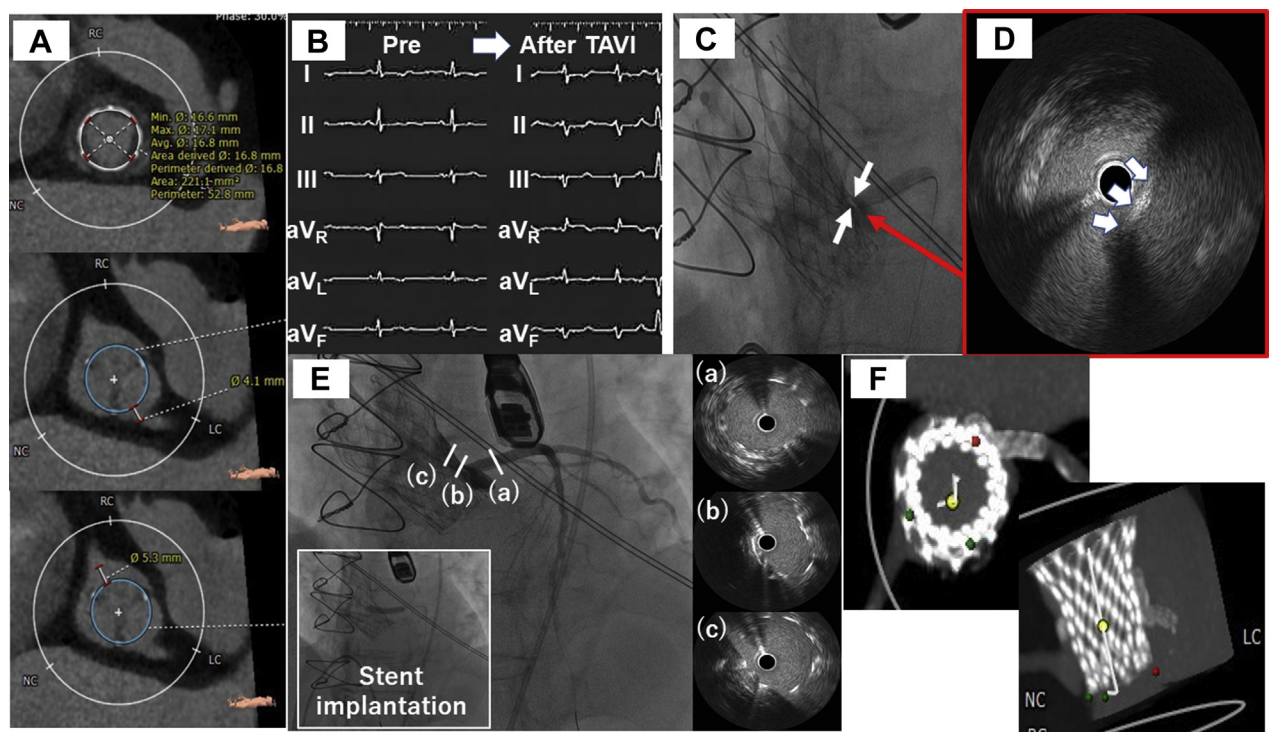
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scenario. Although chimney stenting in this setting may be helpful to resolve the situation, the antiplatelet therapy regimen following this technique remains unclear. Because patients undergoing TAVR have a high bleeding risk (i.e., advanced age, chronic kidney disease) and the prolonged dual antiplatelet therapy might cause harm, we believed that 3 to 9 months of dual antiplatelet therapy may be suitable for this case (3). In case of chimney stenting, coronary angiography alone does not provide sufficient information to see if chimney stenting after valve-in-valve TAVR appropriately covers the flailing leaflet. The IVUS images may therefore help guide us in achieving optimal procedural outcomes. With the insight of IVUS images, this is the first report to point out fluttering bioprosthetic leaflet obstructing the ostium of LCA during valve-in-valve TAVR.

**ABBREVIATIONS
AND ACRONYMS**

IVUS = intravascular ultrasound
LCA = left coronary artery
TAVR = transcatheter aortic valve replacement

FIGURE 1 Peri-Procedural Images During Valve-in-Valve TAVR



(A) Computed tomography image. **(B)** Electrocardiographic change during transcatheter aortic valve replacement (TAVR). **(C)** Coronary angiography after TAVR revealed a radiopaque structure near an ostium of the left coronary artery. **(D)** Intravascular ultrasound image revealed fluttering leaflet (white arrows) of the bioprosthetic valve. **(E)** Final coronary angiography and intravascular ultrasound image revealed well-expanded coronary stent. **(F)** Computed tomography images after TAVR.

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KEY WORDS aortic stenosis, coronary occlusion, valve restenosis

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