Intravascular Ultrasound Observation of an Obstruction of the Left Main Coronary Artery Caused by Displaced Leaflet Calcification and Hematoma After Transcatheter Aortic Valve Implantation

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A 89-year-old woman underwent transcatheter aortic valve implantation (TAVI) using a transapical approach for severe senile calcific aortic stenosis (area = 0.39 cm²; peak and mean gradients = 176 mm Hg and 103 mm Hg, respectively; ejection fraction = 62%). Preprocedural computed tomography imaging revealed severe calcification of the left coronary cusp and a small sinus of Valsalva (Figure 1A). The patient was considered high-risk for coronary obstruction after TAVI.

Aortography during predilatation with a 20-mm balloon showed reduced coronary blood flow. Sion Blue wires (Asahi Intecc, Aichi, Japan) and a 2.5-mm noncompliant balloon catheter were placed in the left coronary artery before valve implantation. A 23-mm Sapien XT valve (Edwards Lifesciences, Irvine, Calif.) was implanted under rapid right ventricular pacing at 200 bpm. Shortly after implantation, the patient became hypotensive, and transesophageal echocardiography revealed regional wall motion abnormalities involving the anterior and anteroseptal walls. Selective angiography revealed severe stenosis of the left main trunk (Figure 2A). After dilatation of the left main trunk by the 2.5-mm balloon catheter, an intravascular ultrasound examination was performed which showed that the left main trunk stenosis was attributable to external compression by the displaced native leaflet calcification and hematoma (Movie I in the online-only Data Supplement, Figure 3A). Transesophageal echocardiography revealed a contained hematoma around the aortic root. A 3.5 mm × 18 mm Nobori drug eluting stent (Terumo, Tokyo, Japan) was implanted, followed by dilatation with a 4.5-mm noncompliant balloon catheter. Postprocedural coronary angiography showed normal coronary flow (Figure 2B). Intravascular ultrasound imaging confirmed a good final angiographic result with adequate stent apposition (Figure 3B). Transesophageal echocardiography showed the absence of wall motion abnormalities and perivalvular leaks. The patient’s postprocedural course was uneventful. Postprocedural CT imaging obtained 10 days after TAVI showed that the displaced leaflet calcification compressed the left main trunk stent, but the stent was well expanded without any residual hematoma around the stent (Figure 1B). Coronary artery obstruction after TAVI is rare but can be a fatal complication.1,2 Unsuccessful percutaneous coronary intervention after coronary obstruction leads to disastrous outcomes. The most frequent mechanism associated with coronary obstruction after TAVI has been considered the displacement of the calcified native cusp over the coronary ostium. Kim and colleagues3 described a case of coronary occlusion after TAVI attributable to contained aortic root hematoma. Contained aortic root hematoma is another cause of TAVI-related coronary obstruction. To the best of our knowledge, our case is the first report that describes intravascular ultrasound imaging of TAVI-induced coronary obstruction caused by a bulky calcification and hematoma.

Disclosures
None.

References


**Figure 1.** Computed tomography (CT) imaging before and after transcatheter aortic valve implantation (TAVI). *A,* CT imaging before TAVI showing a severe calcification of the left coronary cusp and a small sinus of valsalva. *B,* CT imaging after TAVI showing the displaced leaflet calcification and the patent coronary stent. There were no signs of residual hematoma around the stent.

**Figure 2.** *A,* Coronary angiography just after the valve implantation showing a severe stenosis of the left main trunk. *B,* Final coronary angiography after successful deployment of a drug-eluting stent into the ostium of the left main trunk.

**Figure 3.** Intravascular ultrasound (IVUS) imaging before and after the coronary stent implantation. *A,* IVUS imaging showing severe left main trunk stenosis caused by external compression by the displaced native leaflet calcification and hematoma. *B,* IVUS imaging showing a well expanded stent.
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