Descending Aorta Rupture During Transcatheter Aortic Valve Replacement

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A 88-year-old woman with a permanent VDD pacemaker and severe aortic stenosis underwent elective transcatheter aortic valve replacement because of high surgical risk (logistic Euroscore of 35.3%). Aortic valve area was 0.5 cm², mean gradient was 86 mm Hg, and left ventricular ejection fraction was 64% on transthoracic echocardiography. Aortic annulus sizing was 23.5 and 23.7 mm by transesophageal echocardiography and multidetector computed tomography, respectively. Femoral and iliac arteries evaluated by angiography and computed tomography were straight with mild calcification and had adequate internal diameters. Great tortuosity of the aorta was also observed in computed tomography, with the presence of a double angle in the descending thoracic aorta and a very pronounced curve in the distal part of the aortic arch (Figure 1). The procedure took place via right transfemoral access with the use of a percutaneous closure device. A self-expandable 29-mm Core Valve prosthesis (Medtronic, Inc., Minneapolis, MN) was advanced, encountering a high resistance to the delivery system and kinked the descending thoracic aorta in the proximal angle. This case gives further evidence of unexplained hypotension during catheter advancement. In our case, we hypothesize that the aortic rupture at the time the delivery system was advanced was attributable to the presence of an acute angle in the aortic arch that transmitted resistance to the delivery system and kinked the descending aorta in the proximal angle. This case gives further evidence that careful evaluation, selection of the patient candidates, and the approach for transcatheter aortic valve replacement are...
crucial, and must be discussed on a case-by-case basis, considering the benefit–risk ratio.

Disclosures
None.

References

![Figure 1. Pre-TAVR chest computed tomography.](image1.png)

A, Coronal contrast-enhanced CT image showing the great tortuosity with a double angle in the descending thoracic (arrows). B, 3D reconstruction showing kinking of the aorta and a very pronounced curve in the distal part of the aortic arch (arrow). CT indicates computed tomography; 3D, 3-dimensional; and TAVR, transcatheter aortic valve replacement.

![Figure 2. Fluoroscopy during the advancement of the prosthesis.](image2.png)

A high resistance was found at the level of the distal part of the aortic arch (A), and the delivery system was bent at the level of the first angle in the descending aorta, worsening the angle (B).
Figure 3. Aortography showing extravasation of contrast medium (arrow) from the descending thoracic aorta at the level where the delivery system was bent.

Figure 4. Transesophageal echocardiography. A, Two-dimensional transesophageal echocardiography image showing the rupture of the anterior aortic wall (arrow). B, Color Doppler image showing systolic flow across the site of rupture (arrow). C, Three-dimensional transesophageal echocardiography image showing the tear of the aortic wall (arrow).

Figure 5. Fluoroscopy (A) and aortography (B) after stent graft deployment and TAVR, showing no leakage of contrast material outside the aorta. TAVR indicates transcatheter aortic valve replacement.
Figure 6. Necropsy demonstrated a large tear (arrows) of the aortic wall at the level of the external edge of the proximal angle in the descending aorta covered by the stent graft.
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