Acute Descending Thoracic Dissection

A case with multiple complications and the failure of initial medical management was treated successfully using an endovascular stent graft.

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A 57-year-old man was admitted to the hospital with severe hypertension, severe persistent chest and back pain, and an acute descending thoracic dissection documented by CT. The CT demonstrated an entry site distal to the left subclavian artery with the dissection ending above the celiac artery. After the patient was evaluated by medical and cardiovascular physicians, conventional medical management, including IV administration of three antihypertensive drugs, bed rest, and ICU monitoring, was selected.

Approximately 6 hours after admission to the hospital, the patient became paraplegic with extension of the dissection into the abdominal aorta. There was no flow in the left renal artery, shown by CT, with onset of left flank pain. A lumbar drain was placed, resulting in reversal of the paraplegia within several hours, and there was loss of the left kidney function, shown by perfusion scan.

During the ensuing 6 days, the patient was treated medically with continuing moderate elevation in his blood pressure but showed no other symptoms. On the sixth day, he had recurrence of uncontrollable systolic hypertension, developed diffuse abdominal pain, and had loss of pulses in the lower extremities with proximal extension of the dissection to between the left carotid and subclavian arteries. He also became anuric after his creatinine level elevated to 9, and he was started on dialysis.

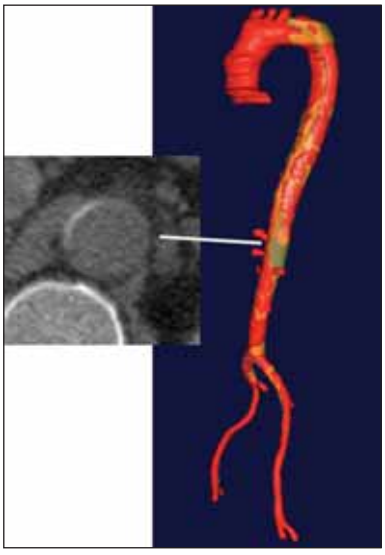

Figure 1. M2S reconstructions (M2S, West Lebanon, NH) of the thoracoabdominal aorta demonstrate the extent of the dissection and near occlusion of the true lumen in the visceral segment, shown on the axial CT image at this level.

Due to the severity of the patient's symptoms and the failure of medical management, intervention was recommended. The potential for endoluminal repair was discussed as a possible alternative to surgical repair. The concern for bowel ischemia and other peripheral ischemia was significant, and laparoscopy was considered to determine bowel viability, although he did not have an acute abdomen or serum lactate elevation.

The patient was re-evaluated by contrast CT scan after he was transferred to our institution and was found to have a near occlusion of the visceral segment of the aorta with extension of the dissection to the bilateral iliofemoral arteries (Figure 1). The patient's abdominal tenderness was moderate, but there was no evidence of ischemia. He was evaluat-

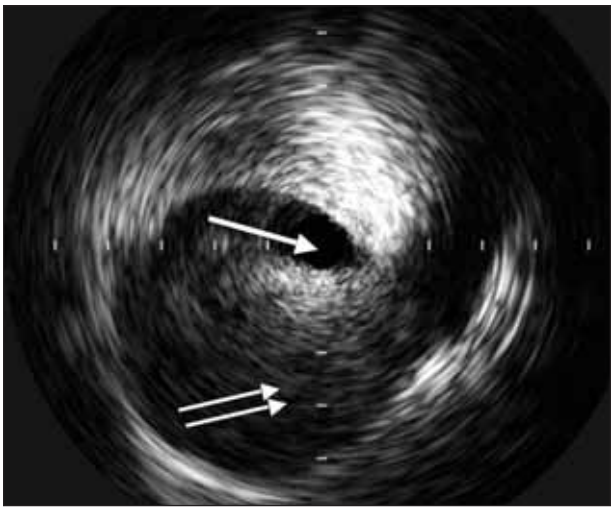

Figure 2. IVUS image shows the severely compromised true lumen at the level of the superior mesenteric artery (arrow) and sluggish flow in the false lumen where it appeared to be thrombosed on CT and on contrast angiography (double arrows).

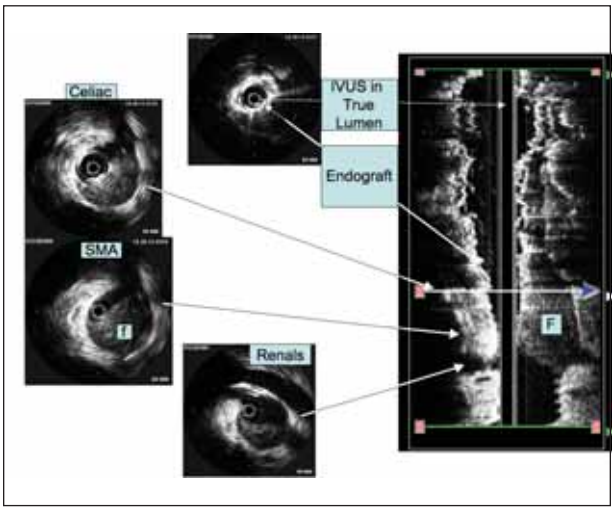

Figure 3. Axial IVUS images (left) and longitudinal grayscale reconstruction of IVUS images along the DTA segment that was covered by the endografts (top, DTA) near the subclavian artery and proximal entry site, and bottom visceral artery origins. There is immediate enlargement of the true lumen with a return of pulsatile flow and stagnation of flow in the false lumen after deployment of the endografts. All visceral artery orifices, except for the left renal, were perfused from the true lumen after coverage of the entry site. F indicates the false lumen.

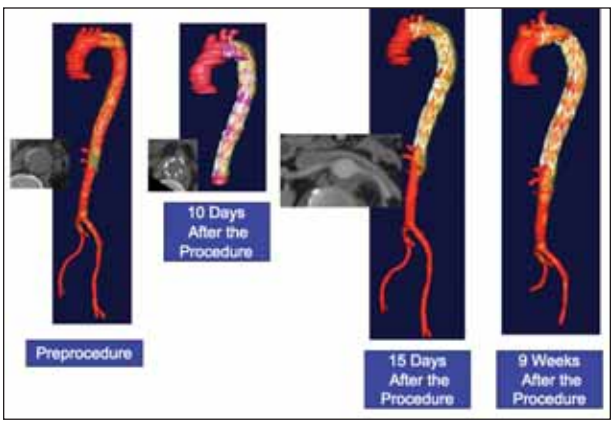

Figure 4. Composite M2S three-dimensional CT reconstructions and axial images of the visceral segment before the procedure and at intervals up to 9 weeks, demonstrating remodeling of the true lumen of the DTA with perfusion of visceral vessels from the true lumen, as the true lumen enlarged, and the septum of the dissection remodeled to an anatomically correct alignment.

ed in the endovascular suite for potential revascularization using an endoluminal device. The patient was treated as part of an FDA-approved, single-center–sponsored, investigator IDE with the Talent Thoracic Stent Graft (Medtronic CardioVascular, Santa Rosa, CA) for descending thoracic aortic pathologies, including dissection.

The endovascular procedure was begun by cannulation of the bilateral iliofemoral arteries, and a guidewire was passed atraumatically along the length of the thoracoabdominal aorta. Intravascular ultrasound (IVUS) interrogation demonstrated a very small, slit-like opening of the true lumen in the visceral segment, but there was obvious flow in the false lumen by IVUS that was not apparent on the contrast studies (Figure 2). The proximal entry site of the dissection in the descending thoracic aorta (DTA) was easily identified at approximately 3 cm distal to the left subclavian artery. The entry site was covered using the Talent Thoracic endoluminal prosthesis (34-mm internal diameter, 115-cm-long) in the true lumen. Immediately after the Talent device was deployed, there was return of pulsatility and enlargement of the true lumen at the visceral segment with reperfusion of the visceral vessels by shift of the true lumen. To enhance reperfusion of the visceral segments, two additional Talent Thoracic devices and a Talent Thoracic Distal Extension with an open distal wire configuration were extended across the celiac artery orifice (Figure 3).

After the endoluminal devices were deployed, pulses returned to both lower extremities and ankle-brachial indexes returned to 1 by 12 hours after deployment. In addition, his abdominal pain resolved.

Eighteen hours after the procedure, the patient had recurrent paraplegia that reversed with placement of a lumbar drain. At 2 weeks after the procedure, the

patient's aorta completely remodeled with perfusion of all visual branches being from the true lumen (Figure 4). The left kidney had shrunk and did not perfuse on CT and was lost, but he had normal renal function with a creatinine level of 1 several days after the procedure.

SUMMARY

This case demonstrates the potential for endograft treatment of acute aortic dissections with realignment of the true lumen, thrombosis, and regression of the false lumen over a fairly short interval. In this patient (who was clearly a failure of medical management, with complications including renal failure, impending visceral and peripheral ischemia, and paraplegia), endograft exclusion has provided an endovascular option for rapid recovery and reversal of the pathology, aside from loss of the left kidney. The benefits of this intervention compared to the complications associated with conventional surgical treatment of an acute dissection with failed medical management are obvious. This patient's outcome supports further clinical evaluation for potential treatment of all acute dissections with endografts, if consistent benefits compared to medical management can be demonstrated. ■

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