

# Endovascular Stent-Grafting in a Patient With a Rapidly Enlarging Thoracic Aortic Aneurysm

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A 79-year-old woman with a history of Sjögren's syndrome, rheumatoid arthritis, hypertension, moderate to severe interstitial lung disease with pulmonary fibrosis, and a known descending thoracic aortic (DTA) aneurysm (4.5 cm) presented with rapid expansion of the aneurysm to a maximal diameter of 6.2 X 5.6 cm over 1-year follow-up. Given these findings, the patient was electively taken for endovascular surgical intervention. The aneurysm had a large mural thrombus burden along with marked tortuosity in the distal thoracic aorta, extending from the proximal DTA to the aortic hiatus. The aortic dimensions were 29 mm at the left subclavian artery takeoff and 28 mm at the celiac axis.

Intraoperatively, right common femoral arterial access was achieved via open groin exposure, along with percutaneous left common femoral artery access for diagnostic study. Upon heparinization, a guidewire was placed into the ascending aorta under fluoroscopic guidance and exchanged to a Lunderquist stiff wire (Cook Medical, Bloomington, IN). A pigtail catheter was advanced from the left femoral access 7 F sheath, and angiography delineated the aortic arch/DTA anatomy (Figure 1). A 34 to 30 mm taper X 200 mm Relay graft (Bolton Medical, Inc., Sunrise, FL) was maneuvered around a severely angulated DTA by the aortic hiatus and was deployed proximally by the left subclavian artery without occluding it (Figure 2A). Upon confirming good proximal seal with angiography, DTA anatomy by the aortic hiatus was delineated, with special attention given to the celiac axis takeoff and the severe angulation of the aorta. Next, a second 34 X 34 X 150 mm Relay graft was advanced in a retrograde fashion and parked inside the first stent with a 5 cm overlap. The graft was then deployed, ensuring that the distal land-

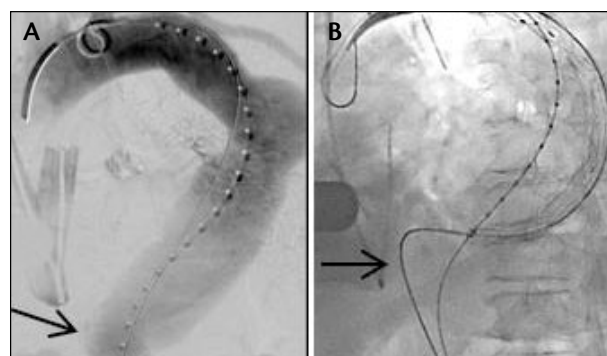
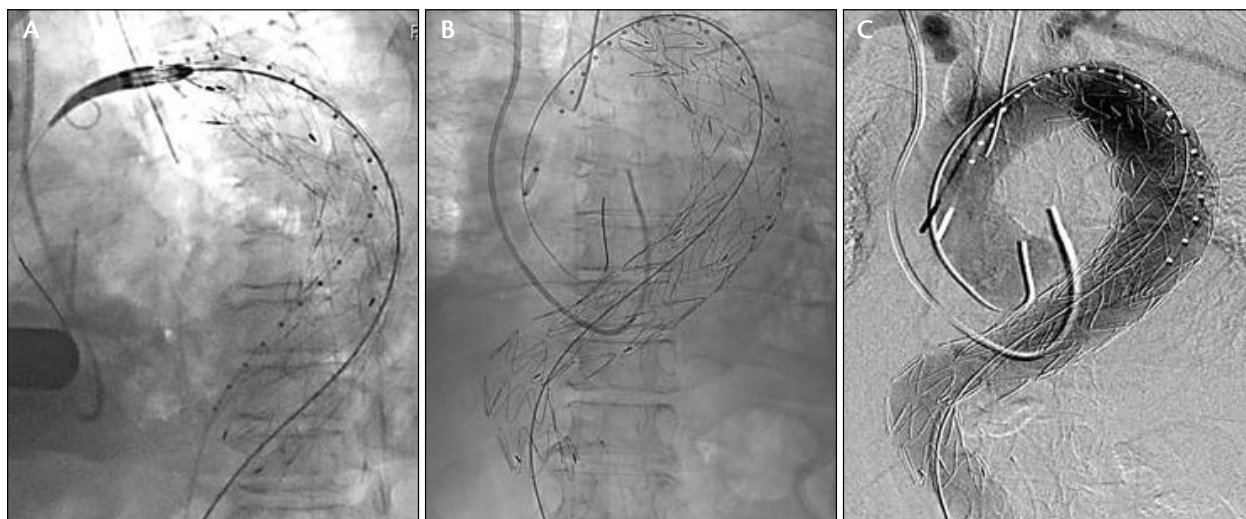


Figure 1. Angiography of the DTA aneurysm is shown, delineating the sharp angulation of the DTA by the diaphragmatic hiatus. DTA angiogram (A) and predeployment image (B) of the proximal Bolton Relay stent-graft are shown.

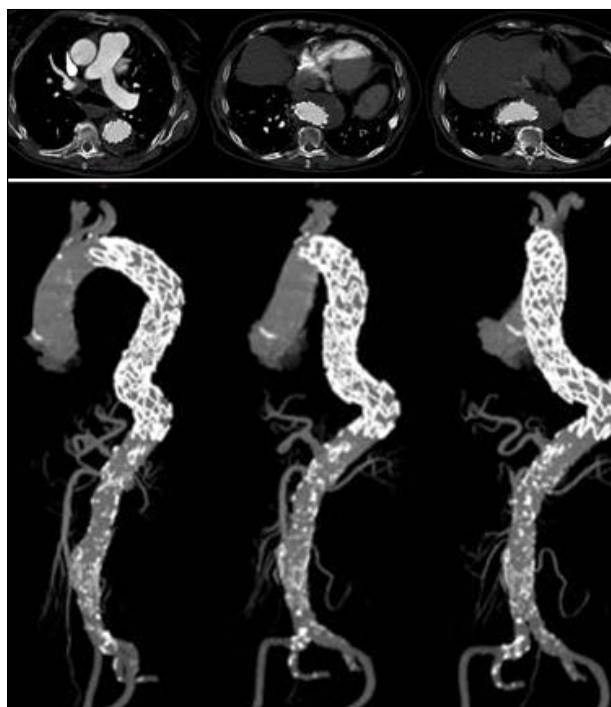
ing zone did not occlude the celiac axis (Figure 2B). A completion angiogram showed good proximal and distal seal, without any type I or III endoleaks (Figure 2C). The patient had an uneventful recovery and was discharged to home on postoperative day 6.

At her most recent 2-year follow-up, the patient continued to do well and remained asymptomatic. A CT scan at follow-up showed no endoleaks (Figure 3), with reduction of the DTA aneurysm to 5.2 cm.

The Bolton Relay graft was the ideal endograft choice in this case given the extreme tortuosity seen in the DTA by the diaphragmatic hiatus. The flexibility of this device, which was specifically designed to handle such tortuosity in the thoracic aorta, facilitated excellent coverage of the DTA aneurysm without any endoleak. The modular design of the system, along with multiple straight and tapered configurations and different lengths, enabled ease of coverage of the entire DTA aneurysm



**Figure 2.** DTA aneurysm coverage with Bolton Relay stent-graft (A). For proximal DTA coverage, a 34 to 30 mm taper X 200 mm Bolton Relay uncovered stent-graft was deployed by the left subclavian artery takeoff. This enabled coverage of the DTA right up to the subclavian artery without occluding this vessel (B). For complete coverage of the DTA, and to handle the extreme tortuosity by the diaphragmatic hiatus, a 34 X 34 X 150 mm Bolton Relay graft was deployed with 5 cm stent-to-stent overlap (C). Completion angiography confirmed excellent coverage of the DTA aneurysm without any endoleak.



**Figure 3.** Two-year follow-up imaging showing a decrease in the size of the DTA aneurysm without any endoleaks or collapse or migration of the stent-grafts. Axial cuts and rotational images of the virtual aorta are shown to display the tortuosity of the DTA aneurysm and the severe angulation by the diaphragmatic hiatus that was successfully stented.

with two stent-graft segments. Proximal landing with a 34 X 30 mm tapered device enabled good proximal landing seal. The ability to place a 34 X 34 mm distal stent-graft piece with 5 cm stent overlap allowed excellent seal between the two stent-grafts to prevent type III endoleak and a good distal landing zone seal by the celiac axis (DTA measured 28 mm by the aortic hiatus). The S-bar technology of the Relay system enables conformability to handle severe angulation of the aorta and provides longitudinal support to prevent the stent-graft from collapsing at the site of a severely kinked aorta. In this case, the severe angulation of the DTA aneurysm by the diaphragmatic hiatus was handled with relative ease due to the excellent conformability of the Bolton Relay endoprosthesis. ■

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