Utilizing the Relay® Thoracic Stent-Graft for Excellent Apposition in a Patient With Tight Thoracic Arch

BY MARTYN KNOWLES, MD, AND CARLOS H. TIMARAN, MD

The tortuous anatomy of the thoracic aorta, especially in the arch, can prove difficult when it comes to the repair of various pathologies via endovascular techniques. Challenges in patient anatomy, coupled with high strain and an acute curve in the aortic arch, can create difficulty in trying to get apposition with a stent-graft.

The Bolton Medical Relay thoracic graft (Bolton Medical, Inc., Sunrise, FL) received FDA approval in the United States a year ago and has had more than 9,000 implants worldwide. The device is designed to conform to difficult thoracic anatomy, preventing endoleaks and migration. With a wide variety of stents available (diameters of 22 to 46 mm, lengths of 100 to 250 mm, straight or tapered), a clinician is well prepared to treat a range of patient scenarios. The dual-sheath design and hydrophilic coating creates excellent pushability to navigate difficult anatomy, while the short tip allows easy proximal extension into the thoracic arch. The deployment technique and ability to adjust the stent allows precise placement, and the spiral support strut and proximal bare stents allow excellent apposition and conformability.

CASE REPORT

A 76-year-old man known to have a type II thoracoabdominal aneurysm, incidentally found on a computed tomography (CT) chest scan 3 years earlier, had an increase in aneurysm sac size to 6.2 cm. CT imaging showed the largest segment was paravisceral, however, there was aneurysmal involvement proximally to an area near the left subclavian artery (Figure 1). He was asymptomatic and denied any back, chest, or abdominal pain. He had a significant history of hypertension, coronary artery disease, and had previous coronary artery bypass surgery. A staged endovascular repair was planned, with a thoracic aortic aneurysm repair (TEVAR) performed first to reduce the risk of paraplegia.

The patient was taken to the operating room, and percutaneous bilateral femoral access was achieved. Thoracic angiography and intravascular ultrasound were performed to confirm an adequate proximal landing zone. The angiogram uncovered a short landing zone distal to the origin of the left subclavian artery and prior to an acute angle of the proximal descending thoracic aorta. After dilating the right femoral access with a 22 F sheath, we placed a 38 X 34 X 200 mm tapered stent-graft into the mid-descending thoracic aorta. Uncovering the inner sheath, we advanced into position using our previous

Figure 1. A CT angiogram 3D reconstruction showing the type II thoracoabdominal aortic aneurysm with a large paravisceral segment as well as an abnormal proximal aorta with an acute turn near the left subclavian artery.

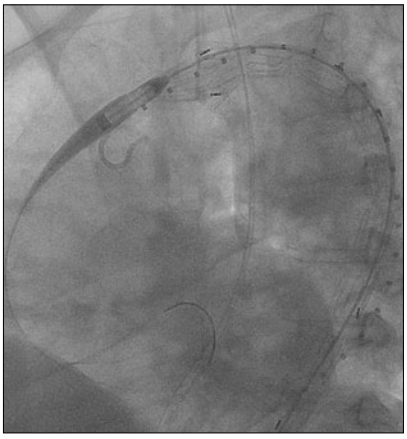

Figure 2. Intraoperative fluoroscopy showing sheath withdrawal after the first stent, allowing exact deployment and the ability to realign the graft if needed before complete deployment.

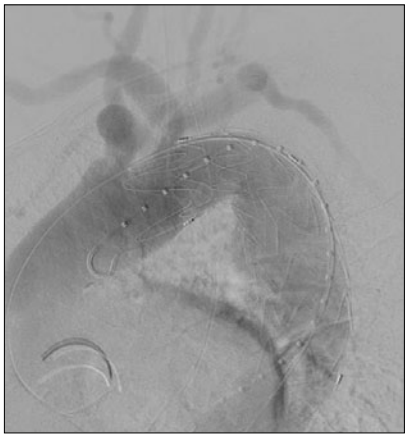

Figure 3. Intraoperative angiogram showing placement of the thoracic graft abutting the left subclavian artery without any bird-beaking and excellent apposition in a tight, short curve.

Figure 4. Postoperative CT angiogram 3D reconstruction showing no evidence of endoleak and exceptional conformability of the graft.

angiogram as a reference. The spiral support strut automatically took favor to the outer curve during sheath advancement. The device was partially unsheathed uncovering the first stent, and we obtained another angiogram for confirmation of location and placement (Figure 2). We were able to realign the device for accurate landing at the left subclavian artery, and once satisfied with positioning, released the remainder of the device. No additional maneuvers, such as significantly dragging or advancing the device, were necessary to obtain the desired placement after deployment. The bare stents were released, and the deployment device was resheathed and removed. We placed another device, 36 X 32 X 150 mm, distally after ensuring adequate overlap with similar precision. A completion angiogram was obtained, showing excellent apposition of the stent without bird-beaking proximally in the acute angle and no evidence of endoleak (Figure 3), which was confirmed on a postoperative CT angiogram (Figure 4). The patient did well and was discharged home on the third day after an uneventful postoperative course.

CONCLUSION

The Bolton Medical Relay Plus device impresses with excellent apposition and conformability in a tight thoracic arch. In addition, the deployment technique allows precise placement and the ability to adjust the stent. Moreover, the wide variety of sizes, lengths, and opportunity for tapered grafts allows inclusion for a wide variety of patients. ■

Martyn Knowles, MD, is a fellow physician in the Department of Vascular and Endovascular Surgery at the University of Texas–Southwestern in Dallas, Texas. He has disclosed that he has no financial interests related to this article. Dr. Knowles may be reached at (214) 645-0550; martyn.knowles@phhs.org.

Carlos H. Timaran, MD, is the Chief of Endovascular Surgery in the Department of Vascular and Endovascular Surgery at the University of Texas–Southwestern in Dallas, Texas. He has disclosed that he has no financial interests related to this article. Dr. Timaran may be reached at (214) 645-0550; Carlos.Timaran@UTSouthwestern.edu.