Alternative TEVAR Access

A novel approach for patients in whom femoral artery access is not a viable option.

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Thoracic endovascular aneurysm repair (TEVAR) using endovascular stents has revolutionized the treatment of descending thoracic aortic aneurysms. Advantages of TEVAR include the avoidance of an open operation, reduced hospital stay, and reduced morbidity and mortality rates. Disadvantages include an increase in cost due to the expense of these grafts and an increase in follow-up imaging for evaluation of proper graft location, endoleaks, or aneurysmal expansion. Regardless, TEVAR remains an attractive option for managing descending thoracic aortic aneurysms.

Traditionally, EVAR has been performed with insertion of a stent graft either through the femoral or iliac artery or through an abdominal side graft in patients with extensive aortoiliac disease. This article describes a novel approach to TEVAR in a patient with aortoiliac disease and a hostile abdomen due to multiple abdominal surgeries.

CASE REPORT

An 82-year-old man presented with chest, abdominal, and back pain. His past medical history was significant for peripheral arterial disease with bilateral stenosis of the common femoral arteries that was treated with an aortobifemoral bypass. His aortobifemoral bypass was occluded on presentation, and he only had mild claudication symptoms. He had a history of multiple abdominal surgeries including a total gastrectomy, colectomy, and small bowel resection with lysis of adhesions, as well as a history of a left lower extremity deep venous thrombus managed with warfarin. A radiocontrast computed tomography scan demonstrated a perforated aortic ulcer in the middescending thoracic aorta with a pseudoaneurysm in the left thoracic cavity (Figure 1). Complicating the case further was the fact that the patient did not want to undergo a blood transfusion if needed because of religious beliefs. Given the bilateral femoral and iliac artery occlusion and the multiple abdominal operations, retrograde placement of a stent was not an option. Therefore, an axillary anterograde approach was chosen.

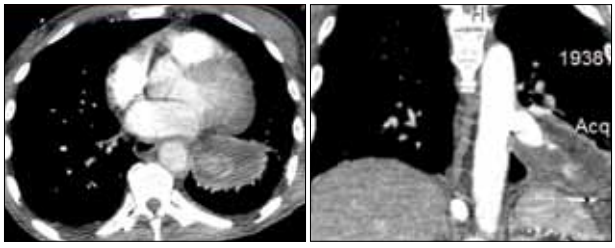

Figure 1. Thoracic computed tomography images acquired before surgery showing the pseudoaneurysm.

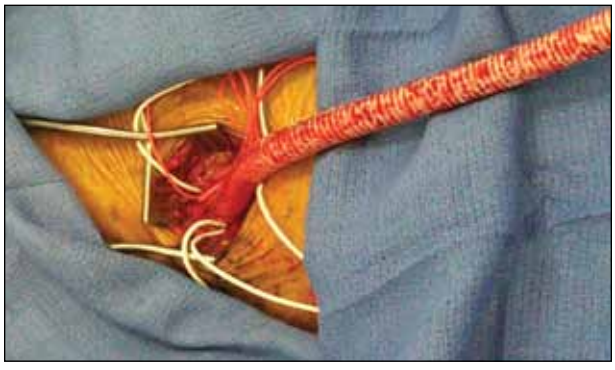

Figure 2. The Dacron graft in an end-to-side configuration sutured to the right axillary artery.

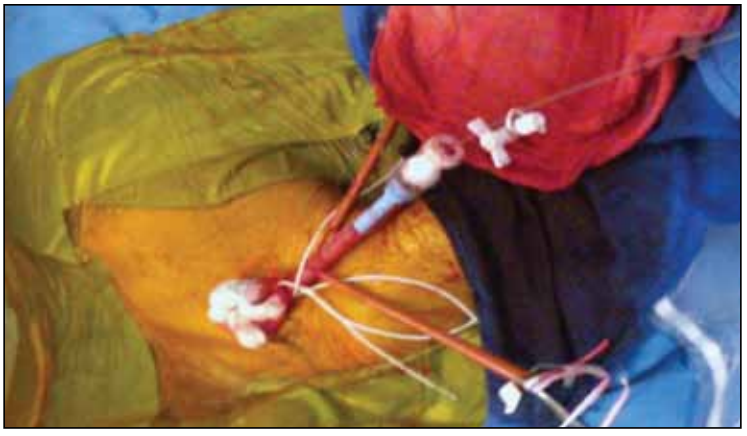

Figure 3. The DrySeal sheath in place inside the conduit with the Lunderquist wire being placed.

After consent was obtained, the patient was immediately taken to the operating room for TEVAR. The right axillary artery was exposed using an infraclavicular incision along with dissection of the pectoralis major and minor. After anticoagulation with heparin, the right axillary artery was clamped both proximally and distally before creation of an arteriotomy. Next, a 10-mm X 30-cm Dacron graft was sutured with a 5–0 prolene suture in an end-to-side configuration for use as a conduit (Figure 2). A 22-F DrySeal sheath (Gore & Associates, Flagstaff, AZ) was then introduced inside the conduit (Figure 3). Aortography was performed, showing the aortic pseudoaneurysm (Figure 4). A 34-mm X 10-cm TAG thoracic device (Gore & Associates) was introduced over a Lunderquist wire (Cook Medical, Bloomington, IN) to the appropriate location. After confirming the location, the device was deployed without difficulty. Final aortography showed resolution of the pseudoaneurysm with no flow into the aneurysmal sac (Figure 5). The axillary exposure site was closed in the normal fashion without issue.

Figure 4. Preoperative angiography detailing the thoracic pseudoaneurysm.

The patient was extubated and transferred to the critical care unit in stable condition. Postoperative imaging showed the appropriate location of the graft with excellent aneurysm exclusion (Figure 6). The postoperative course was unremarkable, and the patient was discharged on postoperative day 7. He did not require any blood products. In addition, he had normal lower extremity function and no other neurologic sequelae.

DISCUSSION

The preferred access for endovascular procedures is the retrograde approach using the femoral artery. However, situations exist in which the retrograde approach is not an option due to the small diameter, occlusion, or tortuosity of the anatomy. In addition, endovascular repair through the abdomen can also be challenging in patients with multiple previous abdominal surgeries, obese patients, or patients with other abdominal pathology.

In comparison to retrograde endovascular repair, axillary anterograde repair maintains most of the same benefits, such as less blood loss, and eliminates the need for an aortic cross-clamp. This technique can be conducted just as quickly once the operator becomes comfortable with the axillary dissection. In combination with the DrySeal sheath, the axillary anterograde approach allows for the safe placement of a stent with minimal blood loss. Even in the most complex patients, such as this one who was on warfarin and would not accept a blood transfusion, this system can be successful. One potential complication is stroke (especially if

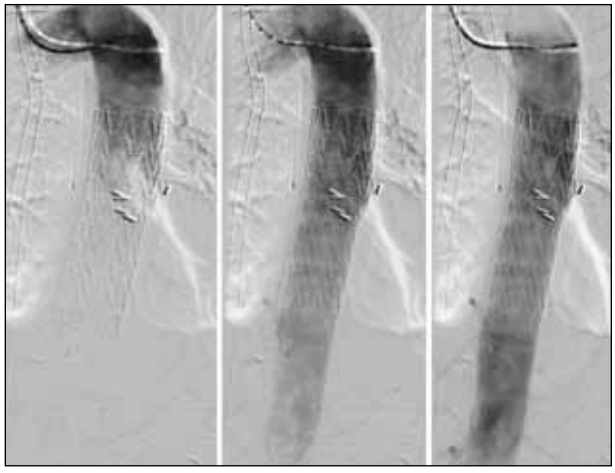

Figure 5. Angiography after stent placement showing a lack of flow into the aneurysm sac.

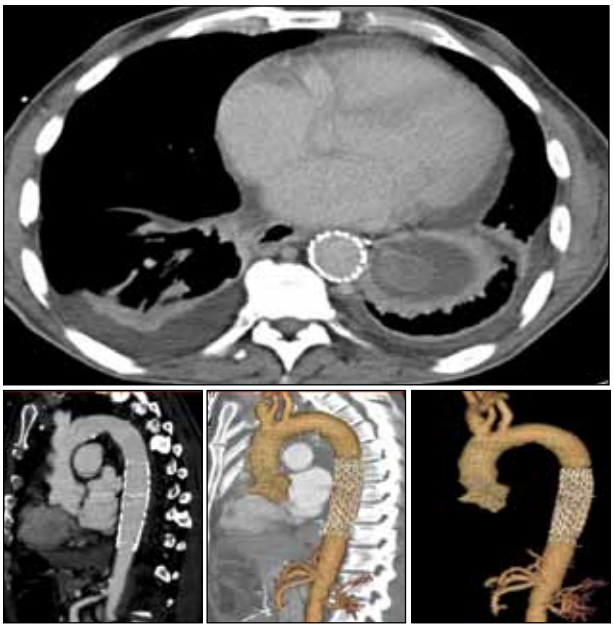

Figure 6. Postoperative computed tomography scan with three-dimensional reconstructions showing stent placement in the thoracic aorta.

using the right axillary artery) due to the closer proximity of the aortic arch and its branches. However, this is mostly a theoretical risk and has not been an issue at our institution. ■

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