

Endovascular repair of a thoracoabdominal aortic aneurysm using ascending aorta as an access route in Leriche syndrome: a case report

Leriche sendromunda torakoabdominal aort anevrizmasının çıkan aortun erişim yolu olarak kullanılması suretiyle endovasküler tamiri: Olgu sunumu

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In this article, we present a successful thoracic endovascular repair in a 62-year-old male case with totally occluded infrarenal aorta. We believe that the need of using ascending aorta as an access route in endovascular repair is extremely rare.

Key words: Aneurysm; endovascular procedures/stents; peripheral vascular disease.

In recent years, endovascular procedures have become the treatment of choice for thoracic and certain types of thoracoabdominal aortic aneurysms (TAAAs). The most common contraindications for endografting of the thoracic aorta is an insufficient amount of proximal and distal sealing zones and the failure to introduce the graft through the femoral artery. We report here the successful endografting of a Crawford type 1 TAAA with infrarenal occlusion of the aorta.

CASE REPORT

A 62-year-old male patient was admitted to our hospital with severe back pain and a previous diagnosis of type 1 TAAA. He also had suffered from severe bilateral thigh, buttock, and calf claudication for several years. The patient was operated on in another hospital for his infrarenal aortic occlusion and underwent an aortobifemoral bypass graft via a retroperitoneal approach two weeks prior to being admitted to our facility. His medical history was notable for severe chronic obstructive pulmonary disease (COPD), hypertension, and congestive heart

Bu yazıda, infrarenal aortu tam tıkalı olan 62 yaşında bir erkek olguda başarılı bir endovasküler torasik tamir uygulaması sunuldu. Endovasküler tamirlerde erişim yolu olarak çıkan aortun kullanılması gerekliliğinin oldukça nadir olduğu kanısındayız.

Anahtar sözcükler: Anevrizma; endovasküler işlemler/stentler; periferik vasküler hastalık.

failure, and he also had a hostile abdomen because of multiple previous abdominal operations. Computed tomography (CT) angiography and intra-arterial digital subtraction angiography (DSA) (Figure 1a, b) revealed a 11 cm type 1 TAAA extending from the middle of the descending aorta that was 1.2 cm proximal to the celiac artery. In addition, the patient's infrarenal aorta was stenotic proximal to his new aortobifemoral graft. Given the comorbid conditions, we decided that endovascular treatment was appropriate. Due to his new aortobifemoral graft, stenosis proximal to this graft, and the distance to the celiac artery, we performed the procedure through the ascending aorta in an antegrade fashion in the cardiovascular surgery operating room with a mobile Avantic C-Arm (Siemens AG, Erlangen, Germany). Under general anesthesia, a median sternotomy was performed, and 5000 IU of heparin was given intravenously. A 10 mm Dacron graft was then sewn to the ascending aorta. An 8F introducer was placed through the Dacron graft, and a hydrophilic 0.035 inch guidewire (Terumo Medical Corporation, Tokyo, Japan) was advanced



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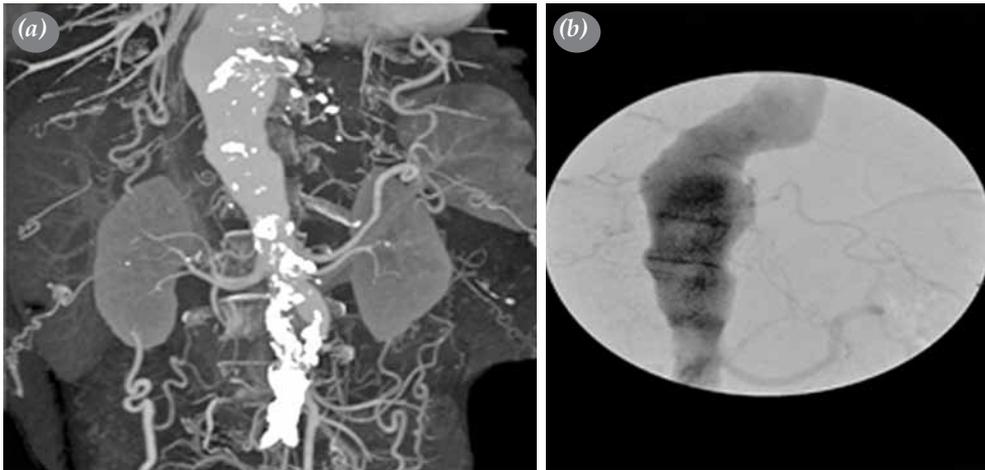


Figure 1. (a) Preoperative computed tomography angiography and (b) digital subtraction angiography demonstrated a large type 1 thoracoabdominal aortic aneurysms 1.2 cm proximal to the origin of celiac artery.

through the introducer. Next, a Backup Meier steerable guidewire (Boston Scientific Corporation, Natick, MA, USA) was introduced to the abdominal aorta via an exchange system. Then a 32 mm x 20 cm Valiant Captivia thoracic stent graft delivery system (Medtronic, Minneapolis, MN, USA) was advanced under fluoroscopy over an extra-stiff guidewire and deployed with its distal bare edge just barely opposing the ostium of the celiac artery. A post-procedural angiogram demonstrated successful exclusion of the aneurysm with no endoleak, and the flow of the celiac artery was spared. The patient had an uneventful recovery and was discharged on the third postoperative day. In addition, at the one- and nine-month follow-ups, the patient had a stable TAAA with no signs of an endoleak (Figure 2).



Figure 2. Follow-up computed tomography angiograms at nine months showed no evidence of an endoleak and continued patency of the visceral arteries.

DISCUSSION

The first successful open repair of a thoracic aortic aneurysm was reported in 1953 by DeBakey and Cooley, and the introduction of thoracic endovascular aortic repair (TEVAR) for the descending thoracic aorta was reported by Dake et al.^[1] in 1994. Since then, several reports have described the intermediate-term outcomes of TEVAR.^[2] These have been generally promising with the early benefits of decreased morbidity and mortality compared with open repair.^[3,4] However, the use of endovascular techniques for TAAAs still has limited applications due to difficulties with blood flow preservation in the renal and visceral arteries. Another major problem with endografting is the presence of adverse features in an individual's vascular anatomy, such as stenosis in the iliac arteries.^[5]

Recently fenestrated devices and hybrid procedures, including visceral bypass grafting combined with endografting, have been applied to eliminate the risks associated with conventional surgical repair in difficult cases.^[6] Whereas the management of stenotic iliac arteries in endografting is still controversial, dilating these arteries with covered stents prior to endografting along with direct retroperitoneal iliac conduits have been used successfully in some cases. Our patient also received a retroperitoneal aortobifemoral graft 15 days prior to his admission to our center. Given that his recent surgery and calcifications were proximal to his new graft, we decided not to attempt to deliver the graft via the femoral route.

One of the most common exclusion criterias for endografting of the thoracic aorta is an insufficient

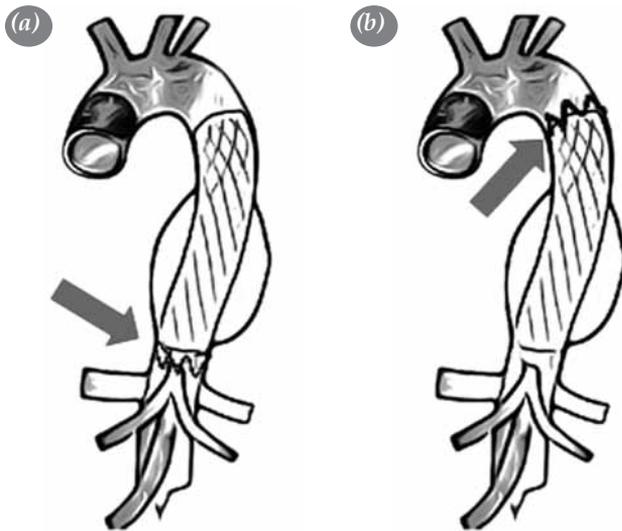


Figure 3. (a) Stent graft deployment from the distal end. (b) Stent graft deployment from the proximal end.

proximal and/or distal sealing zone. The minimal safe sealing length in the thoracic aorta is 2 cm. In the proximal end, the sealing zone can be extended by covering the left subclavian artery, and this can be achieved with or without a carotid-subclavian bypass. In the distal end, the distance between the celiac artery and aneurysm also becomes an important issue. Most stent grafts are deployed from the proximal end by retracting an outer sheath, and it is difficult to predict exactly where the distal margin of the stent graft is going to land. Therefore, we thought that we would have a better chance of preserving the patient's celiac artery if we attempted to deliver the graft through the ascending aorta in a retrograde manner and open the graft from the distal end.^[7]

To our knowledge, this is the first case in the literature in which a sternotomy was used as an access route in the case of extensive calcified atherosclerotic disease of the infrarenal abdominal aorta. We did not attempt to use the subclavian artery for such a large introducer sheath with the current devices. Another option might have been to use a partial sternotomy instead of a full sternotomy.

In conclusion, endovascular treatment of aortic aneurysms in the setting of severe peripheral arterial

disease is not a common occurrence. The complex iliac anatomy continues to be a limiting factor and carries a risk of complication that includes hemorrhage, rupture, and dissection. Our case illustrates the feasibility of placing an endograft via the ascending aorta, which safely and effectively controlled the possible complications in our patient. In addition, this procedure also allows for the precise placement of the distal landing zone in aneurysms near the visceral arteries.

Declaration of conflicting interests

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