Case Report

Emergency Endovascular Repair of a Ruptured Descending Thoracic Aortic Aneurysm in an Octogenarian: Report of a Case

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Emergency conventional surgical repair of the descending thoracic aorta remains a therapeutic challenge and is associated with a high risk of mortality. We describe a case of ruptured descending thoracic aortic aneurysm in an 87-year-old man who presented with chest and back pain. The patient underwent successful endovascular repair of the lesion with the use of Gore TAG thoracic endoprosthesis. Post-procedure computed tomography showed complete exclusion of the aneurysm without endoleaks. Endovascular repair is feasible and can be effective in such cases.

Key words: endovascular repair, thoracic aortic rupture, octogenarian, emergency

INTRODUCTION

An open surgical procedure to implant a prosthetic vascular graft is the conventional treatment for thoracic aortic aneurysm (TAA). However, this approach, which may require the use of cardiopulmonary bypass, is associated with substantial morbidity and mortality. Possible major postoperative complications include stroke, paraplegia, respiratory failure, and renal failure.^{1,2)} Moreover, TAA occurs primarily in older patients, who are more likely than younger people to have comorbid conditions that can adversely affect the repair outcome.³⁾ Possible advantages of endovascular over surgical management of acute TAA rupture include a reduction in procedural complications. Emergency endovascular repair may

be particularly suitable for elderly patients with serious coexistent disease.^{4,5)} We describe an emergency endovascular repair of a ruptured descending TAA in an octogenarian patient at high risk of complications from an open surgical procedure.

CASE

A 87-year-old man was transferred to our hospital about 1 hour after the onset of chest and back pain. He was awake and responsive but hemodynamically unstable (arterial pressure: 80/40 mmHg). Laboratory investigations showed anemia (hematocrit: 26.6%, hemoglobin: 9.3 g/dl). The patient had previously undergone coronary artery bypass grafting, as well as aneurysmectomy and implantation of a straight prosthetic graft to treat an abdominal aortic aneurysm.

Computed tomography (CT) scanning with 3-dimensional reconstruction revealed a 9-cm-diameter ruptured descending TAA and large amounts of blood in the intrapleural and mediastinal cavities (**Fig. 1**). An endovascular approach was chosen to repair the lesion because the patient was considered to have an increased risk of complications from open surgery. The endovascular repair was performed 3 hours after the onset of symptoms.

The procedure was done with the patient under gener-

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Fig. 1 Preprocedure imaging findings. CT scan with 3-dimensional reconstruction shows a 9-cm-diameter ruptured descending thoracic aortic aneurysm and large amounts of blood in the intrapleural and mediastinal cavities.

al anesthesia in an operating room equipped with an angiographic system and prepared for an emergency conversion to open surgery. Access to the left femoral artery for angiography was obtained percutaneously. The right external iliac artery was surgically exposed by means of a retroperitoneal approach. Heparin (5000 U) was administered, and a stiff Amplatz guidewire (Boston Scientific, Natick, MA, USA) was advanced through the right external iliac artery to the ascending aorta. Over this wire, a 22F introducer sheath with a silicon pinch valve (WL Gore & Associates, Flagstaff, AZ, USA) was inserted into the abdominal aorta under fluoroscopic guidance. An angiogram was obtained. A Gore TAG thoracic endoprosthesis (34 × 200 mm; WL Gore & Associates) was then advanced and deployed at a level just proximal to the aneurysm.

The stent-graft was found to be insufficiently long proximally, so a second device (34 × 150 mm) was inserted, overlapping the first one. Angioplasty using a Gore Tri-Lobe balloon (WL Gore & Associates) was employed to seal the endoprostheses against the aneurysm neck and at the overlap between the two devices. A final angiogram showed total exclusion of the thoracic aneurysm

without endoleaks. The entire procedure required 83 minutes.

The patient's post-procedure course was uneventful; he had no cardiac or respiratory difficulties and no neurologic complications (including neither a stroke nor spinal cord ischemia). He was discharged from the hospital on the 26th day after treatment. At the time of discharge, CT scanning confirmed correct position of the stent-graft; exclusion of the aneurysm without endoleaks; and a substantially decreased amount of blood in the intrapleural and mediastinal cavities (**Fig. 2**).

DISCUSSION

The treatment of acute lesions of the descending thoracic aorta on an emergency basis remains a challenge. Associated serious comorbid conditions are common in patients with these lesions and substantially influence early outcomes, including perioperative mortality. Crawford et al.³⁾ reported a 30-day mortality rate of 12% in low-risk patients with a ruptured descending TAA but a rate of 44% in patients with the same lesion and severe coexistent disease. Postoperative onset of a debilitating

Fig. 2 Post-procedure imaging findings. CT scan with 3-dimensional reconstruction shows correct position of the endoprosthesis; exclusion of the aneurysm, without endoleaks; and substantially decreased amounts of blood in the intrapleural and mediastinal cavities.

condition such as paraplegia occurs more often after emergency operations on the thoracic aorta than after elective procedures.⁵⁾ Moreover, respiratory insufficiency, renal failure, and bleeding requiring a second intervention are common after the conventional surgical approach to thoracic aorta repair.^{1,2)}

Endovascular stent-grafting of the thoracic aorta was introduced in the early 1990s as part of an effort to improve perioperative outcomes of treatment of lesions.⁶⁾ The main advantages of stent-grafting over surgery for the repair of TAAs and symptomatic type B thoracic aortic dissections are avoidance of both thoracotomy (with or without cardiopulmonary bypass) and surgical injury to adjacent structures and a markedly shorter procedural time. These factors and the reduction in intensive care unit stay and overall hospitalization time possible with the endovascular approach have been observed to produce improvements in short- and long-term patient survival and decreased morbidity compared with surgery.⁷⁾

The TAG device was the first commercially available endoprosthesis approved by the US Food and Drug Administration for use in TAA repair. A few previous re-

ports have described treatment of a ruptured TAA with this stent-graft.^{5, 8, 9)} The patient in our case had several risk factors that made him a poor candidate for open surgery, including his advanced age and history of coronary artery bypass grafting and abdominal aortic aneurysm repair. Additionally, because his descending thoracic aorta was tortuous, insertion of a rigid prosthesis into the vessel would have been difficult. The TAG device was considered the best option for stent-grafting in this case because of its flexibility and simple deployment mechanism, advantages that are particularly relevant to endovascular procedures in the curved aorta.

Our case shows that endovascular repair of a ruptured TAA is feasible, even in an octogenarian. However, whether this procedure truly represents a valuable alternative to open surgical repair cannot be determined until its costs, generalizability, efficacy, and repair durability are investigated in properly conducted clinical trials with adequate follow-up.

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