SHORT REPORT

Endoluminal Repair of a Complex Tortuous Descending Thoracic Aortic Aneurysm

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Introduction

Thoracic aortic aneurysms (TAA) occur in the population with an incidence of 6 per 10^5 person years.1 If left untreated, 40–50% of patients with non-dissecting TAA will die as a result of aneurysmal rupture.1,2 In the descending aorta, TAA usually have an atherosclerotic aetiology and a fusiform shape.3 Open aneurysm repair with interposition grafting was until recently the only treatment option. The morbidity associated with this procedure is 22% (not including wound complications) with a perioperative mortality of 11.4%.4 In 1994 Dake et al. published their results of the first series of endoluminal repair of TAAs.5 Relative contraindications for the endovascular procedure include inadequacy of vascular access, a high degree of tortuosity of the aorta and unsuitable aneurysm morphology, particularly a wide neck and short anchorage points.5–7 We present a case of a tortuous distal thoracic aortic aneurysm terminating just above the coeliac axis successfully repaired by endovascular exclusion. We outline our techniques for overcoming the technical difficulties presented.

Technical Report

A 63-year-old man who was involved in a motor vehicle accident had an aneurysmal thoracic aorta found incidentally on the chest X-ray performed in the emergency department. A CT scan demonstrated a 6.1 cm thoracic aortic aneurysm extending from the lower descending aorta to 3 cm above coeliac axis. A calibrated aortogram (Fig. 1a and 1b) confirmed the proximal and distal relations of the aneurysm. The abdominal aorta was ectatic but not aneurysmal.

Under epidural anaesthesia to level L1/L2 the patient was placed in the supine position and the right common femoral artery was exposed, with a plan to deploy the graft via this side. The left common femoral artery was cannulated percutaneously for planned angiography. Two pigtail catheters were positioned at the proximal and distal ends of the aneurysm. The lower catheter was used for intermittent bolus injections of contrast during the procedure to precisely define the position of the coeliac axis, and any changes in position brought about by straightening of the tortuous aorta (Fig. 2a). Simultaneous contrast injection through both catheters ameliorated dilution caused by high rates of blood flow in the thoracic aorta. A super-stiff Lunderquist guide wire was used to partially straighten the thoracic aorta (Fig. 2b). After straightening, aneurysm length was confirmed and an Excluder Thoracic Endoprosthesis (W. L. Gore) 20 cm length × 37 mm diameter was deployed taking reference from a point 1 cm above the orifice of the coeliac artery (Fig. 3a). Two 10 cm length grafts were on standby in case proximal or distal overlap was required. The total operative time was 120 min. Three hundred ml of radiographic contrast agent was used over a total screening time of 25.3 min.
Post operatively there were no complications. In particular, despite the contrast load the serum creatinine remained stable at 66±68 μmol/L. CT aortography at 36 h post procedure demonstrated satisfactory positioning of the graft and no endoleak. These findings were confirmed on follow-up CT scan at 3 months post procedure. The patient was discharged on the fourth post operative day.

**Discussion**

Since Dake et al. described endovascular exclusion of TAAs in 1994 several centres have reported initial results with mortality rates of 10–12.5% and one year survivals of 80%.

Up to 60% of the patients
undergoing endovascular procedures are not judged suitable for open surgery.\textsuperscript{8}

Relative contraindications for endovascular repair include close proximity of the left subclavian and coeliac arteries to the aneurysm, inadequate vascular access, unfavourable aneurysm morphology and gross tortuosity of the thoracic aorta.\textsuperscript{5–7} Tortuosity in particular poses several problems. It may make estimation of the true length of the aneurysm difficult as the aneurysm often partially straightens during and after graft deployment. It may cause difficulty when cannulating the graft across the aneurysm and anchoring the graft correctly. Straightening may also cause movement of the origin of major branches, with risk of the graft covering these orifices. The placement of a graft across a very tortuous aneurysm may lead to kinking and subsequent stenosis of the graft. In this case the use of two pigtail angiographic catheters to perform progress bolus angiograms during the procedure and the super-stiff Lunderquist guide wire enabled precise deployment of the graft across an aorta, partially straightened prior to graft deployment.

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Additional Notice

The EXCLUDER Thoracic Endoprosthesis (W. L. Gore) has been suspended from distribution due to concern regarding the incidence of wire fractures in U.S.A. clinical trials.

References


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