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CASE REPORT

A Complication of the Tapered Aortouni-iliac Graft for Endovascular Aneurysm Repair

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Introduction

Endovascular repair of an abdominal aortic aneurysm (AAA) is subject to close monitoring by Vascular Surgeons and Interventional Radiologists, as evidenced by the Registry of Endovascular Treatment of Aneurysms (RETA)¹ in Britain and Eurostar² in Europe. The devices in current use are the straight aortic tube or aortobiiliac stent-grafts and aortouniiliac tapered stent-grafts with contralateral iliac occlusion and femorofemoral bypass. We present a previously unreported complication, which questions the use of thin-walled ePTFE for the latter.

Case Report

Conventional repair of a 7 cm abdominal aortic aneurysm in a 64-year-old gentleman was abandoned when the presence of para-aortic lymphomatous tissue made safe dissection impossible. Histology demonstrated non-Hodgkin's lymphoma, but, after good response to chemotherapy, he was referred to our institution one year later to assess the feasibility for endovascular repair. Angiography demonstrated a suitable proximal neck, 3 cm in diameter and 4 cm long, but with aneurysmal common iliac artery origins extending down to both iliac bifurcations, and external iliac artery diameters of 17 mm. An aortouni-iliac graft with contralateral iliac occlusion and femorofemoral crossover was therefore planned.

Insertion of the stent-graft system was via a left iliac fossa incision, allowing access for the stent deployment system avoiding the tortuous femoral vessels, and a Dacron conduit was attached to the left external iliac artery. An extra-large Palmaz stent was sutured to the proximal end of a thin-walled ePTFE 8 mm graft (Impra UK) which had been predilated proximally to 35 mm, and this was deployed successfully on the second attempt in the infrarenal neck, (on the first attempt, the stent slipped distally, and the ePTFE was removed leaving the stent floating within the sac, as can be seen in Fig. 2). The distal end of the ePTFE, which had been predilated to 15 mm and was drawn through the Dacron conduit, was anastomosed to the left common femoral artery and the left internal iliac artery was surgically occluded. The right external iliac was excluded using a Gianturco Z-stent covered with ePTFE (with the right internal iliac preserved for perfusion of the pelvis), and the femorofemoral crossover graft used 8 mm Dacron. Completion angiography showed exclusion of the aneurysm and distal pulses were palpable.

His recovery was uncomplicated, with a duplex scan on the fifth post-operative day showing complete thrombosis of the aneurysm sac, with no leak and good flow down the graft, which measured 15 mm in diameter. He was discharged home the next day. Clinical follow-up at 1, 3 and 6 months was unremarkable, but a CT scan at one month showed graft diameter of 8 mm below the stent. When seen at one year he complained of claudication in his right thigh, and the initial claudication distance of 500 yards had deteriorated to 200. The ABPI was 0.6 on the right, and 0.7 on the left. A CT scan and abdominal duplex

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Fig. 1. CT scan at thirteen months post repair, with graft diameter of 8 mm.



Fig. 2. Angiogram at fifteen months, demonstrating the shrunken ePTFE and the kink in the graft.

scan confirmed that the aneurysm was excluded, but again showed that the ePTFE had shrunk to 8 mm along its length (Fig. 1). Flow in the crossover graft was of low velocity with low resistance, but there was no focal stenosis. An angiogram demonstrated flow through the graft with no endoleaks, but there was a kink in the graft (Fig. 2) which has since been stented, with improvement of his claudication distance such that he now has no limitations to exercise. He remains under regular review.

Discussion

In our institution, endovascular repair of AAA with the aortouniiliac graft and crossover is reserved for

those patients with iliac artery morphology which excludes them from having commercially available tube or bifurcated stent-grafts, and who are unfit for conventional repair. In this case, endovascular repair was felt to be the safest option, given that the surgeon in the referring institute had previously attempted repair, and the patient had since undergone a treatment course of chemotherapy. There were no aortobiliac systems available suitable for the measurements of the aneurysm, and use of the aortouniiliac system was comparable to that in other centres.³ Whilst aortouniiliac techniques continue to be developed, a recent review of 30 patients indicates that this repair has acceptable morbidity and mortality rates, and, with a follow-up from 1 to 13 months, 88% of grafts were free of complication.⁴ Many combinations of stent and graft material are in use, although Palmaz/PTFE and Gianturco/Dacron systems are the two most commonly used. These have to be made in-house before or at the time of procedure and there is no evidence to suggest any one system might be superior. Extra-thin-walled Dacron can be obtained from the manufacturers, but ePTFE must be predilated to make it thinner and larger. When ePTFE is expanded, it has a remarkable ability to withstand the deformation, and radial expansion of ePTFE up to 500% of its original diameter results in moderate elastic recoil (23%) of the material with no tears and a minimal increase in the internodal distance with little shortening.⁵ Whilst the moderate elastic recoil of dilated ePTFE may ensure adequate fixation of the material when used to cover stents, when used as a free-standing conduit, initial dilation of the ePTFE must allow for the subsequent loss of diameter by elastic recoil.⁵

In the case described, whilst the material was predilated to a diameter greater than that finally required, with good results initially, clearly the significant recoil noted at follow-up is of concern, and it may be possible that as the ePTFE recoiled it lengthened and this may have led to the kinking of the graft. Whilst the solution may be to dilate the ePTFE for longer or to a greater diameter, a commercially available system which is ready to use would be a significant advance in the repair of these aneurysms.

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