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ENDOVASCULAR AND SURGICAL TECHNIQUES

Endovascular Repair of Aortic Pseudoaneurysms

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Introduction

The early incidence of non-infected, anastomotic, pseudoaneurysm formation following aortic grafting is estimated to be 1–6%, rising to 23–27% at 15 years.^{1–3} Such aneurysms predispose to rupture, thrombosis, distal embolisation and fistulation. Open repair is associated with significant morbidity and mortality, especially when performed in the emergency setting.^{1–3}

Patients and Techniques

Patient 1

A 72-year-old male who, 6 months earlier, had undergone tube-graft repair of a ruptured abdominal aortic aneurysm (AAA), was found on review to have an asymptomatic, pulsatile abdominal mass. Past medical history was unremarkable. However, his initial post-operative period had been complicated by pulmonary embolism for which he had just finished warfarin therapy. On examination, he was afebrile. An infection screen was negative, and his full blood count, C-reactive protein level and erythrocyte sedimentation rate were all normal. Duplex ultrasonography demonstrated blood flow within the original aneurysm sac. The presence of a pseudoaneurysm was confirmed by contrast computed tomography (CT). Calibrated angiography revealed a jet

of contrast entering the pseudoaneurysm from the posterior aspect of the proximal anastomosis, which was situated 15 mm below the renal arteries (Fig. 1). The aortic diameter at this point was 34 mm in both transverse and anteroposterior planes, indicating suprarenal extension of aneurysmal disease. A Talent stent graft (length 105 mm, diameter 38 mm, World Medical Manufacturing Corporation, Florida, U.S.A.) was introduced via a left femoral arteriotomy and deployed using fluoroscopy and “road mapping”. The procedure was conducted in the operating theatre under full heparinisation. Complete exclusion of the



Fig. 1. Calibrated angiogram demonstrating a jet (i) of contrast which originates from the upper anastomosis and flows into the old aneurysm sac.

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Figs 2 and 3. Early and late views of calibrated angiogram demonstrating leak of contrast from aortic graft anastomosis, filling of old aneurysm sac, right iliac false aneurysm and internal iliac aneurysm.

pseudoaneurysm was confirmed by anteroposterior and lateral angiography. Contrast CT performed 48 hours postoperatively showed no contrast within the pseudoaneurysm. The patient was discharged on the fourth postoperative day. The patient remains well, and the pseudoaneurysm excluded, one year following the procedure.

Patient 2

A 72-year-old male, who, 12 years previously, had undergone an elective aortobi-iliac graft for AAA,

was found to have a large right internal iliac aneurysm in the course of investigations for rectal bleeding. Past medical history included angina, hypertension, tuberculosis and chronic obstructive airways disease. Spiral CT scan demonstrated contrast entering a large pseudoaneurysm formed by the original AAA sac. Calibrated angiography revealed a jet of contrast entering the pseudoaneurysm from the upper anastomosis, which was located 2 cm below the renal arteries. Contrast was seen to re-enter the right limb of the graft, which appeared to have become completely disconnected from the native right common iliac artery (Figs 2 and 3). Exclusion of the pseudoaneurysm proceeded in three phases. First, the right internal artery aneurysm was coil-embolised as a separate procedure in the angiography suite. Second, a Talent stent graft (length 50 mm, diameter 35 mm) was deployed across the upper anastomosis via a left common femoral arteriotomy. Third, a second Talent stent graft (length 90 mm, diameter 14 mm) was deployed across the right iliac anastomosis via a right common femoral arteriotomy (Fig. 4). Both stent grafts were deployed in the operating theatre under full heparinisation. Completion angiography revealed contrast within the sac, which did not resolve following further balloon dilatation of both stent grafts. Further angiography, including multiple projections, delayed views and selective catheterisation of the superior mesenteric artery, showed no evidence of endoleak from lumbar or the inferior mesenteric arteries, or either end of either stent graft. The leak was therefore attributed to graft porosity. A CT at 48 hours showed no contrast within the pseudoaneurysm. The patient made an uneventful recovery and, six weeks later, underwent anterior resection of a Dukes' C adenocarcinoma. The patient remains well, and the pseudoaneurysm excluded, at 6 months' follow-up.

Discussion

Endovascular stent grafts have been successfully used to exclude true infrarenal aortic, thoracic and iliac aneurysms. However, review of the literature reveals only three previously reported cases of endovascular repair of postoperative, non-infected, anastomotic, aortic pseudoaneurysm.^{4,5} These patients had presented 8, 9, and 17 years following surgery, two had occurred following aortobifemoral bypass for occlusive disease, and they had presented with acute abdominal pain and upper gastrointestinal bleeding, chronic abdominal pain, and as an incidental finding.

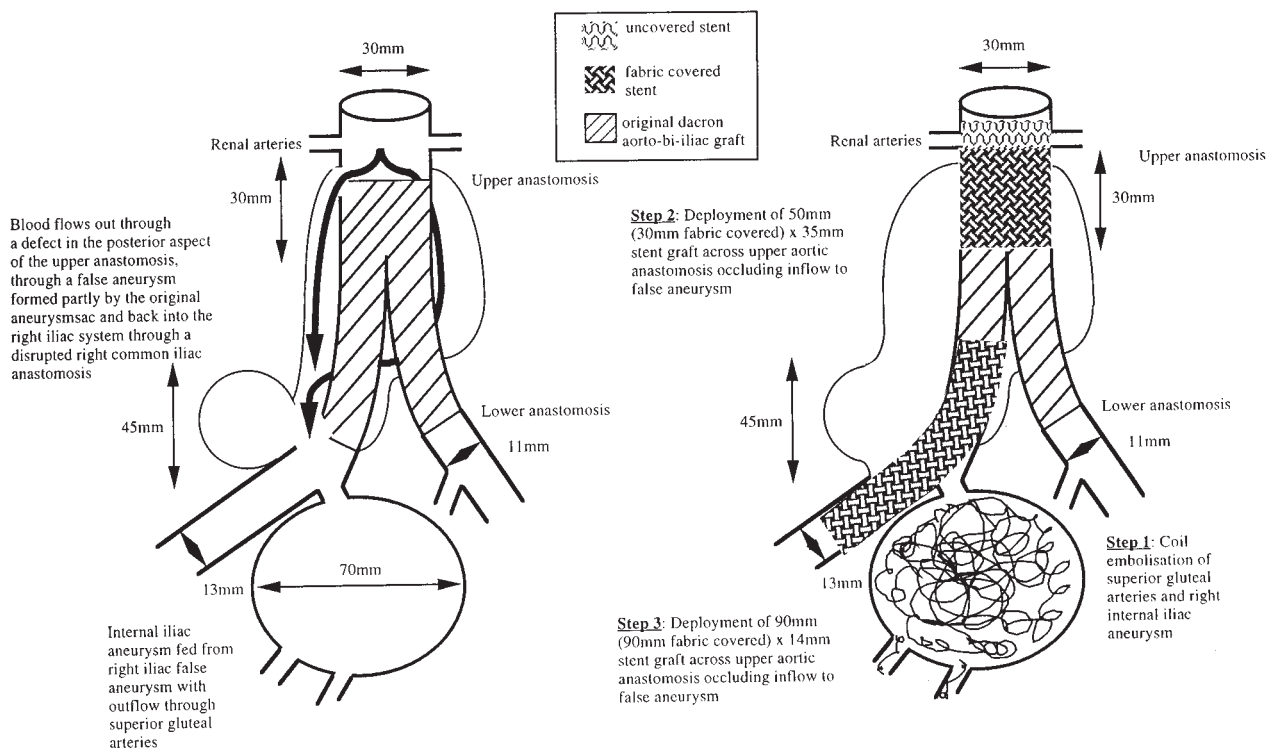


Fig. 4. Diagram illustrating sites of leak and procedure of stent deployment.

Aortic anastomotic aneurysms have been classified into chronic stable (CSAA) and rapidly expanding (REAA) types, with incidences of 1.8% and 0.7% respectively. In patients managed conservatively, the mortality rate due to rupture may be as high as 61%. For this reason, most authors recommend elective surgical repair of symptomatic and/or large CSAA, and urgent open repair of REAA.^{1,6,8} However, Allen and colleagues reported a 21% operative mortality rate in 29 patients undergoing open repair of anastomotic aneurysm.⁷ Similarly, Mulder reported an overall operative mortality of 7.6%, rising to 24% in patients undergoing emergency procedures.¹ The two cases presented here illustrate the feasibility, clinical- and cost-effectiveness, and safety of endovascular repair of non-infected, postoperative, aortic pseudoaneurysms. Given the morbidity, mortality and costs of open repair, endovascular stent grafting is likely to become the treatment of choice for this condition.

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