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ENDOVASCULAR AND SURGICAL TECHNIQUES

Endovascular Exclusion of Juxtarenal Anastomotic Pseudoaneurysm

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Introduction

Aortic anastomotic pseudoaneurysm is generally considered to be a rare and dangerous complication of aortic reconstruction,[1] although the true incidence,[2–8] pathogenesis[9,10] and natural history remain largely unknown. Aortic anastomotic aneurysms are often categorised together with true aneurysms of the residual aorta and referred to as para-anastomotic aneurysms,[5,6] juxtaanastomotic aneurysm,[7] or aortic anastomotic failure.[4] Both types or recurrent aortic aneurysm occur with steadily increasing frequency long after the original operation,[2–8] both are usually asymptomatic,[5,7] both can lead to life threatening complications,[8] and both call for some potentially difficult reoperative surgery. Quoted mortality rates vary widely,[2–4, 6–8] especially if the results of emergency operations are included, but morbidity is usually high,[4,6,7] possibly due to the proximity of the renal arteries.[4,7]

Under these circumstances, endovascular exclusion by transfemoral implantation of a stent-graft offers several potential advantages. With the endovascular approach, access to the arterial tree is gained at a remote location, and there is no need to dissect or clamp the upper abdominal aorta and its visceral branches. Endovascular exclusion of traumatic pseudoaneurysm[11] and popliteal anastomotic aneurysm[12] have been reported, but this is the first reported case in which endovascular stent-graft technology has been applied to anastomotic aortic aneurysm.

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Case Report

A 79-year-old man was admitted for acute epigastric pain. Eight years previously he had undergone abdominal aortic aneurysm repair with a tube graft of knitted Dacron. Computerised tomography (CT) revealed a large retroperitoneal mass, and a pseudoaneurysm arising from the anterior aspect of the proximal anastomosis (Fig. 1). The stump of native aorta, between the renal arteries and the mouth of the pseudoaneurysm, was short and angulated anteriorly. These findings were later confirmed by angiography.

With the provisional diagnosis of ruptured aortic pseudoaneurysm, the abdomen was explored through a transverse, transperitoneal incision. The retroperitoneal mass proved to be comprised of oedema and induration, not blood as suggested by CT. Nevertheless, the presence of the mass and many adhesions from the previous surgery prevented exposure of the aorta and its visceral branches, to such a degree that proximal aortic control would have required a thoracotomy. Attempts at operative repair of the pseudoaneurysm were abandoned, the abdomen was closed, and the patient was evaluated for endovascular repair.

Endovascular exclusion of the aneurysm was performed in the operating room under general endotracheal anaesthesia. The prosthesis consisted of two Gianturco Z-stents and a 5cm long segment of 34mm graft (Cooley VerisoftR, Meadox Medicals, Inc., Oakland, NJ, U.S.A.), which had been ironed to remove crimping. The first intraoperative angiogram, after deployment of the stent graft, showed perigraft leak and angulation of the proximal stent relative to the long axis of the implantation site in the native aorta.

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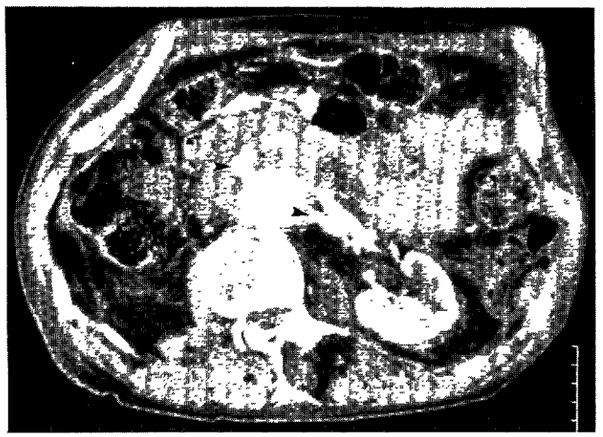

Fig. 1. Trans-axial view of a contrast enhanced spiral computerised tomogram, showing the retroperitoneal mass, the pseudoaneurysm (arrow), and the proximity of the renal artery (arrow).

This was corrected by gentle inflation of two cardiac valvuloplasty balloons, placed side by side. The final angiogram showed no perigraft leak, unimpeded flow into both renal arteries, and the proximal stent in good position. An uncovered portion of the stent was at the same level as the left renal artery orifice, as intended.

The postoperative course was complicated by an episode of upper gastrointestinal haemorrhage from a gastric ulcer. Deep venous thrombosis, occurring 1 month after operation, was treated with coumadin despite the history of bleeding. CT, performed 2 months after operation, showed complete resolution of the pseudoaneurysm and surrounding mass (Fig. 2).

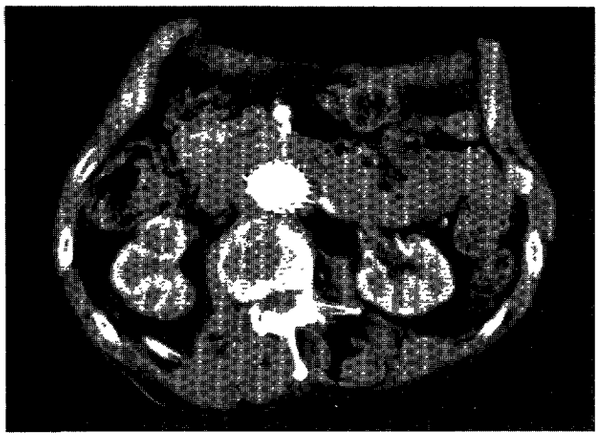

Fig. 2. A repeat study 2 months after endoluminal exclusion, showing resolution of the pseudoaneurysm and retroperitoneal mass.

Discussion

Most aortic anastomotic aneurysms are asymptomatic, and the diagnosis is often made as an incidental finding during investigation for an associated femoral pseudoaneurysm.[5–7] Acute epigastric pain is an unusual presentation, which in this case contributed to the mistaken impression that the aneurysm had ruptured.

The reported mortality of conventional operative repair is generally low when cases of graft infection and gastrointestinal involvement are excluded,[2–4, 6–8] but few patients have the extensive retroperitoneal oedema, seen in this case, which compromised arterial exposure and proximal control to such a degree that conventional operative repair was considered to be too hazardous.

The decision to proceed with endovascular repair was made in the light of the patient's rather limited options. Preoperative imaging had shown the segment of native aorta between the false aneurysm and the renal arteries to be short and angulated. Under these circumstances, proximal stent implantation is often challenging and this proved to be the case. Sufficiently accurate placement was only possible through repeated visualisation of the renal arteries, balloon inflation was required to align the proximal stent with the angulated segment of aorta, and secure haemostatic implantation could only be achieved by placing an uncovered portion of the stent over the orifice of left renal artery. However, endovascular exclusion of the pseudoaneurysm was unaffected by any of the factors that had precluded conventional surgical repair. This illustrates a fundamental difference between endovascular and conventional techniques. The feasibility of an endovascular technique depends mainly on luminal anatomy, while the feasibility of a conventional surgical technique depends mainly on extraluminal anatomy. In addition, whilst conventional surgery allows direct inspection and replacement of infected graft, endovascular treatment does not. It is unlikely that endovascular repair would be a durable solution in the presence of overt graft infection, since the infection is likely to persist and spread. The patient reported here had no signs of infection at the time of presentation and none when seen at follow-up 2 months after repair.

References

1 Goldstone J. Anastomotic aneurysms. In: Bernhard VM, Towne JB, eds. *Complications in vascular surgery.* St Louis: Quality Medical Publishing. 1992: 87–99.

2 KRAUS TW, PAETZ B, HUPPT, ALLENBERG JR. Revision of the proximal aortic anastomosis after aortic bifurcation surgery. *Eur J Vasc Surg* 1994; **8**: 735–740.
3 MCCANN RL, SCHWARTZ LB, GEORGIADE GS. Management of abdominal aortic graft complications. *Ann Surg* 1993; **216**: 729–734.
4 HAGINO RT, TAYLOR FUJITANI RM, MILLS JL. Proximal anastomotic failure following infrarenal aortic reconstruction: late development of true aneurysms, pseudoaneurysms, and occlusive disease. *Ann Vasc Surg* 1993; **7**: 8–13.
5 EDWARDS JM, TEFFEY SA, ZIERLER RE, KOHLER TR. Intraabdominal paraanastomotic aneurysms after aortic bypass grafting. *Vasc Surg* 1992; **15**: 344–353.
6 ALLEN RC, SCHNEIDER J, LONGENECKER L, SMITH RB 3d, LUMSDEN AB. Paraanastomotic aneurysms of the abdominal aorta. *J Vasc Surg* 1993; **18**: 424–432.
7 CURL GR, FAGGIOLI GL, STELLA A, D'ADDATO M, RICOTTA JJ. Aneurysmal change at or above the proximal anastomosis after infrarenal aortic grafting. *J Vasc Surg* 1992; **16**: 855–860.
8 GAWENDA M, PROKOP A, SORGATZ S, WALTER M, ERASMI M. Anastomotic aneurysms following aortofemoral vascular replacement. *Thorac Cardiovasc Surg* 1994; **42**: 51–54.
9 DENNIS JW, LITTOOY FN, GREISLER HP, BAKER WH. Anastomotic pseudoaneurysms: A continuing late complication of vascular reconstructive procedures. *Arch Surg* 1986; **121**: 314–317.
10 KAEBNICK HW, BANDYK DF, BERGAMINI TM, TOWNE JB. The microbiology of explanted vascular prostheses. *Surgery* 1987;**102**: 756–762.
11 MARIN ML, VEITH FJ, PANETTA TF *et al.* Transluminally placed endovascular stented graft repair for arterial trauma. *J Vasc Surg* 1994; **20**: 466–473.
12 DORROS G, BATES M, KUMAR K. Percutaneous deployment of a polytetrafluoroethylene (PTFE) graft to repair a pseudoaneurysm produced by a graft to graft anastomotic dehiscence. *Cathet Cardiovasc Diagn* 1994; **32**: 372–375.

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