Combined Surgical and Endovascular Treatment of Pseudoaneurysms of the Visceral Arteries and of the Left Iliac Arteries after Thoracoabdominal Aortic Surgery

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Introduction

Aortic para-anastomotic pseudoaneurysm (AP) is a clinical entity recognised with increasing frequency, reoperation being associated with high operative mortality rates.1 An alternative procedure to regrafting procedure has been successfully recently employed in our patient.

Technique and Results

A 60-year-old man who 10 years earlier underwent replacement of a thoracoabdominal type B dissecting aortic aneurysm with a Dacron graft, was admitted for an 8 cm pseudoaneurysm involving the coeliac axis, the superior mesenteric artery (SMA) and the right renal artery, and a 3 cm pseudoaneurysm involving the left iliac arteries (Fig. 1). During the primary procedure, the coeliac axis, the SMA and the right renal artery were anastomosed as a single inclusion patch, and the left renal artery separately. A bifurcated graft was then anastomosed to the iliac arteries.

The patient had a history of heavy smoking, alcohol abuse, severe, untreated hypertension, pneumonia, and gastric resection for gastric bleeding.

During the last year, the patient complained of several episodes of abdominal and right flank pain associated with vomiting and weight loss of about...
10 kg which resulted in cachexia. The pseudoaneurysm involving the visceral arteries showed a continuous increase in size. Eventually, the right renal artery occluded (Fig. 1), although creatinine levels remaining within the normal range. Spirometry showed marked reduction in vital capacity (50%) and FEV₁ (74%). No sign of prosthesis infection was present. Because of his poor general condition contraindicating formal aortoiliac regrafting, a combined surgical and endovascular treatment was planned.

Through a midline, transperitoneal approach, the AP was exposed as well as the coeliac axis, the SMA and the left renal artery. A saphenous vein graft was anastomosed to the right limb of the previously placed prosthesis in an end-to-side fashion. The SMA was ligated and cut as close as possible to the AP and an end-to-side anastomosis to the vein graft was carried out. The arterial stump was oversewn. Then, the coeliac artery was ligated as close as possible to the AP and an end-to-side anastomosis to the vein graft was carried out. A second saphenous vein graft was anastomosed to the first vein graft in an end-to-side fashion and, then, an end-to-end anastomosis to the left renal artery was carried out (Figs 2 and 3) with a renal ischaemia time of 20 min. The blood flow as measured by a transit time flowmeter was 1 L/min into the proximal vein graft, 300 ml/min into the graft feeding the left kidney and 700 ml/min into the vein graft feeding the coeliac axis and the SMA. Postoperatively, serum creatinine levels were normal. On the 5th postoperative day, the patient underwent endovascular treatment of the pseudoaneurysms. Preplacement angiography showed a minor leak from the coeliac axis despite it was ligated during surgery. Coil embolisation of the coeliac axis and of the left internal iliac artery was performed. A 34 mm stent-graft was inserted into the aortic prosthesis and a 16–12 mm stent-graft into the left common and external iliac arteries (Excluder, W. L. Gore & Associates) (Fig. 3). The final angiogram showed no perigraft leaks. The patient made an uneventful recovery and was discharged on the 19th postoperative day. At 6-month follow-up, the patient was asymptomatic and gained 6 kg weight.

**Discussion**

The choice of suture material (silk, braided polyester), prosthesis dilatation (Dacron), type of anastomosis (end-to-side), bypass grafting for lower limb ischemia, vessel versus graft compliance mismatch, infection, complicated postoperative course and α₁-antitrypsin deficiency have been found to be risk factors associated with the development of para-anastomotic pseudoaneurysms which are usually detected more than 8 years after aortic surgery.¹

Before the introduction of endovascular stent-grafting, surgical regrafting was the only method of repair. However, surgical treatment of this condition, both in elective and emergency setting, is associated with high morbidity and mortality rates.²⁻³ It is likely that the operative risk is higher in those APs involving the visceral arteries as suggested by several failed attempts described in the literature.

van der Molen et al.³ reported a case of para-anastomotic pseudoaneurysm of the supracoeliac abdominal aorta which developed 6 year after aortorenal bypass reconstruction. The attempt to aortic regrafting with revascularisation of the SMA was not successful. Lundblom et al.² reported a pseudoaneurysm of the suprarenal aorta in a patient who 10
years earlier underwent graft replacement of a type III thoraco-abdominal aortic aneurysm. This patient underwent a combined surgical and endovascular approach similar to that herein described, but their patient died postoperatively probably because of visceral ischaemia.2

Interestingly, Inoue et al.3 have successfully inserted a branched stent-graft for the management of an AP close to the coeliac axis. However, the endovascular approach alone would not have been feasible for a pseudoaneurysm involving several abdominal aortic branches as in the patient herein reported.

This observation suggests the feasibility of an endovascular approach in the management of APs involving visceral arteries in poor-risk patients and/or hostile surgical field, provided that an adequate, preliminary visceral revascularisation is carried out.

References