

Case Report

Endovascular repair for acute symptomatic and ruptured abdominal aortic aneurysms

S P Junnarkar, J Reid, L C Johnston, B Lee, R J Hannon, C V Soong

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Since the introduction of endovascular repair of abdominal aortic aneurysm, an increasing proportion of elective asymptomatic patients have been found to be suitable for endovascular repair despite uncertainties over long-term durability and cost benefit. However, one group of patients whose recovery would most likely be improved and in whom postoperative hospital stay would be reduced by this technique are those who present with an acutely symptomatic or leaking abdominal aortic aneurysm. Conventional urgent and

emergency open repair of these patients are associated with significant mortality rates of approximately 20% and 50% respectively.¹ Those who survive may have a protracted recovery, requiring prolonged management in an intensive care unit.

The endovascular technique avoids an abdominal incision and involves the intraluminal placement of stem-grafts via surgically exposed femoral arteries. The graft, which is preloaded in a plastic sheath, is advanced over guidewires up the femoral arteries until it is immediately distal to the lower of the two renal arteries. Once in position, the graft is released from the sheath and extensions into the iliac arteries are then attached to the main body of the graft through additional delivery sheaths (Figure 1). The stem-grafts are self-expanding and will fill to exclude the aneurysm.

Here we report three patients, who presented with acute symptomatic infrarenal abdominal aortic aneurysms, one of which was confirmed to have a contained leak on CT scan.

CASE REPORT The first patient was a 76 year old man who presented to a district general hospital with pain in the left flank radiating to the groin. He had a documented history of valvular and ischaemic heart disease, atrial fibrillation

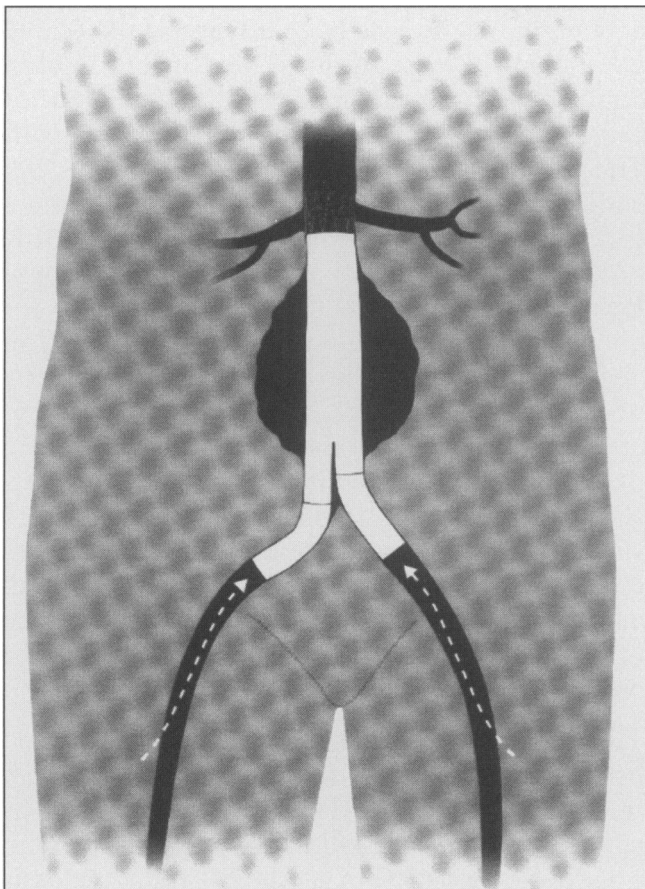


Fig 1. Diagrammatic representation of insertion of stent graft (Zenith device (William Cook Europe A/S, Bjaeverskov, Denmark)).

Vascular Surgery Unit, Tower Block, Belfast City Hospital, Lisburn Road, Belfast BT9 7AB.

Mr S P Junnarkar, MS, FRCS, Specialist Registrar.

Ms J Reid, MRCS, Specialist Registrar.

Dr L C Johnston, FRCR, Consultant.

Mr B Lee, FRCS, Consultant.

Mr R J Hannon, MD, FRCS, Consultant.

Mr C V Soong, MD, FRCS, Consultant.

Correspondence to Mr Soong.

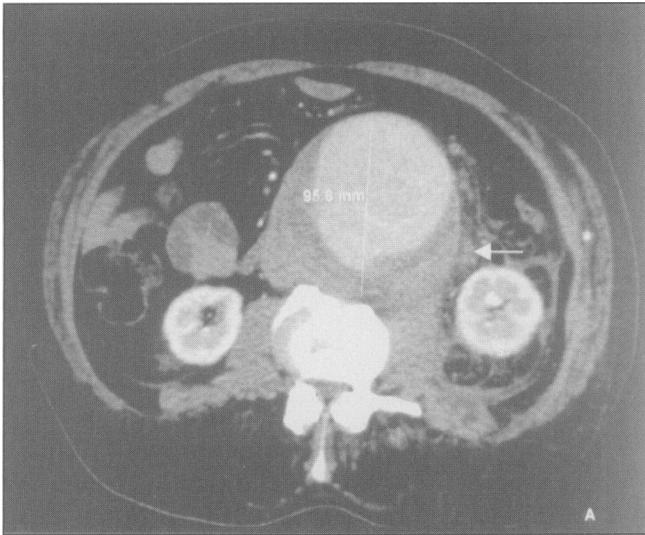


Fig 2. CT scan abdomen showing abdominal aortic aneurysm with contained leak posteriorly (Arrow showing site of contained leak).

and left ventricular failure. On examination, he was found to have a pulsatile mass in the epigastrium. This was confirmed on both ultrasound and CT scan to be a leaking infrarenal abdominal aortic aneurysm measuring 7.5 cm (Figure 2). He was haemodynamically stable and evaluation was made following transfer for possible endovascular repair. Measurements from CT scans were used to select a suitable off-the-shelf stem-graft (Talent, Kimal plc, London, UK). Two hours after arrival to the Belfast City hospital, the patient was anaesthetised in theatre, and femoral arteries exposed. This facilitated the potential use of an intra aortic occlusion device, which in this case was not required. A bifurcated system was used and deployed through the femoral arteries. Total anaesthetic time was 4½ hours and blood loss was estimated to be 1700 ml. On-table completion angiography confirmed exclusion of the aneurysm by the stem-graft with no evidence of an endoleak (Figure 3). Post-operatively the patient was transferred to the intensive care unit where he stayed for approximately 12 hours. He was allowed to eat and drink on the first post-operative day and was transferred to the vascular ward where he commenced mobilisation on the second post-operative day. His discharge from hospital was delayed to three weeks because of social circumstances, although it was assessed that he was fit for discharge on the seventh postoperative day.

The second patient was an 82 year old man who was known to have an infrarenal abdominal aortic

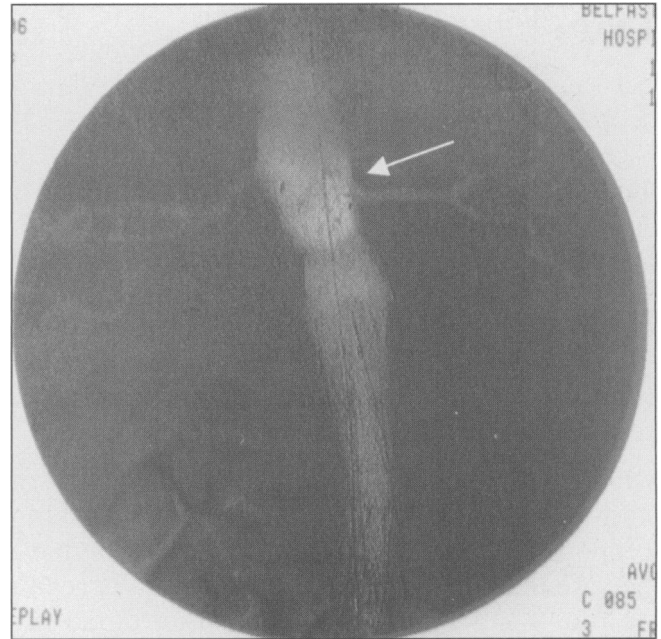


Fig 3. Completion angiogram showing exclusion of the aneurysm sac by stent graft (arrow showing Renal arteries).

aneurysm. He presented with pain in the abdomen radiating into his back and tenderness over the aneurysm. As he was haemodynamically stable an urgent CT scan was performed which confirmed a 7 cm aneurysm without evidence of rupture that was amenable to endovascular repair. The patient was haemodynamically stable and, endovascular repair was carried out 48 hours following his admission to hospital. On this occasion, a bifurcated device (Zenith, Cook, Bjaererskov, Denmark), which was pre-made for another patient, was utilised. Completion angiography revealed no endoleak and exclusion of the aneurysm sac. Post-operatively his epigastric pain resolved and he was cared for in the high dependency unit for less than 24 hours, after which he was transferred to the vascular surgical ward to resume oral diet. He developed chest infection, which rapidly resolved with antibiotics. Check CT scan revealed no evidence of endoleak and the patient was discharged home on the twelfth post-operative day.

The third patient was an 83 year old man who had been under outpatient surveillance for a 4.6 cm infrarenal abdominal aortic aneurysm. He was admitted to the ward following presentation with a sudden onset of pain in his left flank and was found to be tender over the aneurysm. CT scan revealed an infrarenal aneurysm with a 'thin irregular' posterior wall. As no leak was evident

on the scan, investigations to exclude other possible cause for his pain were undertaken. A barium enema and oesophagogastroduodenoscopy were performed and found to be normal. Again the CT scan showed the aneurysm to be anatomically suitable for endovascular repair. An off-the-shelf commercially available bifurcated stem-graft (Talent, Kimal, London, UK) was used to exclude the aneurysm. The operation itself was uneventful, but post-operatively, he suffered a left hemispheric stroke. He made good early recovery with minimal residual weakness. Fifteen days following the stroke the patient developed several episodes of melaena. Endoscopy revealed a bleeding duodenal ulcer, which responded to injection sclerotherapy and triple therapy for *Helicobacter pylori*. He made a slow recovery but was eventually well enough to be discharged to a rehabilitation unit on the twenty-eighth post operative day following a check CT scan which showed no endoleak.

DISCUSSION

The morbidity and mortality of ruptured and symptomatic abdominal aortic aneurysm repair remains high. Many of the survivors require prolonged periods of recovery in the Intensive Care unit, often needing a protracted period of rehabilitation prior to achieving independence and discharge from hospital. Endovascular repair of abdominal aortic aneurysms has already been well described for the repair of asymptomatic elective cases. The technique is certainly feasible, but as yet the available data have not shown significant survival advantage over conventional open repair for elective cases.^{2,3} The emergency and urgent repair of abdominal aneurysm is however, still associated with a high perioperative mortality of up to 60%. It is anticipated that this is the area where an endovascular technique could significantly reduce mortality if it were technically and logistically possible. Some preliminary studies from pioneering units have suggested feasibility, albeit with substantial logistical support.

Our report provides further evidence that endovascular repair for patients with acute symptomatic or stable leaking abdominal aortic aneurysm is possible, utilising commercially available 'off the shelf' devices. In all three patients, postoperative ICU stay was short and hospital recovery time relatively low in comparison to the conventional open technique.

However, this report must be treated with caution. These patients deemed suitable for the endovascular repair, were haemodynamically stable and would tend to have a better prognosis than unstable patients, even with open repair. Hardman *et al*⁴ demonstrated that the mortality rate with open repair in patients who are haemodynamically stable was approximately 20%. Therefore, although savings in ICU stay may be incurred by endovascular repair of acute abdominal aortic aneurysm, the potential reduction of morbidity and mortality has yet to be proven. This may only be determined by a well conducted multicentre randomised study.

REFERENCES

1. Sayers R D, Thompson M M, Nasim A, Healey P, Taub N, Bell P R F: Surgical Management of 671 Abdominal Aortic Aneurysms: A 13 Year Review from a Single Centre. *Eur J Vase Endovasc Surg* 1997; **13**: 322-327.
2. Yusuf S W, Whitaker S C, Chuter T A M, *et al*: Emergency endovascular aortic aneurysm repair. *Lancet* 1994; **344**: 1645.
3. Seelig M H, Berchtold P, Jakob P, Schönleben K. Contained rupture of an infrarenal abdominal aortic aneurysm treated by endoluminal repair. *Eur J Vase Endovasc Surg* 2000; **19**: 202-204.
4. Hardman D T, Fisher C M, Patel M I, *et al*. Ruptured abdominal aortic aneurysms: who should be offered surgery? *J Vase Surg* 1996; **23**: 123-9.