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SHORT REPORT

Endovascular Repair of Abdominal Aortic Aneurysms with Aortocaval Fistula

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Objectives. *To examine the risk of high-flow type II endoleak following endovascular repair of abdominal aortic aneurysm with aortocaval fistula.*
Design. *Case reports.*
Subjects. *Two patients with abdominal aortic aneurysms with aortocaval fistula.*
Methods. *Both patients had an endovascular repair of their aortic aneurysms.*
Results. *The aneurysms were successfully treated in both patients, without any endoleak on completion angiography. Apart from a transient type II lumbar endoleak in one of the patients, no endoleak was found after 3 and 12 month follow-up. Seven other cases have been published, reporting one type II and one type Ic endoleak.*
Conclusion. *We found no evidence that endovascular repair of abdominal aortic aneurysm with aortocaval fistula is associated with a higher incidence of persistent endoleak.*

Keywords: Abdominal aortic aneurysm; Endovascular aneurysm repair; Aortocaval fistula.

Open surgical repair of abdominal aortic aneurysm with aortocaval fistula is associated with high morbidity and mortality. Endovascular repair is an attractive alternative. However, there will be persistent communication between the aortic sac and the inferior vena cava and the presence of this communication could result in a high-flow type II endoleak, which may cause sac enlargement and, perhaps more importantly, result in persistent high cardiac output. There are only seven reported cases of endovascular repair of abdominal aortic aneurysm with aortocaval fistulae in the literature. In the period from late 2003 through 2004, two cases were diagnosed at our hospital. Both cases were treated endovascularly and are presented with up to 1 year follow up. Contrary to our expectations persistent type II endoleak and high cardiac output have not been an issue.

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Case 1

A 66-year-old man with a long history of angina, presented with increasing shortness of breath, peripheral oedema extending to the umbilicus and a large pulsatile abdominal mass. Contrast-enhanced CT scan revealed an 8.6 cm infrarenal aortoiliac aneurysm with an aortocaval fistula (Figs. 1 and 2) suitable for endovascular repair. Antegrade filling was noted in three pairs of patent lumbar arteries but not in the inferior mesenteric artery. He was diagnosed to have a non ST-segment elevation myocardial infarction and an echocardiogram revealed left ventricular impairment with an ejection fraction of 35–45%.

A bifurcated endograft device (Tri-Fab design, Cook, Denmark) was used to repair the abdominal aortic aneurysm. To get a seal at the bifurcation of the right common iliac artery, the internal iliac artery was embolised and the limb of the endograft extended into the external iliac artery. Completion angiogram showed no sign of endoleak.

Intra-operatively a Swan-Ganz catheter and central venous catheter were used to monitor the cardiac

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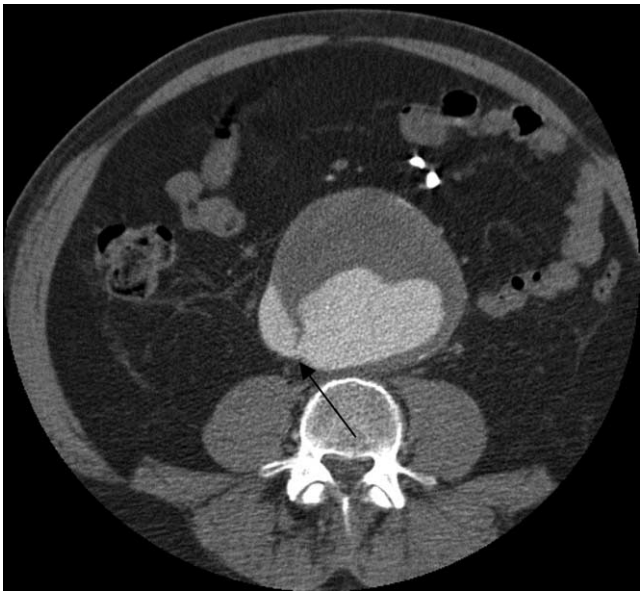

Fig. 1. Patient #1. Aortocaval fistula (arrow).

output and central venous pressure. After successful exclusion of the aortocaval fistula, the cardiac output dropped from 12 to 6 L/min and the central venous pressure from 36 to 18 mmHg. The patient

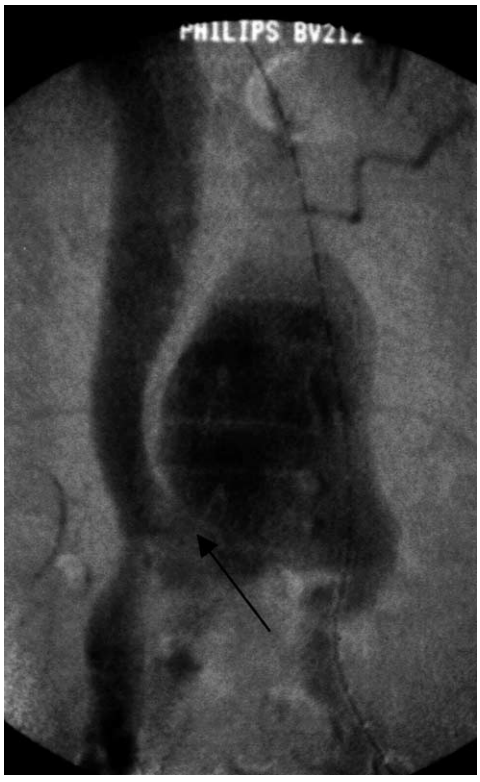

Fig. 2. Patient #1. Intraoperative angiogram of aortocaval fistula (arrow).

subsequently made a good post-operative recovery and lost 19 kg in weight as his oedema resolved. A mild preoperative renal impairment (urea-9.1, creatinine-139) resolved within 2 weeks of the procedure (urea-5.5, creatinine-97).

Duplex scan 2 weeks after operation revealed a type II lumbar endoleak, which had resolved by 4 weeks. There was no evidence of migration on repetitive plain abdominal radiographs and the maximum aneurysm diameter has reduced by 10 mm during the first year of follow-up on CT.

Case 2

An 80-year-old man who suffered from polymyalgia rheumatica and hypertension presented with shortness of breath, chest pain, deep vein thrombosis in his left leg and renal impairment (urea-18.1, creatinine-206). Physical examination revealed bilateral basal chest crepitations, peripheral oedema extending to the groins, especially in his left leg, and a pulsatile abdominal mass. Echocardiography suggested normal left ventricular function (ejection fraction of 61%). The cardiac output was assessed to be 9.94 L/min. Contrast enhanced CT scan revealed an infrarenal abdominal aortic aneurysm measuring 12.3 cm with an aortocaval fistula and two patent lumbar arteries. The infrarenal part of the inferior vena cava was compressed by the aneurysm (Fig. 3).

Endovascular repair was successfully achieved with a bifurcated endograft device (Tri-Fab design, Cook, Denmark). Completion angiogram confirmed no endoleak. The central venous pressure was within normal limits pre- and postoperatively. The patient initially made a good recovery with a weight loss of about 5 kg. Within 2 weeks the renal parameters normalized (urea-9.0, creatinine-101). At a duplex scan at 2 weeks and multislice CT at 4 weeks follow-up there was no sign of endoleak (Fig. 4). He was scheduled for a follow-up echocardiogram, but unfortunately 3 months following the repair he had a laparotomy for perforated diverticulitis and did not recover. On laparotomy there was no sign of ischemic colitis.

Discussion

Without surgical repair, aortocaval fistula leads to high output cardiac failure and death. Conventional surgical repair was until recently the only treatment for an abdominal aortic aneurysm complicated by aortocaval

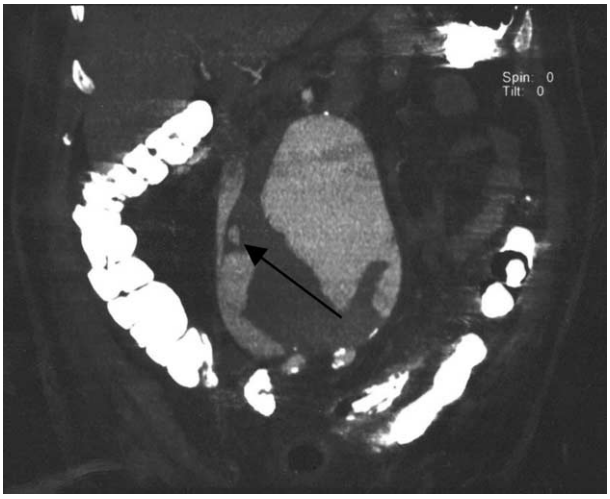

Fig. 3. Patient #2. Aortocaval fistula with compression of the inferior vena cava (arrow).

fistula, but is associated with a high mortality up to 40% even in elective cases.[1] Endovascular treatment offers an attractive therapeutic alternative to open repair, but prior to the two patients presented here only seven cases have been reported.[2–6]

Endovascular repair is attended by theoretical concerns due to the persistent communication between the aortic sac and the inferior vena cava. The presence of this communication could facilitate the development of a high-flow type II endoleak which, if allowed to mature, may lead to persistent increased cardiac output and sac pressurization with increase in the diameter of the aneurysm sac.

In case one of our report we did see an early lumbar endoleak but this was not persistent and did not result in increased cardiac output or sac enlargement. It is reassuring to see the evolution of type II endoleak in this situation follow the path that most type II endoleaks take after endovascular repair of uncomplicated aneurysms. This conservative approach to type II endoleak contrasts with the more aggressive treatment recorded in one of the previous reports. This patient was discovered to have a type II endoleak from the inferior mesenteric artery 4 days postoperatively and was treated aggressively with a cuff in the inferior vena cava and glue in the sac of the aneurysm.[5]

The cases of abdominal aortic aneurysms with aortocaval fistula so far published have a reported follow-up of 6, 12 and 12 months,[2–4] in four cases the follow-up period was not given[5,6] and the two cases presented here have 3 and 12 months follow-up. Longer follow-up is certainly needed to see whether endovascular repair in this type of disease carries an increased risk of recurrence of endoleak or subsequent complications.

Although only small numbers of patients have been treated and the follow up interval is short, we have found no positive evidence to justify our theoretical concern that endovascular repair of abdominal aortic aneurysm with aortocaval fistula is attended by a higher incidence of persistent endoleak and failure to resolve the hemodynamic problems. We believe that endovascular repair is justified in this group of patients when considering the high morbidity and mortality of open repair and the promising cases thus, far reported.

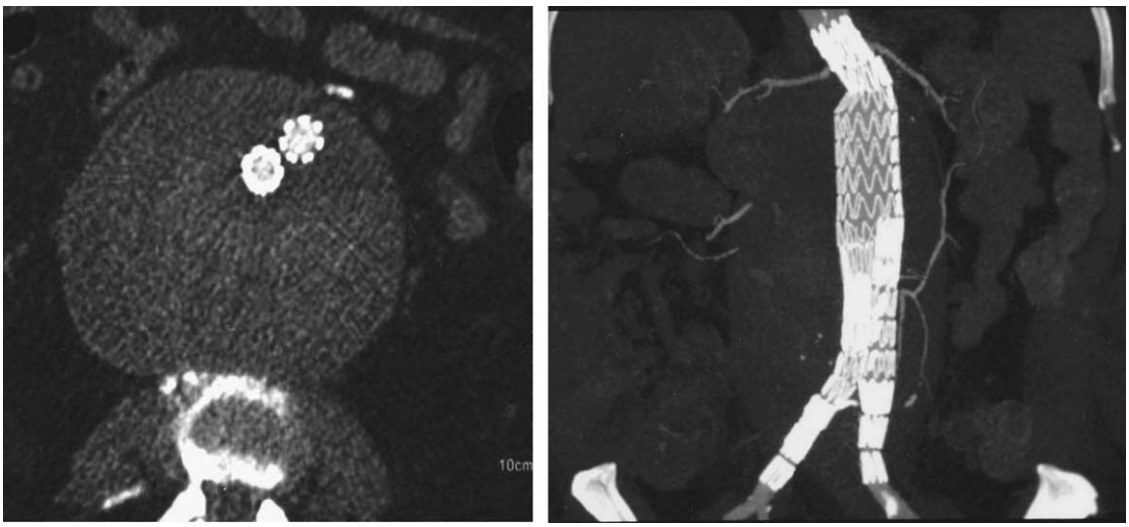

Fig. 4. Surveillance CT scan patient #2, 4 weeks postoperatively.

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