A 14-year Experience with Aortic Endograft Infection: Management and Results

O.T.A. Lyons a,b,*, A.S. Patel a,b, P. Saha a,b, R.E. Clough a,c, N. Price d, P.R. Taylor a,c

a Vascular Surgery Unit, Guy’s and St Thomas’ NHS Foundation Trust, King’s Health Partners, London, United Kingdom
b Cardiovascular Division, NIHR Comprehensive Biomedical Research Centre, King’s College London, London, United Kingdom
c Division of Imaging Sciences and Biomedical Engineering, NIHR Comprehensive Biomedical Research Centre, King’s College London, London, United Kingdom
d Department of Infectious Diseases, Guy’s and St Thomas’ NHS Foundation Trust, King’s Health Partners, London, United Kingdom

WHAT THIS PAPER ADDS
Without device removal aortic endograft infection is fatal, but abdominal endograft explantation carries a 30% 30-day mortality. Extension with new devices or sac drainage are useful temporising measures, but are not curative.

Objectives: The management of thoracic and abdominal aortic endograft infection is complex and associated with high mortality. Cases are rare: a recent systematic review identified 117 reported cases; the largest reported series comprises 12 infected endografts.

Methods: We report 22 consecutive patients with infected abdominal or thoracic aortic endovascular devices implanted from 1998 to 2012. Management included extension with new devices, aneurysm sac drainage of pus/irrigation with antibiotics, endograft explantation, and axillo-(bifemoral reconstruction.

Results: Twenty-two patients (16 men) were identified. Median age was 71 years (range, 43–88 years). Index devices were infra-renal endovascular repair (n = 13), and thoracic endovascular repair (n = 9) all for aneurysmal or pseudoaneurysmal disease. Seven (32%) had prior aortic surgery. Follow-up was complete in all cases; in survivors follow-up was a median of 29 (range, 12–45) months. The mortality from explantation of ten infra-renal devices was 1/10 (10%) on-table and a further 2/10 (20%) within 30 days. Device retention led to disease progression and death in all patients with infected endografts. Sac drainage/irrigation provided only temporary control of sepsis. Device extension can treat rupture, but additional devices became infected.

Conclusion: Abdominal endograft explantation is high risk but may be curative. Appropriate selection of patients for infected endograft explantation remains a major challenge.

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INTRODUCTION

Since the initial reports of endovascular devices their use has increased dramatically in both the infra-renal and thoracic aorta.1,2 Endograft infection was first reported in 1993 and now affects approximately 1% of implantations.3–8 Infection is likely to remain a significant problem, but clinical reports are limited.6 A systematic review identified 117 published cases (34 thoracic, 83 abdominal) with many individual case reports, making comparison of different management options difficult.6,7,9 To the best of our knowledge the largest aortic endograft explantation series comprises only nine patients.5

Traditionally endograft infection has been managed by removal of all foreign material with debridement of infected tissue followed by arterial reconstruction, either in situ using biological conduit or extra-anatomically using prosthetic graft, followed by prolonged antibiotic therapy.5,10 Aortic endograft infection presents particular difficulties owing to the high risk of major aortic surgery, and the challenge of reconstructing the arterial supply in patients who may be poor candidates for open surgery. Enteric fistulae can re-infect the field.11 Endograft design poses particular problems as none are intended to be removable and bare proximal stents may become embedded in the aortic wall, complicating explantation.12 Consequently the outcome of infected abdominal and thoracic endografts is poor, with estimated overall short- to medium-term survival of 30% and 65% respectively.4 Conservative management of endograft infection without device removal has been described, with variable results.5,9,13,14 Removal of infected endografts is associated with high short-term mortality of approximately 20–30% and 47% for abdominal and thoracic devices respectively.4,6

This article describes our experience with management of infected abdominal and thoracic devices with sac
drainage, extension with new devices, or explantation with extra-anatomical reconstruction.

**MATERIALS AND METHODS**

Patients with endograft infection were retrospectively identified from a prospectively maintained consecutive database of devices implanted from 1998 to 2012. The ‘index’ device refers to the first aortic endograft deployed in the aorta. Cases were reviewed for prior aortic procedures, endografts deployed, and aetiology of endograft infection. Mycotic aneurysms and aorto-enteric fistulae were investigated and diagnosed as described previously. Aortic endograft infection was diagnosed with a combination of radiological evidence (air within the sac on computed tomography [CT], aided by positron emission tomography CT, or white cell scan in some patients), microbiology (positive sac or peripheral blood cultures), and clinical evidence of sepsis. Endografts deployed in ‘infected fields’ (e.g., mycotic aneurysm, aortoenteric fistula) were not assumed to be infected until patients presented with features of infection. Oesophagogastroscope and bronchoscopy were performed to identify aorto-oesophageal, aorto-enteric and aorto-bronchial fistulae. Fitness for surgery was assessed with respiratory, cardiac, and renal investigations, and consideration was given to life expectancy from comorbid conditions. Antibiotics were given to all patients with advice from the microbiology department.

**Explantation method**

Our method of explantation of infrarenal devices has been described in detail elsewhere. An axillo-(bi)femoral bypass graft is performed immediately prior to midline laparotomy with the proximal common femoral arteries clamped to prevent competitive flow from the native arteries. At laparotomy the sac is opened and the graft main body clamped to allow retrieval of the iliac limbs and distal control. A Foley catheter (with a 30-ml balloon) is passed proximally via the contralateral iliac limb and inflated within the thoracic aorta to allow displacement of the proximal (including supra-renal) fixation with a metal sucker. Occasionally, a supra-renal clamp is used for proximal control. The endograft is collapsed digitally and pulled distally, and the stump of infra-renal aorta is oversewn with a layer of continuous layers of 2-3/0 prolene. Omentum is sutured over the open aneurysm sac after extensive debridement of infected tissue, and drains are placed for irrigation of the aortic stump.

**Sac irrigation and washout**

Following exclusion of endoleak with a contrast-enhanced CT scan, pigtail drains are placed in the aneurysm sac under CT guidance. Antibiotics or saline are instilled through the drains regularly until the patient’s temperature, white cell count and C-reactive protein are normal (usually 5–7 days). Two drains may be placed, allowing concomitant irrigation and drainage of the sac. Irrigation failed in one patient with aorto-bronchial fistula as instillation produced coughing.

**Extension with further devices**

Devices are placed proximal and/or distal to the infected device to extend coverage into non-infected aorta (Fig. 1). One renal artery was intentionally covered when this was the only option to obtain a proximal landing zone.

**RESULTS**

Twenty-two patients (16 men) were identified with infected endografts (9 thoracic, 13 abdominal) deployed between 1998 and 2012. Indications for use of the index device are given in Table 1. Only one thoracic and six abdominal stentgrafts were inserted for non-infected, non-salvage indications. Seven (32%) index devices were deployed for complications following prior open aortic surgery. During the study period seven fistulae were treated with endografts, and six (86%) subsequently presented with device infection. Devices used were Gore TAG, TX2, Talent, Cook Zenith, Low Profile, Aneuryx, Medtronic, and aortic cuffs. Index devices in 18 out of 22 patients (82%) were deployed in our tertiary centre; seven patients (32%) after having been referred from elsewhere (e.g., with aorto-enteric fistula). Four patients (18%) were referred to us following deployment and subsequent diagnosis of infection elsewhere. Follow-up from presentation with endograft infection was a median of 29 (range, 12–45) months in survivors.

The median age at presentation with infection was 71 (range, 43–88) years. Significant comorbidities included hypertension in 12 (55%), pulmonary disease in seven (32%), ischaemic heart disease in eight (36%), diabetes in two (9%), prior surgery for cancer in eight (36%), blood dyscrasia in two (9%) patients, and congenital aortic coarctation and pneumothorax with pleuradhesis in one (5%), monosomy chromosome 7 in one (5%), and panhypopituitarism (treated with steroids) following hypophysectomy in one (5%) patient.

Presentation with infection was a median of 5 (range, 0–51) months after the original index deployment. Presentation was with fever in 13 (59%), leucocytosis >11 x 10^9 cells/l in 13 (59%), chest or abdominal pain in 12 (55%), rigors in nine (41%), bleeding in ten (45%), frank rupture in seven (32%), and anorexia in six (27%) patients. Anorexia and cachexia were prominent in patients with a prolonged duration of infection prior to diagnosis.

The major risk factors for device infection included sepsis post deployment in 11 (50%), primarily infected pathology in 11 (50%), re-intervention in six (27%), and fistula in five (23%) patients. Patients with an index device deployed in primarily infected pathology were more likely to present with infection within 3 months of deployment ($p = .009$, Fisher’s exact test).

Causative organisms were cultured from the endograft, blood, or sac aspirate in only 12 (55%) patients, probably due to prior antibiotic use. Single isolates were *Escherichia coli* ($n = 3$ patients), *Staphylococcus aureus* ($n = 1$), and *Pseudomonas aeruginosa* ($n = 1$)
Candida \((n = 1)\), Enterococcus \((n = 1)\), and Propionibacterium \((n = 1)\). Of 5 (23%) cases that grew mixed organisms, three were combinations of Pseudomonas with either E. coli and S. aureus \((n = 1)\), Klebsiella \((n = 1)\), or coagulase-negative Staphylococcus \((n = 1)\). One case was Enterococcus with Candida; one was Streptococcus milleri with Candida.

**Management and perioperative mortality**

All patients received antibiotics with specialist advice. Narrow spectrum antimicrobials were used where the causative organism and sensitivity profile was known. Broad-spectrum therapy was given to those with no growth.

**Abdominal endografts.** The device was not explanted in three patients with infra-renal devices because they were unfit for major surgery; all died due to progression of their aortic disease. In patient 11 two drains were placed in the sac for irrigation (pus was aspirated). Patient 12 was not fit for the thoraco-laparotomy required for explantation and was planned for re-lining, but died from mesenteric ischaemia while waiting for a custom-made fenestrated device to be manufactured.
<table>
<thead>
<tr>
<th>No.</th>
<th>Age (years)</th>
<th>Indication for index device</th>
<th>Re-interventions prior to presentation with infection</th>
<th>Management of index device infection</th>
<th>Follow-up from infection presentation (months)</th>
<th>Cause of death</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>66</td>
<td>Elective EVAR; subsequent discitis, psoas collection</td>
<td>—</td>
<td>Explant + AxFem</td>
<td>27, alive</td>
<td>—</td>
</tr>
<tr>
<td>2,a,b</td>
<td>69</td>
<td>Elective EVAR (right iliac occlusion, unplanned fem-fem crossover, paraplegia)</td>
<td>—</td>
<td>Explant + AxFem</td>
<td>29, alive</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>78</td>
<td>Elective EVAR</td>
<td>Limb extension, embolisation type 2 endoleak, open taping of iliac limbs</td>
<td>Explant + AxBifem</td>
<td>28, alive</td>
<td>—</td>
</tr>
<tr>
<td>4,a,c</td>
<td>78</td>
<td>Aorto-enteric fistula following elective open infra-renal aneurysm repair</td>
<td>—</td>
<td>Explant + AxBifem</td>
<td>12, alive</td>
<td>—</td>
</tr>
<tr>
<td>5,a,b</td>
<td>83</td>
<td>Elective EVAR</td>
<td>—</td>
<td>Explant + AxBifem</td>
<td>68, dead</td>
<td>Bronchopneumonia, COAD</td>
</tr>
<tr>
<td>6</td>
<td>82</td>
<td>Elective EVAR</td>
<td>Right limb occlusion and type II endoleak: fem–fem crossover and open ligation right IIA</td>
<td>Explant + AxBifem</td>
<td>0, dead</td>
<td>Intra-operative cardiac arrest; acute kidney injury, respiratory failure</td>
</tr>
<tr>
<td>7,a,b</td>
<td>86</td>
<td>Elective EVAR; re-exploration of bilateral groin haematomas</td>
<td>—</td>
<td>Explant + AxBifem</td>
<td>16, dead</td>
<td>Coagulopathy, iatrogenic liver puncture</td>
</tr>
<tr>
<td>8</td>
<td>75</td>
<td>Auto-uniliac for ruptured iliac aneurysm</td>
<td>Coiling of internal iliac artery</td>
<td>Explant + AxBifem</td>
<td>0, dead</td>
<td>Intra-operative haemorrhage</td>
</tr>
<tr>
<td>9,a,b</td>
<td>71</td>
<td>Ruptured mycotic infra-renal aneurysm (renals covered during top cap recapture; device pulled down with wire snared over bifurcation)</td>
<td>—</td>
<td>Explant + AxBifem</td>
<td>4, dead</td>
<td>Metastatic cancer</td>
</tr>
<tr>
<td>10,b</td>
<td>68</td>
<td>Urgent for tender AAA</td>
<td>Right popliteal embolectomy, left limb extension</td>
<td>Drain, Explant + AxBifem</td>
<td>1, dead</td>
<td>Acute kidney injury and respiratory failure</td>
</tr>
<tr>
<td>11,b</td>
<td>80</td>
<td>Expanding mycotic aneurysm</td>
<td>—</td>
<td>Drains, Abx, embolisation of ruptured visceral mycotic aneurysms</td>
<td>0, dead</td>
<td>Sepsis and intra-abdominal haemorrhage (visceral mycotic aneurysms)</td>
</tr>
<tr>
<td>12</td>
<td>69</td>
<td>Elective mycotic infra-renal aneurysm</td>
<td>Thrombectomy and BMS for thrombosed right limb, later kissing balloon angioplasty</td>
<td>Abx (awaiting fenestrated device for relining)</td>
<td>3, dead</td>
<td>Ischaemic bowel (pseudoneurysm at origin visceral arteries)</td>
</tr>
<tr>
<td>13,b</td>
<td>88</td>
<td>Aorto-enteric fistula following open repair</td>
<td>—</td>
<td>Proximal extension cuff, Abx</td>
<td>5, dead</td>
<td>Chronic sepsis, pulmonary oedema</td>
</tr>
</tbody>
</table>

**Infected thoracic aortic devices**

<table>
<thead>
<tr>
<th>No.</th>
<th>Age (years)</th>
<th>Indication for index device</th>
<th>Re-interventions prior to presentation with infection</th>
<th>Management of index device infection</th>
<th>Follow-up from infection presentation (months)</th>
<th>Cause of death</th>
</tr>
</thead>
<tbody>
<tr>
<td>14,b</td>
<td>43</td>
<td>Coarctation repair age 20 years, pleuradhesis, failed open repair of pseudoneurysmal degeneration of graft (LCCA bypass placed)</td>
<td>—</td>
<td>Drain Abx(exsanguinated prior to explantation)</td>
<td>15, dead</td>
<td>Aorto-bronchial haemorrhage</td>
</tr>
<tr>
<td>No.</td>
<td>Age (years)</td>
<td>Indication for index device</td>
<td>Re-interventions prior to presentation with infection</td>
<td>Management of index device infection</td>
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<td>Cause of death</td>
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</tr>
<tr>
<td>15</td>
<td>68</td>
<td>Coronary bypass grafts followed by open repair of type III thoracoabdominal aneurysm, with infected pseudoaneurysm at proximal anastomosis</td>
<td>—</td>
<td>Abx, decortication, bovine patch, left lower lobectomy, thoracic window</td>
<td>45, dead</td>
<td>Aorto-bronchial haemorrhage</td>
</tr>
<tr>
<td>16</td>
<td>72</td>
<td>Elective thoracic aneurysm (following carotid crossover)</td>
<td>LSCA chimney stent for symptoms of hand ischaemia</td>
<td>TEVAR + drain</td>
<td>10, dead</td>
<td>Aorto-bronchial haemorrhage</td>
</tr>
<tr>
<td>17</td>
<td>75</td>
<td>Infected pseudoaneurysm following open thoracoabdominal aneurysm repair</td>
<td>—</td>
<td>Abx</td>
<td>1, dead</td>
<td>Aorto-enteric haemorrhage</td>
</tr>
<tr>
<td>18</td>
<td>63</td>
<td>Aorto-oesophageal fistula following open repair thoracic transection</td>
<td>—</td>
<td>Abx</td>
<td>13, dead</td>
<td>Aorto-oesophageal haemorrhage</td>
</tr>
<tr>
<td>19</td>
<td>69</td>
<td>Aorto-oesophageal fistula</td>
<td>—</td>
<td>TEVAR</td>
<td>1, dead</td>
<td>Multi-organ failure</td>
</tr>
<tr>
<td>20</td>
<td>69</td>
<td>Cutaneous-left subclavian aneurysm fistula following radiotherapy</td>
<td>—</td>
<td>Abx</td>
<td>5, dead</td>
<td>Aorto-cutaneous haemorrhage</td>
</tr>
<tr>
<td>21</td>
<td>75</td>
<td>Infected pseudoaneurysm following open repair thoracic aortic dissection</td>
<td>—</td>
<td>Abx</td>
<td>53, dead</td>
<td>Aorto-oesophageal haemorrhage</td>
</tr>
<tr>
<td>22</td>
<td>59</td>
<td>Mycotic thoracic aneurysm following oesophagectomy</td>
<td>—</td>
<td>TEVAR + drain</td>
<td>3, dead</td>
<td>Ischaemic bowel, kidneys (embolic)</td>
</tr>
</tbody>
</table>

**Note.** Follow-up refers to time from presentation with infection (not initial deployment). Age refers to time of presentation with infection. AAA = abdominal aortic aneurysm; Abx = antibiotics/antifungals; BMS = bare metal stent; COAD = chronic obstructive airway disease; EVAR = infra-renal stent graft; IIA = internal iliac artery; LCCA = left common carotid artery; LSCA = left subclavian artery; TEVAR = thoracic stent graft.

* Osteomyelitis/discitis.
* Local deployment of index stent graft.
* Referrals from other centres prior to index device deployment.
Early outcome after explantation. Ten (45%) devices were explanted from the infra-renal aorta of men with a median age of 78 (range, 68–86) years. Patient 6 suffered cardiac arrest in surgery (the aorta was found to have ruptured), and died with renal and respiratory failure in the intensive care unit. Patient 8 died during surgery as a result of uncontrollable haemorrhage from friable iliac arteries. All renal arteries were preserved despite supra-renal fixation. Patient 10 required early thrombectomy of the bypass graft, and died with renal and respiratory failure. In total, three patients (30%) required filtration, four (40%) contracted pneumonia, and one (10%) required re-laparotomies for sepsis owing to a persistent duodenal fistula. Overall 30-day mortality was three (30%).

Medium-term outcome. There were no re-operations for aortic bleeding and no incidence of blowout of the aortic stump. Patient 4 had successful radiological drainage of an abdominal collection and bypass graft thrombectomy at 1 year. Patient 9 died at 3 months from metastatic cancer. Patient 5 was found to have osteomyelitis and collapse of L4, and required a corpectomy and cage reconstruction at 4 months, complicated by an iliac vein tear. He subsequently developed infection of the bypass graft that resulted in an above-knee amputation. Patient 7 died at another centre at 16 months (aged 87 years) from coagulopathy and iatrogenic puncture of the liver during an attempt to drain an abdominal collection.

Thoracic endograft infection. The device was not explanted in nine thoracic patients who were unfit or refused explantation, and seven (78%) had died at 24 months. Patient 14 exsanguinated from an aortobronchial fistula while explantation was being planned. He required a pneumonectomy as a previous attempt at open repair failed owing to adhesions following prior pleuradise for spontaneous pneumothorax.

New endograft extensions were used in three thoracic cases as a life saving temporising measure for haemorrhage or pseudoaneurysm progression (patients 16, 19, and 22). Patients 19 and 22 died 1 month and 1 day later. Patient 16 had presented with massive bleeding via an aorto-bronchial fistula—extension was successful in preventing recurrent bleeding for 9 months until disease recurred.

Percutaneous drainage of the aneurysm sac was performed in patients 14, 16, and 22, and appeared useful in reducing systemic sepsis. In combination with lifelong antibiotics this produced a moderate outcome in some patients, but infection eventually progressed in all patients.

Patient 15 received an index thoracic endograft for infected pseudoaneurysmal degeneration/rupture at the proximal anastomosis of an open type III thoracoabdominal aneurysm repair.16 Following endograft infection he was managed with antibiotics, but suffered disabling daily haemoptysis due to an aorto-bronchial fistula, and underwent left lower lobectomy and bovine patch interposition between the graft and left upper lobe at 40 months. Initially this was successful but pleural sepsis subsequently required creation of a thoracic window. Haemoptysis recurred and he died at 45 months.

DISCUSSION

Infection is a rare complication of endovascular treatment and there is no good evidence to guide management.3,4 To the best of our knowledge our data represent the largest consecutive series of infected endografts and of explanted devices. We show promising midterm results from explantation of infected abdominal endografts but the series is too small and heterogeneous to allow for statistical evaluation. No patient died as a result of aortic disease after the infected device was removed. Because of the rarity of these cases it is difficult to find suitable controls with which these results can be compared, but crude comparison with the un-expplanted cases and data from the literature suggests that explantation may avoid the problems of aortic bleeding, sepsis, and septic emboli associated with device retention. In this series all patients (abdominal and thoracic) who did not have their endografts explanted died of aortic disease progression. The 30-day mortality of 30% from endograft explantation is comparable with that achieved by others.4,7,17–19 Laser et al.5 reported 22% mortality in nine patients, three of whom had aortoenteric fistulae. Phade et al.15 achieved 17% mortality in six patients. Following a questionnaire survey sent to multiple centres Ducasse et al.7 reported 14% mortality with surgical treatment and 36% with conservative treatment. These authors also suggested an improved mortality after explantation compared with conservative therapy.7 Extra-anatomical reconstruction using axillofemoral bypass was performed before explantation of the abdominal device to reduce operative time and maintain perfusion of the limbs during explantation, but was associated with a 30% complication rate during the study period.20 A recent systematic review suggested a lower mortality with in situ reconstruction (22%) than extra-anatomic bypass (31%) in treating abdominal infections.4,7 In situ options include reconstruction using femoral vein or spiralled long saphenous vein, rifampin-soaked graft, silver-coated graft, allograft, or bovine pericardium.8,9,18,21–27

Mortality from management of thoracic aortic endograft infection without explantation is reported to be 70%, but in this series with longer and complete follow-up the mortality was 100% (and was due to their aortic disease).5,6,14,28 Extension with further devices was used in salvage situations to prevent immediate death from rupture. While temporary control was achieved this failed in the relatively short term.4,29–31 Drainage of pus and irrigation of the sac improved systemic sepsis but did not prevent progression to death. Reconstruction following thoracic endograft explantation is challenging owing to anatomical constraints and the need for higher flow rates through the conduit. No thoracic devices were explanted in this series.32,33 Reconstruction with homograft is possible; alternatively, an ascending aortic to infrarenal aortic extra-anatomic bypass may be performed.26,33–35
The incidence of graft infection after deployment in an infected field, such as a mycotic aneurysm, infected pseudoaneurysm or aortoenteric fistula suggests that endovascular treatment is only a temporising measure. We have previously demonstrated acceptable medium-term survival with endovascular repair in infected fields if an organism can be identified and treated with appropriate antibiotics, although there is a high risk of eventual failure with fistulae. In this series we have presented survival following presentation with infection, not following deployment. Six out of seven fistulae treated with endografts in the study period subsequently presented with infection, but several patients had devices successfully implanted in infected fields for extended periods before problems occurred. Endovascular repair remains an important option in those with an infected field who are unfit for open surgical repair (particularly in the setting of active haemorrhage) or who have complications of a prior open repair.

In the present series, only four EVAR and one thoracic endovascular repair devices was implanted at our centre for non-infected, non-salvage indications. Patients with infected endografts could have remained undiagnosed, been referred elsewhere, or died out of hospital. This supports the estimation of others who have suggested infection rates in the region of 1%. Most authors have identified Staphylococcus and Streptococcus spp. in endograft infection as the most common significant pathogen involved. In this series Gram-negative organisms (e.g., E. coli and Enterococcus) were also identified, and have previously been reported along with Candida. Four out of six (67%) E. coli or Enterococcus isolates were associated with abdominal endografts, while 2/6 (33%, patients 15 and 18) followed thoracic endovascular repair for proximal pseudoaneurysms after thoracocolaparotomy. Antibiotic/antifungal therapy was determined on a case-by-case basis, guided by culture results. Broad-spectrum therapy was administered when the causative organism could not be identified, which occurred in half these patients and in 18–50% of reported cases. Percutaneous sac drainage can be useful in obtaining diagnostic cultures. Antibiotics were continued long-term for osteomyelitis and indefinitely (with variable compliance) when the endograft remained in situ. In-dwelling central venous catheters were used for outpatient intravenous therapy when there was no oral alternative.

Several risk factors for endograft infection have been suggested. Infection increasingly follows endovascular salvage of complications of open aortic surgery, which substantially complicates management. In the present series approximately half the cases had a primarily infected aortic problem, such as a mycotic aneurysm or an aortoenteric/cutaneous fistula, and they presented with endograft infection earlier than those with uninfected pathology. Half of this series had a period of sepsis following index device deployment that may have seeded bacteria in the aneurysm sac/thrombus. The re-intervention rate following index deployment and prior to presentation with infection was 27%, suggesting that inoculation during re-intervention is important. These endografts were inserted in multiple units and the re-intervention rate in the non-infected cases is not available for comparison, but is likely to be much lower. Some of these re-interventions are no longer considered necessary and so this problem may decrease with time. One of our patients was taking steroids, which may have contributed to a reduced ability to deal with infection.

There are several limitations to the current study. It is small but the majority of patients were followed until death. The study group is heterogeneous with infected and non-infected primary pathologies, but there is no evidence that they subsequently behave differently once the device is infected. Diagnosis of infected aneurysms can be challenging and it is possible that some aneurysms that were thought to be uninfected were in fact infected at the index deployment. Selection of patients for surgery was based on patient fitness, thus making it difficult to draw any conclusions about which patients might benefit from explantation. Conservative temporising measures remain the mainstay of therapy in patients unfit for explantation, particularly in the thoracic aorta.

CONCLUSIONS

Explantation of infected abdominal endografts carries a high early mortality and morbidity, and appropriate selection of patients for such a high-risk procedure remains a major challenge, but explantation can result in cure of aortic endograft infection. Conservative (non-operative) management with retention of the infected aortic endograft inevitably results in death from disease progression, usually within two years of presentation with infection.

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CONFLICT OF INTEREST

None.

REFERENCES


