

## SHORT REPORT

**Acute Presentation of a Late Abdominal Aortic Graft Infection Due to Salmonella****M. Taurino\*<sup>1</sup>, L. Rizzo<sup>1</sup>, M. Liberatore<sup>2</sup>, A. Schioppa<sup>1</sup>, S. Varraso<sup>3</sup>, S. A. Serio<sup>3</sup> and P. Fioran<sup>1</sup>**

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**Introduction**

An aortic graft infection is among the most serious complications of surgical arterial reconstruction, with an incidence of 0.4–2.6%,<sup>1</sup> it carries with it significant mortality and morbidity. Aortic graft infections can be caused by many different pathogens. Cultures from early graft infections most commonly yield coagulase-negative *Staphylococcus aureus*; those from late infections more often grow *Staphylococcus epidermidis*. Other bacteria frequently responsible for graft infections are *Pseudomonas aeruginosa*, *Escherichia coli* and the Klebsiella species, found in 20% of all cases.<sup>2</sup> The Salmonella species – relatively frequent in arteritis and aneurysmal infections – only occasionally cause graft infections. In a review including 150 cases of thoracic or abdominal aortic infections caused by the various Salmonella species over the years 1948 to 1999, the most frequent causative organisms were *Salmonella typhimurium* and *Salmonella enteridis*.<sup>3</sup>

In contrast to primary infections of the large arteries, only a few cases of aortofemoral graft infections due to Salmonella have been described to date.<sup>1,3–6</sup>

**Case Report**

A 62-year-old man was admitted to the Department of General Surgery for the investigation of pyrexia

and lumbar pain radiating to the right groin. Five years previously he had undergone surgery elsewhere for Leriche syndrome and received an aortobifemoral bypass with a 14 × 7 Dacron bifurcation graft. No complications or infections of note arose immediately or over the ensuing years.

On admission to this hospital the patient had a high fever, an increased erythrocyte sedimentation rate and a leukocytosis. Physical examination disclosed a painless, pulsatile mass in the mesogastric region. Peripheral pulses were present and groin examination raised no suspicion of septic complications. Abdominal ultrasound scanning suggested the presence of a small pseudoaneurysm with no evident perigraft fluid collections, and a small stone in the right ureter. On the day after admission, a sudden episode of hypotension developed, with intense lumbar pain. An abdominal angiographic CT scan disclosed a ruptured pseudoaneurysm involving the proximal anastomosis (Fig. 1). The patient was therefore referred to the vascular surgery unit.

At emergency laparotomy, the right side of the proximal anastomosis appeared to have become detached and the graft was surrounded by pus. The common body of the graft measured 30 mm in diameter. The right and left graft branches appeared well incorporated and uninfected as did the femoral anastomoses. After clamping of the infrarenal aorta the infected prosthetic graft was entirely removed, the aortic stump was ligated and a right axillobifemoral bypass was constructed. The postoperative course was

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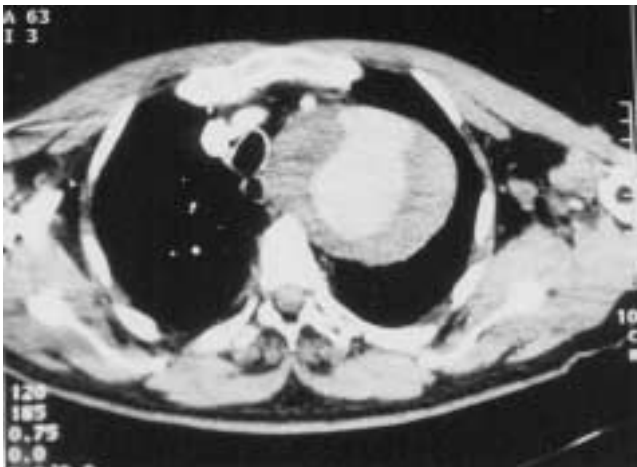
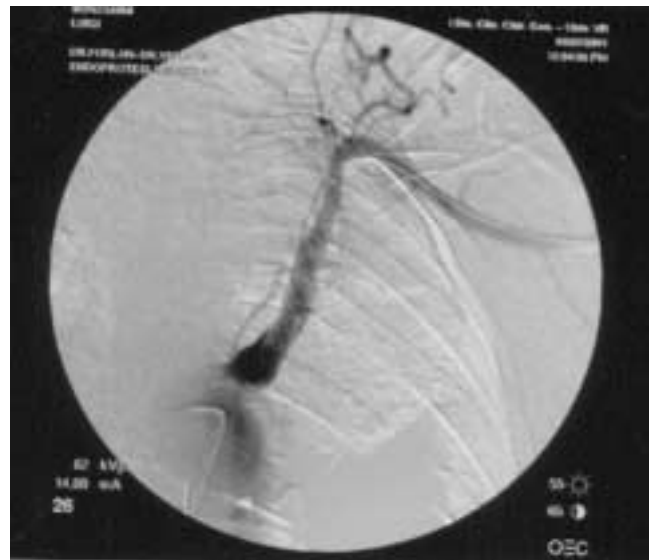


Fig. 1. Angio-CT of the abdomen showing a haemorrhagic retroperitoneal effusion caused by a ruptured aortic pseudoaneurysm.



[Fig. 3.]

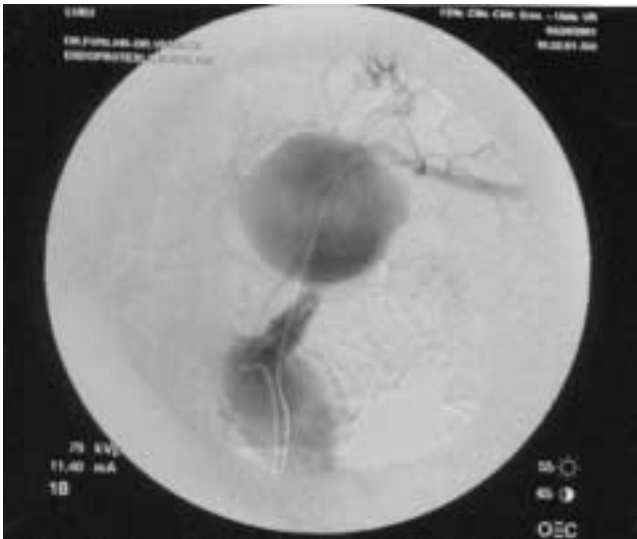
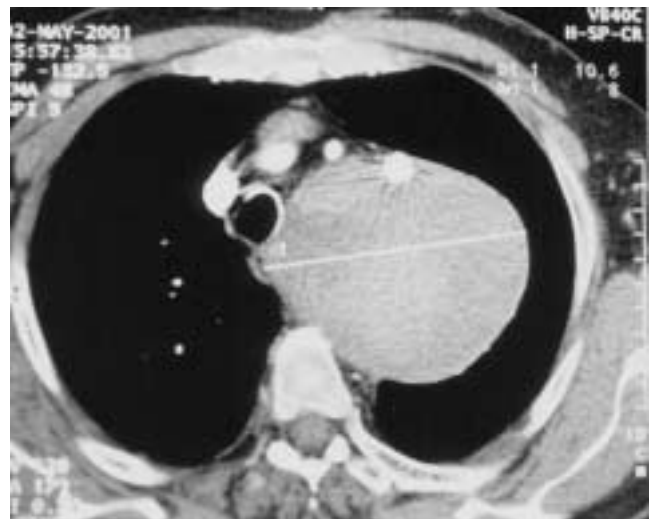


Fig. 2. Magnetic resonance angiography scan showing perfect closure of the aortic stump and a patent axillofemoral bypass graft 20 months after the operation.



[Fig. 4.]

unremarkable. Cultures of the periprosthetic fluid grew *Salmonella typhimurium*; samples taken from along the rest of the graft and at femoral artery level were sterile. The patient received antibiotic therapy with ceftazidime 8 g/day for 20 days and ciprofloxacin 500 mg twice daily for 8 weeks. The patient was discharged on day 20 in good general health. Post-operative follow-up leukocyte-labelled scintigraphic scans at 4 and 19 months were negative. An MRI angiographic scan obtained in March 2001 showed that the aortic stump closure held well, no periaortic fluid collection was visible and the axillobifemoral bypass was patent (Fig. 2). At 20 months after surgery the patient remains well.

### Discussion

The steadily increasing incidence of non typhoidal *Salmonella* infections in western countries has now reached an estimated rate of 0.8 to 3.7 million cases in the United States.<sup>2</sup> The most frequent extraintestinal manifestations include endovascular lesions, osteomyelitis and meningitis. Endovascular lesions preferentially involve the thoracic and abdominal aorta but arise also in the peripheral and coronary arteries, and occasionally in vascular grafts and prosthetic heart valves. Published reports in the international literature (MEDLINE) to date include only few cases of infected abdominal vascular prostheses.<sup>1,3-6</sup> In all the cases described the infection had a subtle, subacute acute

course characterised by infected perigraft soft tissues. Drainage of a saccular fluid collection may allow the bacterial pathogen to be identified before surgery and specific antibiotic therapy started. In one case, simple drainage and a prolonged course of antibiotic therapy eradicated the infection.<sup>5</sup>

The feature that distinguishes our case is the sudden onset of the infection and the patient's rapid clinical deterioration leading to haemorrhagic shock from proximal anastomotic dehiscence on the day after hospital admission. This presentation, typical of a high-grade graft infection, indicated conventional surgical management with aortic ligation and extra-anatomic limb revascularisation. Given the excellent healing of the prosthetic graft branches in this case, despite the acute infection, a less aggressive management by *in situ* revascularisation might have been equally successful. As a previous report from our department shows,<sup>7</sup> in patients with high-grade graft infections, *in situ* revascularisation considerably shortens operative times, and reduces amputation and mortality rates in selected cases. It is especially advantageous when preliminary culture has identified a weakly pathogenic bacterium or, when preliminary typing is impossible in patients with low-grade graft infection, defined as the absence of generalised sepsis or gross perigraft pus collection and a characteristic subacute clinical course.

When a patient presents with an acute aortic graft infection, the possibility that the causative organism might be a highly virulent bacteria such as *Pseudomonas* should be considered because this graft pathogen can result in the long-term failure of an *in situ* reconstruction.<sup>2,7</sup> Since *Salmonella* species rarely causes

graft infections it is not usually suspected as a graft pathogen. When responsible for primary aortic infection, *Salmonella* can be exceptionally virulent. In a large case series of patients treated for primary *Salmonella* aortic graft infection, the mortality rate was twice as high after *in situ* reconstruction than after aortic ligation and extra-anatomic revascularisation (46% and 23%).

In conclusion, even though an aortic graft infected with *Salmonella* remains a rare event, epidemiological evidence shows that *Salmonella* infections in extraintestinal sites are on the increase. In patients with acute graft infections, the surgeon should keep a possible *Salmonella* infection in mind.

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