

An endoluminal aortic prosthesis infection presenting as pneumoabdomen and aortoduodenal fistula

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Abstract

Herein, we present a case of pneumoabdomen and aortoduodenal fistula (ADF) caused by an endoluminal aortic prosthesis infection. An 82-year-old man underwent endovascular aneurysm repair with a stent graft to exclude a 5.1-cm abdominal aortic aneurysm. Three months after the index procedure, the patient was taken to the emergency department at a medical university hospital. He presented with a 2-d history of bloody diarrhea. An endoluminal aortic stent graft infection was diagnosed, and an ADF was identified. The patient died of septic shock despite emergency surgery and intensive care. When encountered, stent graft infections require appropriate antibiotics and graft explantation.

The diagnosis of an ADF is important, and surgery remains the most effective management if septic shock presents despite conservative treatment.

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Key words: Aortoduodenal fistula; Endovascular aneurysm repair; Infection; Stent graft; Shock

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INTRODUCTION

The use of stent grafts to treat abdominal aortic aneurysms (AAAs) has recently become more widely used^[1-3]. Stent graft infection rates associated with use of the endovascular technique appear to be lower than those for conventional open repair (range: 0.3%-0.4%)^[1,2] as demonstrated by Ducasse *et al*^[3], who reported a frequency of infection of 0.43%. However, the incidence of infection resulting from the implantation of an endoluminal aortic prosthesis has been reported to be as high as 6%^[4,5]. Although prophylactic antibiotics are routinely prescribed prior to an operation, the incidence of infection and possible sequelae remain difficult to predict. Surgical intervention with complete stent graft removal may provide the best outcome for patients with an infection^[3]. The overall treatment strategy can be optimized with the early detection of an endovascular stent graft infection. Herein, we present the case of an elderly male patient with an

endovascular stent graft infection who ultimately died of septic shock despite intensive care.

CASE REPORT

An 82-year-old male patient with type 2 diabetes initially presented with a bulging mass in the abdomen and localized pain. The patient underwent endovascular aneurysm repair with a stent graft (Zenith; Cook, Bloomington, IN) to exclude a 5.1-cm AAA in October 2010 (Figure 1A). The patient recovered without incident post-surgery and was discharged. Although the post-surgical protocol calls for an abdominal computed tomography (CT) scan at one month, the patient did not return to the cardiothoracic surgery clinic following his discharge.

Three months post-surgery, the patient was taken to an emergency department at a medical university hospital reporting a 2-d history of bloody diarrhea. Upon further examination, his blood pressure was measured at 121/55 mmHg, his body temperature was 37.8 °C, his pulse was 68/min, and his oxygen saturation was 88% as measured using a nasal cannula with 3 L/min of oxygen flow. A physical exam revealed pale conjunctiva and a distended abdomen. Furthermore, blood analysis revealed leukocytosis with a white blood cell count of 21 250 cells/mm³ and a hemoglobin level of 9.6 g/dL. Serum chemistry was unremarkable except for mildly elevated creatinine (1.3 mg/dL) with an estimated glomerular filtration rate of 56.45 mL/min. Empiric antibiotics were prescribed, including flomoxef and vancomycin. An abdominal CT scan disclosed a fistula between the aorta and the retroperitoneal duodenum, suggesting the formation of an aortoduodenal fistula (ADF) (Figure 1B). There was circumferential fluid collection with air surrounding the stent region, suggesting the presence of necrotic tissue and associated gas formation (Figure 1B-D). Due to the occurrence of refractory shock, an emergency operation was indicated. A bilateral axillary-femoral extra-anatomic bypass was performed with 8-mm polytetrafluoroethylene grafts. In addition, a retroperitoneal abscess and an abdominal aortic aneurysmal sac necrosis were debrided. The ADF was located at the bare-metal stent supra-renal fixation point. The stent graft was removed, and the aortic stump was closed just distal to the renal artery orifices. The tear at the third portion of the duodenum was repaired using LigaSure (Tyco-Healthcare, United States). A segmental resection of the duodenum and a side-to-end duodenojejunostomy were performed. The ADF was 1.5 cm × 1.3 cm in diameter.

Blood cultures revealed a mixed growth of *Salmonella* species, *Bacteroides fragilis*, *Clostridium* species and *Gemella morbillorum*. Bacterial culture of the necrotic tissue demonstrated a mixed *Salmonella* and *Bacteroides* infection. The patient died of septic shock two days after admission despite intensive care.

DISCUSSION

In the current case, a gas-forming bacterial infection

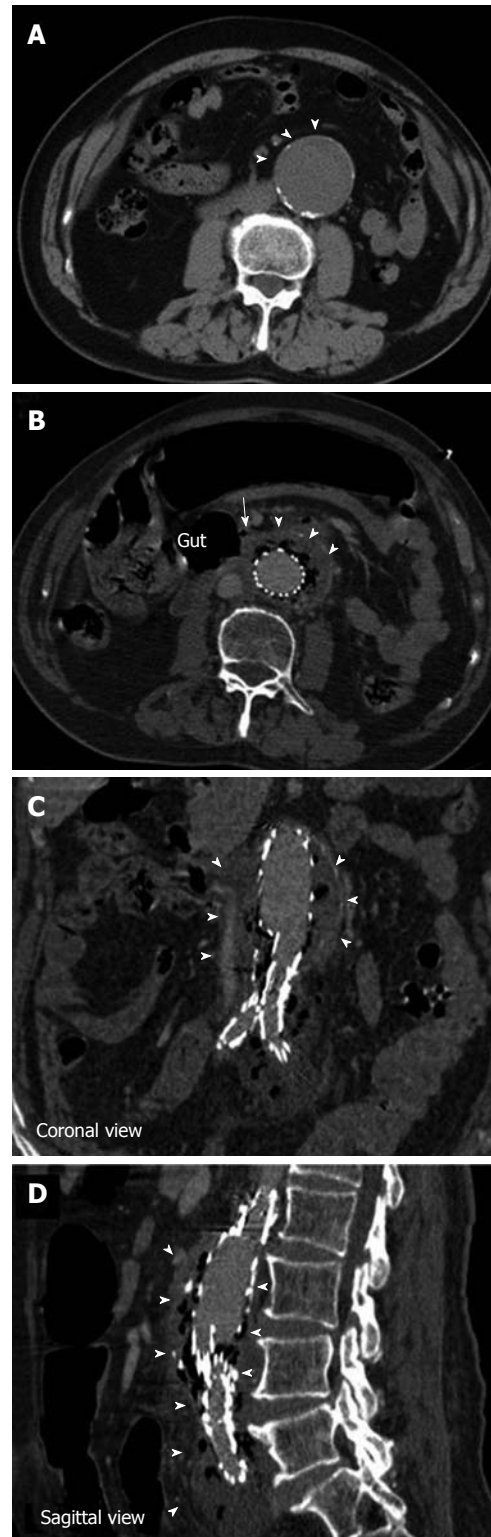


Figure 1 Abdominal computed tomography scans of the patient. A: The abdominal aortic aneurysm before stent-graft implantation (arrowheads); B: The aortoduodenal fistula (arrow); B-D: The necrotic tissue and associated gas formation (arrowheads).

resulted in the development of a pneumo-aorta, which is uncommon. In one recent report^[9], a 77-year-old man was diagnosed with a stent graft infection, and his CT scan demonstrated soft-tissue thickening and air present in the right anterolateral aspect of the aneurysm sac. Ad-

ditionally, coagulase-negative staphylococci were identified in a blood culture. Another case report^[7] described a stent graft infection due to *Bacteroides fragilis*. The patient's condition was successfully managed with staged extra-anatomic revascularization followed by graft excision.

ADF is a well-recognized and dangerous condition^[8-15]. According to a single-center review, five patients developed an ADF between 18 d and 1 year after successful endovascular aneurysm repair^[12]. ADF has also been shown to occur as late as five years after endovascular aneurysm repair^[13]. The patient in this study presented with ADF and bloody stool passage three months after the index procedure. ADFs and aortic aneurysms can be caused by biliary stent-induced retroperitoneal perforation^[14]. However, the current patient did not report any prior gastrointestinal (GI) procedures, such as biliary stenting. The ADF etiology might have included infection and endoleak^[12], but an endoleak was not observed on the CT scan. An ADF might further act as a connecting route between the GI tract and the aorta, causing bacterial propagation and infection-related deterioration. Therefore, the bloody stool passage was a possible sequelae of the ADF formation^[15].

In conclusion, prompt diagnosis and intervention are crucial for effectively treating a patient with an endovascular stent graft infection. A combination of the appropriate antibiotics and surgical repair is the best course for avoiding a fatal outcome. The most effective surgical intervention consists of a complete stent graft explantation followed by *in situ* reconstruction. Endovascular prosthesis implantation is a challenging technique for AAA, but the early recognition and detection of a possible stent infection may be more critical.

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