A rare case of ruptured infrarenal aortic aneurysm infected with *Haemophilus influenzae* type B

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CASE PRESENTATION

A 56-year old woman presented to the emergency department with a vague history of abdominal pain that had persisted for five days. A long-standing smoker, she was otherwise healthy with no previously diagnosed chronic medical conditions, and had no recent exposure to any sick contacts; she did admit to having a short episode of an upper respiratory tract infection two weeks previously that self-resolved. There was also no recent history of travel. On examination, she was tachycardic (110 beats/min to 115 beats/min), hypertensive (169/110 mmHg) and afebrile, and had a soft but tender abdomen. White blood cell count was in the 20×10^9/L range.

Computed tomography (CT) angiography of the abdomen and pelvis revealed a 4 cm infrarenal aortic aneurysm extending to the aortic bifurcation with an associated 6.4 cm × 10 cm periaortic hematoma suggestive of rupture (Figure 1). The renal arteries and visceral vessels displayed mild atheromatous changes; other intra-abdominal structures were unremarkable. The patient's relatively young age and female sex, coupled with the relatively small size and inflammatory appearance of the ruptured aneurysm on CT scan, were highly suggestive of a mycotic aneurysm.

Blood cultures were drawn and ciprofloxacin and cefazolin were initiated. The patient was brought to the operating room for emergent open repair through a midline transperitoneal approach. Intraoperatively, note was made of an edematous retroperitoneum and an adherent duodenum. There were significant inflammatory changes in the aorta, extending distally into the iliac arteries.

The periaortic fluid was noted to be nonpurulent; a sample of this was sent for Gram stain, and was reported as "moderate polymorphs with no organisms seen". Given these nonspecific findings, the aneurysm was repaired with an in situ aorto-bi-iliac 12 mm × 7 mm Hemashield graft.

The patient was then transferred to the intensive care unit (ICU) for postoperative care and continued on ciprofloxacin and cefazolin. Recovery was complicated, however, with acute occlusion of the graft. The patient underwent a second surgery with extensive thrombectomy of both limbs of the graft, as well as a left iliofemoral bypass due to consistently poor flow. The patient continued to decline, requiring increasing pressors to maintain hemodynamics. Antibiotics were broadened to include meropenem, vancomycin and fluconazole to treat her sepsis, despite negative blood cultures drawn at the time of the initial presentation. Additional complications included the need for hemodialysis for renal failure.

DIAGNOSIS

Culture results from the aneurysm sac were reported four days after the initial surgery, and subtyping was performed shortly thereafter. The aneurysm sac was infected with *Haemophilus influenzae* type B.

A subsequent CT scan 19 days into admission revealed evidence of free air under the diaphragm, as well as around the graft itself. Exploratory laparotomy revealed a perforated colon with gross graft contamination with stool and pus; a subtotal colectomy was performed with the creation of an end-ileostomy and the graft was heavily irrigated. Bilateral axillofemoral grafts were placed in a subsequent surgery with 8 mm ringed polytetrafluoroethylene. Four days later, the patient underwent explantation of the infected graft; intraoperatively, the bowel was also noted to be edematous and friable, resulting in two inadvertent enterotomies requiring additional surgeries for repair.

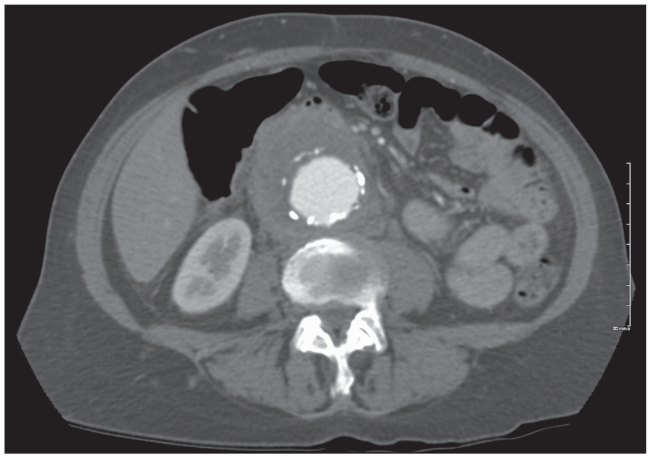

Figure 1) *Computed tomography angiography of the abdomen and pelvis, demonstrating an infrarenal aortic aneurysm with associated periaortic inflammation and hematoma suggestive of rupture*

In total, the patient underwent nine separate operations in a span of two months. She also required a tracheostomy in the ICU for prolonged ventilation over this time. Additionally, her postoperative neurological function was compromised due to the development of new-onset lumbar plexopathy. With ongoing medical care as well as physiotherapy support, she recovered slowly and was discharged to the floor from ICU on postoperative day 82; her antibiotics were discontinued on postoperative day 91. She was eventually discharged to her home hospital for planned rehabilitation on postoperative day 120.

DISCUSSION

The present report outlines the life-threatening nature of this rare, but devastating disease. Infected aneurysms are generally classified under five different subtypes: mycotic aneurysms from septic emboli; microbial arteritis secondary to bacteremia; infection of a pre-existing aneurysm; contiguous spread of infection from an adjacent septic site; and post-traumatic or iatrogenic false aneurysm. The most common species implicated are *Salmonella* and *Staphylococcus* (1-3). Furthermore, patients with infected aneurysms are generally severely comorbid and present with coexisting sepsis (4).

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H influenzae is a very rare causative agent for mycotic aneurysms. Children in North America are routinely vaccinated against type B, which is one of the most virulent encapsulated strains (5). There are only four previous cases in English literature of infected aneurysms caused by *H influenzae* type B from Europe and Asia (4,6-8). To our knowledge, this represents the first reported case in North America.

We believe that the patient likely had a type 2 or a type 3 mycotic aneurysm. In other words, she had a pre-existing aneurysm that became infected, possibly from her episode of upper respiratory tract infection two weeks previously; less likely, she had an episode of bacteremia in the past, resulting in aortitis. Additionally, the patient was relatively healthy on initial presentation, with no fever and negative blood cultures, in contrast to the classical symptoms described by Reddy et al (9).

Although a small sample size, the present report, along with previously reported cases (4,6,8), suggest that the organism results in more subtle and insidious infections than *Salmonella* and *Staphylococcus* species. This favours a low threshold for suspecting infected aortic aneurysms. In the present patient, the key factors included her relatively young age, the absence of any known vascular pathology, the significant inflammatory nature of the aorta and the progression to rupture before any suspicious signs. The presence of the upper respiratory tract infection two weeks previously may also be significant, although it is an unreliable finding.

In retrospect, the decision to place an in situ aorto-bi-iliac synthetic graft resulted in significant patient morbidity, despite ongoing treatment with antibiotics. Previous reports suggest that in situ bypasses are a viable option in an infected field as long as there is no gross contamination with pus or obvious purulence (10). The clinical course of the present patient fuels the debate on the value of creating an extra-anatomic bypass from the outset.

Mycotic aneurysms, while rare, represent an ongoing challenge in the field of vascular surgery. The presence of *H influenzae* type B as a causative organism is even rarer in the literature, and patients with mycotic aneurysms secondary to this organism present with a clinical picture that is more subtle than what is commonly known from previously described reports. Therefore, it is important to have a low threshold for initiating rapid medical treatment in the form of antibiotics and to consider a variety of surgical approaches in a suspected infected field.

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