**Pasteurella multocida** infection, a rare cause of mycotic abdominal aortic aneurysm

Mark J. W. Koelemay, MD, PhD, Amsterdam, The Netherlands

A 64-year-old man was admitted with abdominal pain 6 weeks after treatment with intravenous flucloxacillin for cellulitis of his right leg. Urgent operation was necessary for a mycotic aneurysm of the abdominal aorta due to infection with **Pasteurella multocida**, a microorganism residing in the oral cavity of domestic animals that very rarely causes infection of native arteries or grafts. The aorta was repaired with a rifampin-coated tube graft. Despite postoperative duodenal perforation, abdominal **Candida** infections, wound dehiscence, and renal insufficiency, the patient is alive 1 year postoperatively. (J Vasc Surg 2009;50:1496-8.)

Mycotic aneurysms of the aorta or peripheral arteries are a rare complication of a systemic or metastatic infection and carry a high risk of death. Typical microorganisms associated with mycotic aneurysms are **Salmonella**, **Streptococcus**, and **Staphylococcus aureus**. The cornerstone of treatment is antibiotic therapy, debridement of the infected tissue surrounding the vessel, and restoration of the circulatory system in case the artery cannot be sacrificed. Although treatment with antibiotics alone may be successful, an operation can seldom be avoided.

In case of an mycotic abdominal aortic aneurysm (AAA), closure of the aortic stump and restoration of the circulation by an extra-anatomic axillofemoral bypass is a conventional option, but replacement of an infected aorta through in situ repair with a prosthetic, venous, or human allograft has also been successful. Novel treatment options include insertion of an aortic endograft to exclude the aneurysm, but this might be associated with a high reintervention rate because the infected tissue is left in place. This report describes a very unusual cause and postoperative course of a mycotic AAA.

**CASE REPORT**

A 64-year-old man was admitted in another hospital for cellulitis of his right leg that was successfully treated with intravenous flucloxacillin. No wound or blood cultures were taken at that time. His medical history comprised severe alcohol and nicotine abuse. He used no medications. Alcohol addiction had made the patient neglect himself, his diet, and his house, which was infested with cockroaches and in which he kept cats.

From the Department of Surgery, Academic Medical Center.

Competition of interest: none.

Reprint requests: Mark J. W. Koelemay, MD, PhD, Vascular Surgeon and Clinical Epidemiologist, Academic Medical Center, Dept of Surgery, G5-153, Meibergdreef 9, PO Box 22660, 1100 DD Amsterdam, The Netherlands (e-mail: m.j.koelemay@amc.uva.nl).

The editors and reviewers of this article have no relevant financial relationships to disclose per the JVS policy that requires reviewers to decline review of any manuscript for which they may have a competition of interest.

0741-5214/$36.00
Copyright © 2009 by the Society for Vascular Surgery.
doi:10.1016/j.jvs.2009.06.052

The patient presented to our hospital 6 weeks later for progressive abdominal pain and fever. On physical examination he was cachectic, had a normal blood pressure, and had a palpable pulsating painful abdominal mass. Results of laboratory analysis were leukocyte count, 14.9 × 10^9/L; hemoglobin, 5.4 mmol/L; and C-reactive protein, 191.2 mg/L. Results also showed signs of liver disease: albumin level, 18 g/L; prothrombin time, 15.7 seconds; aspartate aminotransferase, 222 U/L; alanine aminotransferase, 69 U/L; albumin-free, 139 U/L; and γ-glutamyl transferase, 1396 U/L. Ultrasound imaging detected an irregularly shaped AAA, and a computed tomography (CT) scan showed a configuration of the infrarenal abdominal aorta typical of a mycotic aneurysm (Fig 1).

The diagnosis was confirmed at urgent operation, which found an 8-cm-wide pulsating mass surrounded by inflammation and containing pus and destruction of a large part of the ventral wall of the infrarenal aorta (Fig 2). The inflammation reached onto the fourth part of the duodenum, which was not fully exposed but seemed intact, without evidence of an aortoduodenal fistula.

The aorta was repaired with a rifampin-soaked Dacron tube graft (Vascutek, Inchinnan, UK) and was covered with an omentum patch. Bacterial cultures identified **Pasteurella multocida** that was sensitive to amoxicillin, ciprofloxacin, and cefotaxime. The patient was treated with intravenous cefotaxime (4 g/day) for 4 weeks.

The patient’s postoperative course was complicated by a perforation of the duodenum 4 days after the initial operation (Fig 3), either as a result of mechanical injury at the initial operation or because of ongoing infection. The duodenum was partially resected, and continuity was restored with a side-to-side duodenojunostomy. The tube graft was left in situ because the patient’s unstable condition due to septic shock precluded a longer operation to close the aortic stump and add an axillofemoral bypass.

Other sequelae included multiple intra-abdominal fluid collections containing **Candida albicans** and **C glabrata**, for which he was treated with percutaneous drainage and fluconazole (400 mg/d) for 4 months, **Clostridium difficile** colitis that was treated with metronidazole (1500 mg/d), and wound dehiscence. The patient was dismissed after 3 months.

He was readmitted 3 months later with dehydration and renal insufficiency due to hydrenephrosis of the left kidney. He further sustained aspiration pneumonia with **Klebsiella pneumoniae** that was treated with intravenous cefotaxime (4 g/d). Results of blood
cultures were negative, and follow-up CT scans did not reveal signs of tube graft infection. He was dismissed after 1 month. One year after the operations, the patient is alive and in good clinical condition.

DISCUSSION

P multioccida is a gram-negative coccobacillus that is part of the normal oral flora of many animals, including cats, dogs, and rabbits. Bites or scratches by domestic animals occur frequently, yet the risk of severe complications is unknown. Immunocompromised patients or patients with chronic liver disease have an increased susceptibility to septicemia due to P multioccida infection. Severe complications of P multioccida infection include arthritis, meningitis, and respiratory tract infections, but vascular complications are rare, especially infection of native arteries.2,3

To date, only two other cases of P multioccida myotic aneurysms of the native aorta have been published. The diagnosis in one patient with septic arthritis was established only after he died of a ruptured myotic AAA.4 This patient denied being bitten by his cats or dogs. The other patient had myotic aneurysms of the thoracic and abdominal aorta, probably caused by dogs licking his psoriatic lesions. This patient was treated conservatively with long-term ciprofloxacin and eventual exclusion of the AAA with an endograft 2 years after the initial diagnosis.5

P multioccida infection of prosthetic vascular grafts is also uncommon. Three case reports describe a prosthetic aorto-bifemoral bypass infection caused by dogs licking the site of an amputated toe,6 frequent dog bites,7 and cellulitis of a leg after a cat bite,8 respectively. All patients had partial or complete removal of the prosthesis, and circulation to the leg was restored by extra-anatomic prosthetic bypasses. One other patient, who had an uncomplicated exclusion of an AAA with an endograft 2 years previously, sustained a P multioccida infection after a rabbit bite.9 Despite treatment with oral penicillin for cellulitis of his right leg, endograft infection caused his clinical condition to deteriorate. Axillobifemoral bypass to maintain circulation of the lower extremities was followed 3 days later by explantation of the graft and closure of the aortic stump.

The optimal treatment strategy for patients with a myotic aortic aneurysm is unknown. The decision to do an open repair was based on the presence of fever, laboratory test results, and imaging, and to guarantee adequate debridement of the infection. In their systematic review, Kan et al10 concluded that endovascular repair seems an attractive alternative, but not for patients with aneurysm rupture and fever, a condition applicable to our patient. Also the choice for a conduit such as a rifampin- or silver-coated prosthesis, or cryopreserved allografts, can only be based on reported favorable results in cases and not on robust evidence from controlled trials.18 The same applies to the duration of intravenous antibiotics. Because cultures taken at the second operation and subsequent percutaneous drainages showed no signs of P multioccida, but only Candida spp, we arbitrarily decided to continue cefotaxime for 4 weeks.
The exact cause of the infection in our patient is unknown. He did not report cat scratches or bites that could have caused cellulitis of his right leg, but stated that his favorite cat frequently licked him, a possible route of transmission. Liver disease due to alcohol abuse and a compromised immune system as a result of a deficient diet may have been contributing factors to the eventual severe infection.

CONCLUSIONS

Evidence is insufficient to support routine antibiotic prophylaxis to reduce the risk of infection after a dog or cat bite, except for bites of the hand. Given the high incidence of bites by pets and the few reported cases with an infected native artery or vascular prosthesis, this probably holds true also for patients with vascular disease. Yet, such patients should be educated about the specific possible complications of a pet bite. In patients with a laceration or cellulitis after a pet bite, the liberal use of a broad-spectrum antibiotic is probably indicated to prevent severe complications.

REFERENCES


Submitted May 17, 2009; accepted Jun 23, 2009.