Cryptococcal aortitis presenting as a ruptured mycotic abdominal aortic aneurysm

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Mycotic processes occasionally complicate atherosclerotic aortic disease and usually require aggressive surgical therapy to control sepsis and prevent arterial rupture. Rarely, fungal organisms are responsible for primary infection of the abdominal aorta. We report the first case of *Cryptococcal* aortitis presenting as a ruptured abdominal aortic aneurysm. The surgical, pathologic, and microbiologic aspects of fungal aortitis are discussed. (J Vasc Surg 1999;30:189-92.)

A mycotic process occasionally complicates atherosclerotic aortic disease and usually requires aggressive surgical therapy to control sepsis and prevent arterial rupture.[1] Rarely, fungal organisms are responsible for primary infection of the abdominal aorta, with the most frequently reported organisms being *Candida* and *Aspergillus*.[2,3] *Cryptococcal* infection of the aorta is an extremely rare entity, with only two cases reported in the literature, both of which were documented postmortem.[2,4] We report the first case of a ruptured mycotic abdominal aortic aneurysm caused by *Cryptococcal* infection in a previously healthy male.

CASE REPORT

A previously healthy 55-year-old man was referred to the vascular surgery service at the Wake Forest University School of Medicine with back pain and a 40-pound weight loss within several months. Because of the recent weight loss, the patient had been evaluated for visceral ischemia with a duplex examination 1 month before the clinic visit; normal mesenteric arterial velocities and a 3.3-cm infrarenal aortic aneurysm were revealed by means of this examination. The patient also reported low-grade abdominal pain within the past few weeks that had intensified 2 days before his clinic visit and now radiated to his right thigh.

By means of a physical examination, the patient appeared diaphoretic, and he was uncomfortable. His heart rate was 118 beats/min, his blood pressure was 118/62 mm Hg, his respirations were 22 per minute, and his temperature was 36.2°C. Slight distension with mild tenderness and an expansile midline mass were revealed by means of an abdominal examination. Femoral and popliteal pulses were palpable bilaterally. Pedal blood flow was detectable with continuous wave Doppler.

A computed tomography scan of the abdomen and pelvis was obtained; a 32 by 44 mm abdominal aortic aneurysm that had ruptured into the retroperitoneal space was revealed (Fig 1).

The patient was immediately taken to the operating room for repair of the ruptured aortic aneurysm. The patient was explored via a midline, transperitoneal incision. A large retroperitoneal hematoma was encountered, and infrarenal aortic control was achieved. The aortic wall was inflamed. The entire posterior wall of the aneurysm was absent, revealing eroded vertebral bodies. The aorta was repaired with a 12 by 7 mm bifurcated Dacron graft from the infrarenal aorta to the common iliac arteries bilaterally. Tissue cultures of the aortic wall and its mural thrombus were obtained, and similar specimens were sent for pathologic evaluation.

The patient tolerated the procedure well. He did have a postoperative fever, but an infectious source was not revealed by means of routine in-hospital cultures and a chest radiograph. He otherwise had an uneventful postoperative course. He was discharged home on postoperative day 6.

Although routine cultures were initially negative, actively budding yeast (Fig 2), which were mucicarmine positive (Fig 3), were revealed by means of a histopathologic examination of the mural thrombus, and cultures from the aortic wall eventually grew *Cryptococcus neoformans*. Peripheral blood cultures performed to evaluate postoperative fever also subsequently grew *C neoformans*.

The patient was immediately called at home, and he returned to the hospital. An infectious disease consultation was obtained. To evaluate possible central nervous

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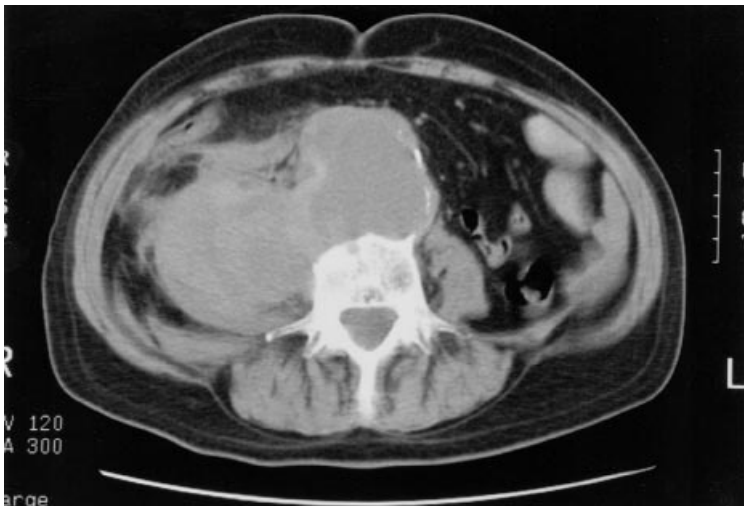

Fig 1. A ruptured infrarenal aortic aneurysm extending into the right retroperitoneal space.

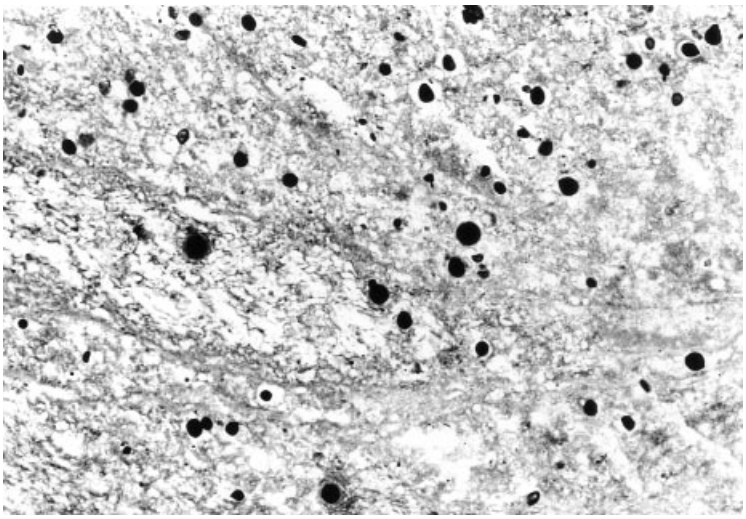

Fig 2. Gram stain of aortic tissue demonstrated actively budding yeast.

system involvement, a lumbar puncture was performed. Cerebrospinal fluid was positive for *Cryptococcal* antigen at a titer of 512, with cerebrospinal fluid cultures growing *C neoformans.* The patient subsequently underwent serologic testing for human immunodeficiency virus and syphilis, both of which were negative.

The patient was treated with 6 weeks of intravenous amphotericin B (0.6 mg/kg/day) and oral flucytosine (37.5 mg/kg Q6°). He responded favorably to that therapy. He was subsequently begun on lifetime suppressive treatment with oral fluconazole, because involvement of his aortic graft could not be excluded. At the 1year follow-up examination, the patient had no evidence of recurrent infection or aneurysm.

DISCUSSION

Cryptococcosis is a systemic infection caused by *C neoformans*, a ubiquitous fungus not restricted to geographic locale. *C neoformans* grows in high concentrations in the droppings of pigeons and other birds. Soil may also contain the fungus when it is contaminated with bird droppings.[5] Cryptococcosis most commonly occurs in immunosuppressed patients and involves the central nervous and respiratory systems. However, virtually all other sites of the body have been reported as being involved in cryptococcosis. For reasons that are not completely understood, endothelial surfaces appear to be some-

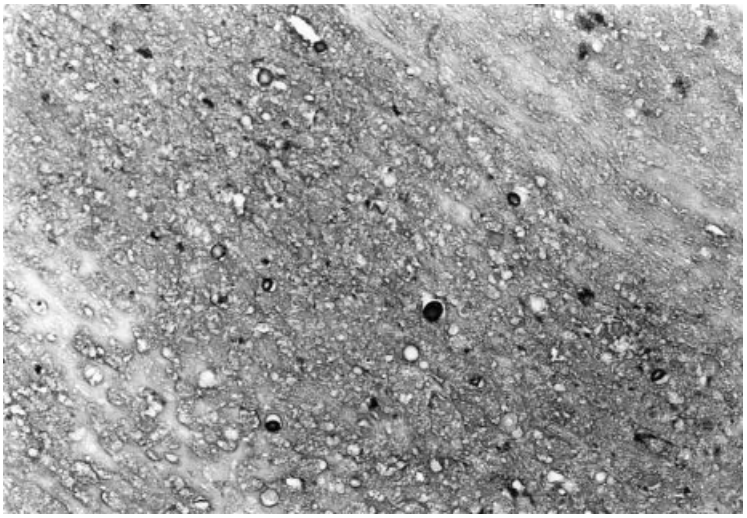

Fig 3. Mucicarmine-stained aortic wall, demonstrating *Cryptococcus neoformans.*

what resistant to fungal infection. When fungi do infect endothelial surfaces, these infections are, for the most part, limited to the heart.[5] In a review of 319 cases of fungal endocarditis, *Candida* species, *Aspergillus,* and *Histoplasma capsulatum* accounted for 91% of the cases. Only rarely was *Cryptococcus* the causative organism.[2]

Fungal arteritis typically occurs in two forms. The first form occurs most commonly in immunodeficient patients and involves the intracranial vessels as part of, or as an extension of, a primary central nervous system *Cryptococcal* infection. The second form manifests as a primary arterial infection after inadvertent intraarterial injection of organisms via contaminated needles (eg, in drug abusers) or from infected indwelling catheters.[2,3] To date, there are only two reported cases of *C neoformans* involving the aorta. Both of these cases were documented postmortem.[2,4] Our case represents the first published report of *C neoformans* presenting as a ruptured aortic aneurysm. Our patient ultimately survived to receive directed antifungal chemotherapy.

Aside from its uniqueness, this case illustrates several important points regarding mycotic aortic aneurysms. First, it underscores the usefulness of computerized tomography in the evaluation of aortic aneurysms. Deviations from the typical fusiform aneurysmal appearance should heighten concerns about a possible mycotic process and the need for further investigative studies.[6] Second, small aortic aneurysms (less than 4 cm) are, on occasion, complicated by rupture and require close surveillance (at 3- to 6-month intervals) for signs of rapid enlargement. Finally, an intraoperative finding of abnormally appearing aortic tissue should prompt evaluation by means of microbiologic and pathologic tissue analysis to rule out the possibility of an infectious etiology.

Previous studies that focused on culture results of aortic tissue at the time of aortic aneurysm repair found several bacterial species (*Staphylococcus, Salmonella,* and *Streptococcus*) to be present with a moderate frequency, especially in cases of ruptured aortic aneurysms.[6-8] The mere presence of bacteria cultured from aortic tissue, however, is not necessarily associated with active clinical infection, nor does it correlate with subsequent aortic graft infection. Thus, a policy of routine aortic wall culturing has fallen out of favor with most vascular surgeons, because of the uncertainty about clinical implications.[8] On occasion, however, the results of cultures provide the key to long-term management, as is demonstrated by our case. Clearly, microscopic evaluation of aortic tissue in unusual cases, such as a patient who has fever and degenerative disease of the aorta or patients who have small aneurysms that rupture, may ultimately assist in treatment and guide postoperative therapy.

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