



# A real mycotic aneurysm-mycotic aneurysm of the abdominal aorta due to fungal infection

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## ABSTRACT

A 53-year-old male who was being followed up by a nephrology department because of type V crescentic glomerulonephritis was admitted with abdominal pain to our clinic. He was diagnosed with abdominal aortic aneurysm after the examinations. Aortic repair with a tubular graft was performed. Pathological examination of the aneurysm tissue showed fungal hyphae. We started antifungal chemotherapy with amphotericin B. A separation of the graft body occurred, and the patient was reoperated on. An excision of the graft, ligation of the aorta, and axillobifemoral graft by-pass was performed. At the 15<sup>th</sup> month of his discharge, the patient was readmitted to the emergency room of our clinic suffering from hematemesis. According to the examinations, an aortoduodenal fistula was diagnosed, and we performed a partial duodenal resection and end-to-end duodenoduodenostomy. We want to share this unusual, interesting, and complicated case, operated on several times because of a mycotic aneurysm due to a fungal infection.

**Key Words:** Mycotic aortic aneurysm, fungal infections, Aspergillus, axillobifemoral by-pass, aortoduodenal fistula

## INTRODUCTION

Mycotic aneurysms of aorta are rarely seen. Furthermore, aneurysms caused by fungi are uncommon (1, 2). The diagnosis may be difficult, because the natural history usually follows an asymptomatic course. Undiagnosed cases carry a high mortality rate. Treatment includes antibiotherapy and a large spectrum of surgical procedures, ranging from in situ reconstructions to ligation of aorta and extra-anatomic by-pass (2-5).

Hereby, we report a case of symptomatic mycotic aortic aneurysm caused by *Aspergillus*, which was treated in our department. Therefore, the report covers an issue that is rarely reported in the literature and a review of the topic.

## CASE PRESENTATION

A 53-year-old male who had a 1-week history of left lower extremity and abdominal pain was admitted to the emergency room of the general surgery department. Past medical history did not reveal any abnormality except a gastric operation because of a perforation 10 years ago and type V crescentic glomerulonephritis. The patient was under corticosteroid therapy corresponding to his current glomerulonephritis in another hospital. Physical examination revealed a pulsatile abdominal mass in the epigastrium. The right lower extremity distal pulses were palpable, but there was no pulse in the left femoral, popliteal, and distal arteries. The arterial blood pressure was 110/80 mm-Hg, and the heart rate was 92/min. Laboratory tests revealed Hct: 33%, Hb: 7.6 g/dL, WBC: 12,300/ $\mu$ L, Plt: 123,000/ $\mu$ L, BUN: 71 mg/dL, creatinine: 2.6 mg/dL, blood glucose: 97 mg/dL, prothrombin time: 13.2 sec., activated partial thromboplastin time: 42.5 sec., and INR: 1.10. Chest radiography at that time did not reveal any pathology. Computerized axial tomography (CT) scan showed an infrarenal aortic aneurysm extending to the iliac bifurcation and thrombosis of the left iliac artery (Figure 1). The patient was consulted by the radiology department and was not considered suitable for endovascular repair regarding his infrarenal aortic angulation. Informed consent was signed by the patient before surgery. Then, left iliac thrombectomy and aortic tubular graft reconstruction with a polytetrafluoroethylene (e-PTFE) graft (Goretex) were carried out. Histopathological examination showed a septated aneurysm wall and branching fungal hyphae on a neutrophil- and lymphocyte-rich background containing cellular debris consistent with *Aspergillus* species (Figure 2a-c). Liposomal amphotericin B (3 mg/kg/d) was added to the treatment. The patient, who had hypovolemic shock and hemorrhage, was taken to the operating room on the 10<sup>th</sup> day of his first operation. During the exploration, the proximal graft anastomosis was separated due to infection. The synthetic graft was excised, the aorta was ligated infrarenally, and axillobifemoral e-PTFE graft by-pass was performed. As methicillin-resistant coagulase-negative staphylococci was isolated from the excised graft, vancomycin 2x500 mg was added to the current treatment. Af-

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ter the second operation, the patient was transferred to the nephrology department for antibiotherapy and further glomerulonephritis treatment. After the operation, he received 21 days of amphotericin B and 14 days of vancomycin.

At the 15<sup>th</sup> month of his discharge, the patient was readmitted to the emergency room suffering from hematemesis. The gastroduodenoscopic examination showed diffuse edema at the second and third part of the duodenum, and a non-bleeding aortoduodenal fistula was noticed (Figure 3). The exploration revealed a fistula between the second and third part of the duodenum and a distal aorta stump without any signs of recurrent infection. Partial duodenum resection, end-to-end duodenoduodenostomy, and ligation of the aortic fistula were performed. The patient was discharged 2 weeks after the operation after an uneventful postoperative follow-up. He was seen at the 1- and 3-month follow-up without any signs of infection and vascular problems. When the patient failed to show on the 6-month follow-up, the family was contacted, and we learned that he died unexpectedly at home.

**DISCUSSION**

“Mycotic aneurysm” was first described at the end of 19<sup>th</sup> century by Osler (6) for an aneurysm secondary to a fungal infection; however, today, this terminology is used for any infectious aneurysm (1). Mycotic aneurysms are rare. Usually their prognosis is asymptomatic. Mycotic aneurysms of the aorta may result from various infectious organisms or can be a suitable environment for many infectious agents (4, 7-9). The most common isolated pathogens from infected aortic aneurysms are *Salmonella* spp. and *Staphylococcus* spp. (2-5).

The operative mortality rate of mycotic abdominal aortic aneurysms is more than 20%. The mortality rate is even higher in diffuse para-aortic infections and suprarenal locations of aneurysmatic dilatations. The antibiotherapy is consequential, even after successful surgical treatment. The survival after mycotic aneurysms is very low when compared to atherosclerotic aneurysms, reaching only to 50% at 5 years (10). Although the data regarding this issue are seldom in the literature, there remains a debate of the endovascular approach in this group of patients. The current approach may be the control of bleeding with an endovascular graft, followed by definite reconstruction (3, 11, 12). Therefore, reports on endovascular treatment of mycotic aneurysms are being seen more commonly recently (4, 7, 8, 13). The mortality rate of endovascular repair (EVAR) was significantly lower than open surgery (11). If there is no contraindication, the first choice of intervention should be EVAR. Regardless of the technique chosen, whether it would be open or endovascular, antibiotherapy is consequential, even after successful surgical treatment (4).

There are not too many reports of mycotic aneurysms of *Aspergillus* reported in the literature (14-16). As an opportunistic infectious agent, *Aspergillus* is seen in severe granulocytopenic patients, such as patients with acute leukemia and lymphoma (16). The agents that primarily affect the lungs are inhaled as spores (17). Although extra-pulmonary affection is possible, it is very rare that the infection affects the cardiovascular system. Antibiotherapy must be added to the surgical or endovascular treatment (18). Once there is no macroscopically infected tissue left, amphotericin must be ordered for at



Figure 1. Abdominal aortic aneurysm on CAT scan

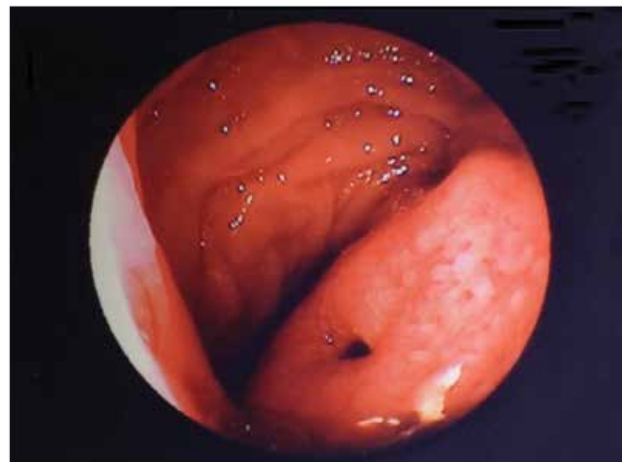


Figure 3. Aortoduodenal fistula in gastroduodenoscopic examination in the second and third part of the duodenum

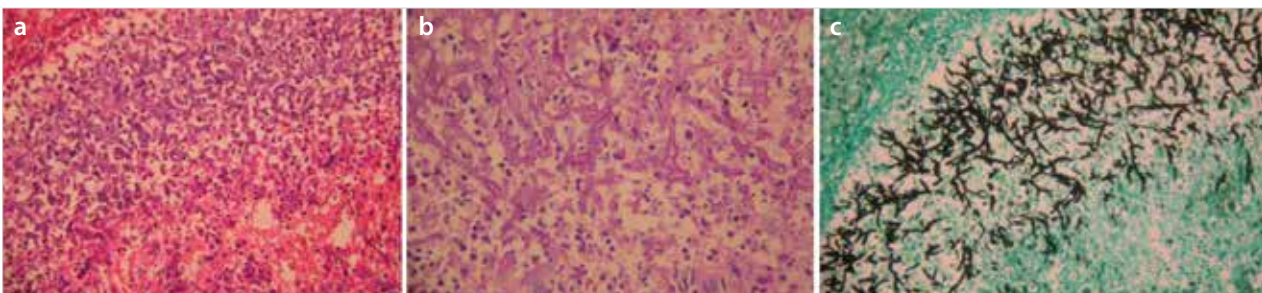


Figure 2. Septated and branching fungal hyphae on neutrophil- and lymphocyte-rich background containing cellular debris (A: HE, 100x; B: PAS, 200x; C: Grocott, 100x)

least 14 days, and the duration may be prolonged in regard to the clinical status of the patient and the laboratory findings. However, the patients should be followed up very closely; as seen in our case, the patients are re-admitted to hospitals with unexpected complications during the course of the disease. Although proper interventions were carried out successfully in our patient, we could not foresee the exact cause of his home death, which may still be related to an *Aspergillus* infection.

## CONCLUSION

Despite proper and timely interventions in mycotic aneurysms, unexpected complications and sepsis may lead to the loss of patients. Therefore, close follow-up is a critical tool in addition to perfect surgical treatment and adequate antibiotics.

**Informed Consent:** Written informed consent was obtained from patient who participated in this case.

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