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# Mycotic Aortic Aneurysm Due To Aspergillus: A 2-Year Follow-Up Case Report

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## Abstract

Mycotic aortic aneurysm(MAA) can easily develop to rupture or lead to sepsis with a high mortality rate. Among the known causative organisms of MAAs, aspergillus is rare even in the era of chemotherapy and immunosuppression. We present a case of MAA due to aspergillus in a patient with recently diagnosed Acute Lymphoblastic Leukemia (ALL) who underwent chemotherapy and developed acute hemoptysis. She then underwent resection of the infected aorta and an extraanatomic bypass without recurrent infection in 2 years. MAA can be diagnosed with Computer Tomography Angiography(CTA), and debridement with extraanatomic bypass procedure can get the best treatment efficacy.

## 1. Introduction

The term Mycotic Aortic Aneurysm(MAA) coined by Osler in 1885 is used for all aneurysms of infectious etiology except for arteritis syphilitica [1,2]. MAA is an acute inflammatory response to pathogenic infection, which induces neutrophilic infiltration at the arterial wall, leading to pseudoaneurysm [3]. Aspergillus is an aggressive invasive fungal infection that occurs frequently in immunocompromised patients [4] but rarely involved aorta. We herein report a case of a patient with recently diagnosed Acute Lymphoblastic Leukemia(ALL) who developed hemoptysis after chemotherapy. She was ultimately found to have a MAA in thoracic aorta due to aspergillus and underwent resection of the infected aorta and an extraanatomic bypass connected the ascending aorta to the abdominal aorta, which resolved her hemoptysis and infected lesions and without recurrence in two years follow-up.

## 2. Case History

A 12-year-old girl, affected by ALL treated with chemotherapy for 2 months, presented to to our intensive with a hisitory of fever for 3 weeks and hemoptysis from about 1 week. She lost 10 kilogram in the past 2 months and denied other special medical or family history. On clinical examination, the patient was apyrexial and haemodynamically stable with unremarkable cardiovascular, respiratory and abdominal examinations.

Laboratory evaluation showed C-Reactive Protein(CRP) 13.79 mg/L, Erythrocyte Sedimentation Rate (ESR) 40 mm/h and Leucocyte count 8.98×109/L,respectively. Several galactomannan tests, blood and urine cultures were negative in her hospital course. CT showed no obvious inflammation in the lung. CTA presented disruption of aortic arch wall with eccentrically pseudoaneurysm greater than 7cm in size and mural thrombus which was diagnosed MAA (Figure 1).

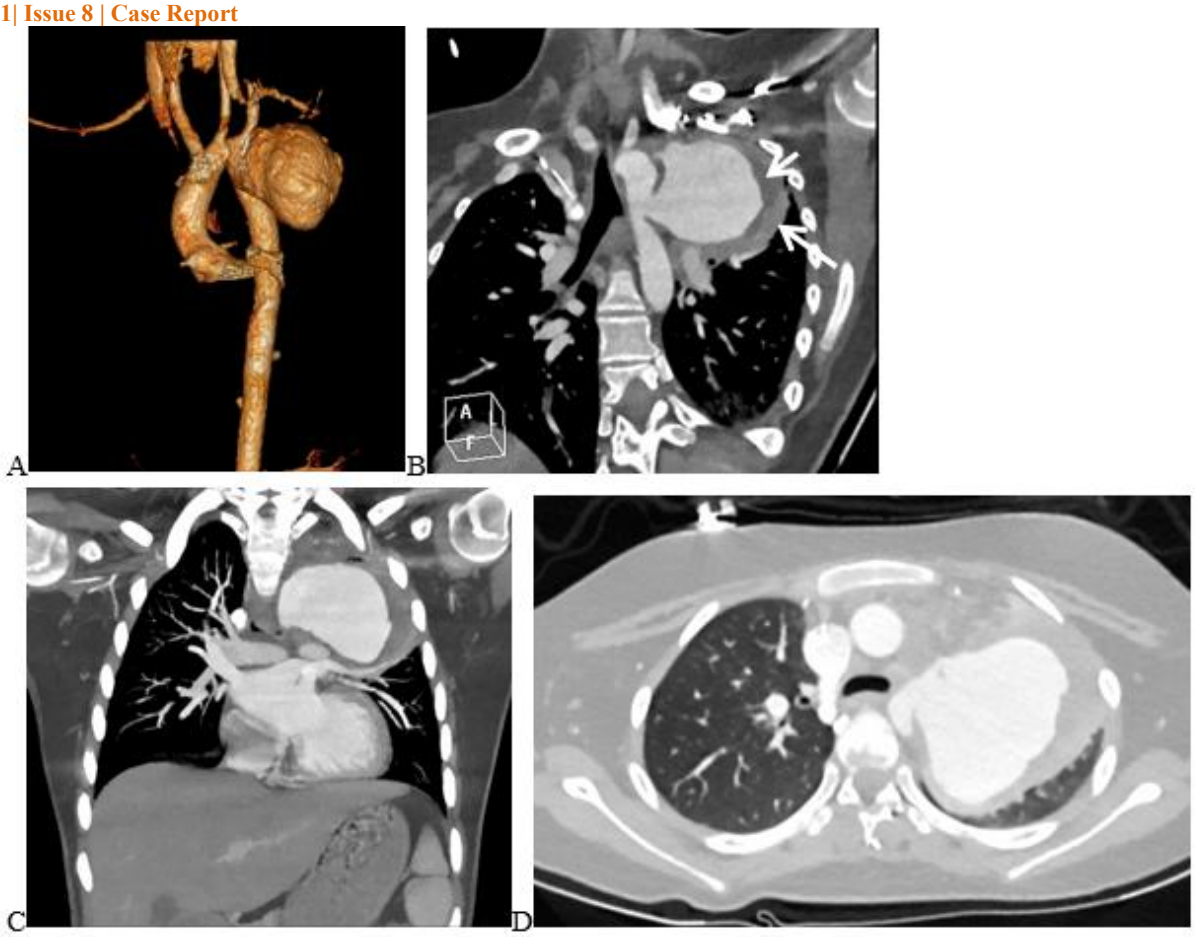


**Figure 1**: CTA of thoracic aorta at the initial visit. (A) 3D CTA showed giant irregular MAA adjacent to the left subclavian artery. (B) Coronal MPR view showed disruption in the aortic wall and the mycotic aneurysm (80*75mm) with periaortic soft tissue (long arrow) and mural thrombus (short arrow). (C) Coronal CT view showed the left pulmonary artery and pulmonary vein are compressed by the aneurysm. (D) Transverse view (lung window) showed clear lung field without patchy shadow or nodules.

Considering the possibility of MAA and avoiding graft placement within an infected field, open surgery with debridement and extraanatomic bypass procedure was performed. General anesthetic procedures were used during surgery. A midline sternotomy was performed to expose the ascending aorta and aortic arch. A midline laparotomy incision revealed distal abdominal artery. After heparinization, a side-biting vascular clamp was applied, and a 14-300-mm TERUMO graft was sutured in an endto-side anastomosis to the infrarenal abdominal aorta. The graft was allowed to fill in a retrograde manner and was placed in a curvilinear fashion before the liver, through the diaphragm, and anastomosed to the anterior side of the ascending aorta in the same manner, ascending aorta-toinfrarenal abdominal aorta bypasses was performed. Then, the left subclavian artery was resected and reimplanted with left common carotid artery and the MAA was resected with cardiopulmonary bypass and deep hypothermic circulatory arrest. Upon exploration, adhesions between the upper lobe of left lung, the pleura and the proximal descending aortic wall were carefully taken down. The aneurysmal portion was noted to contain significant purulence and surgical debridement was also performed. Pathological examination of periaortic tissue and aortic wall revealed necrotic aortic wall with the intense active inflammation and the presence of aspergillus hyphae (Figure 2). After the operation, antibiotics intravenously at induction for vascular surgery prophylaxis for 1week and without antifungal agents using.

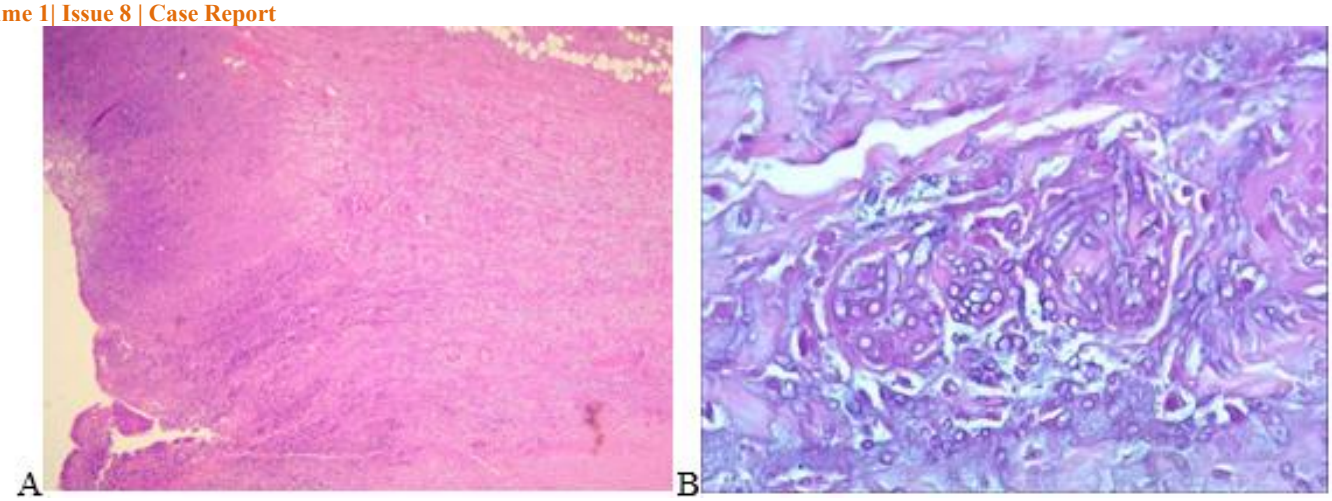


**Figure 2**: Pathological findings of MAA. (A) Surgical pathology revealed intense inflammation with the presence of necrotic aortic wall and loss of normal media architecture. (B) Aspergillus hyphae could be found in the infected aortic wall.

Follow-up at 1 and 3 months, 1 and 2 years demonstrated gradually resolution of residual lesion and the graft was patent (Figure 3).

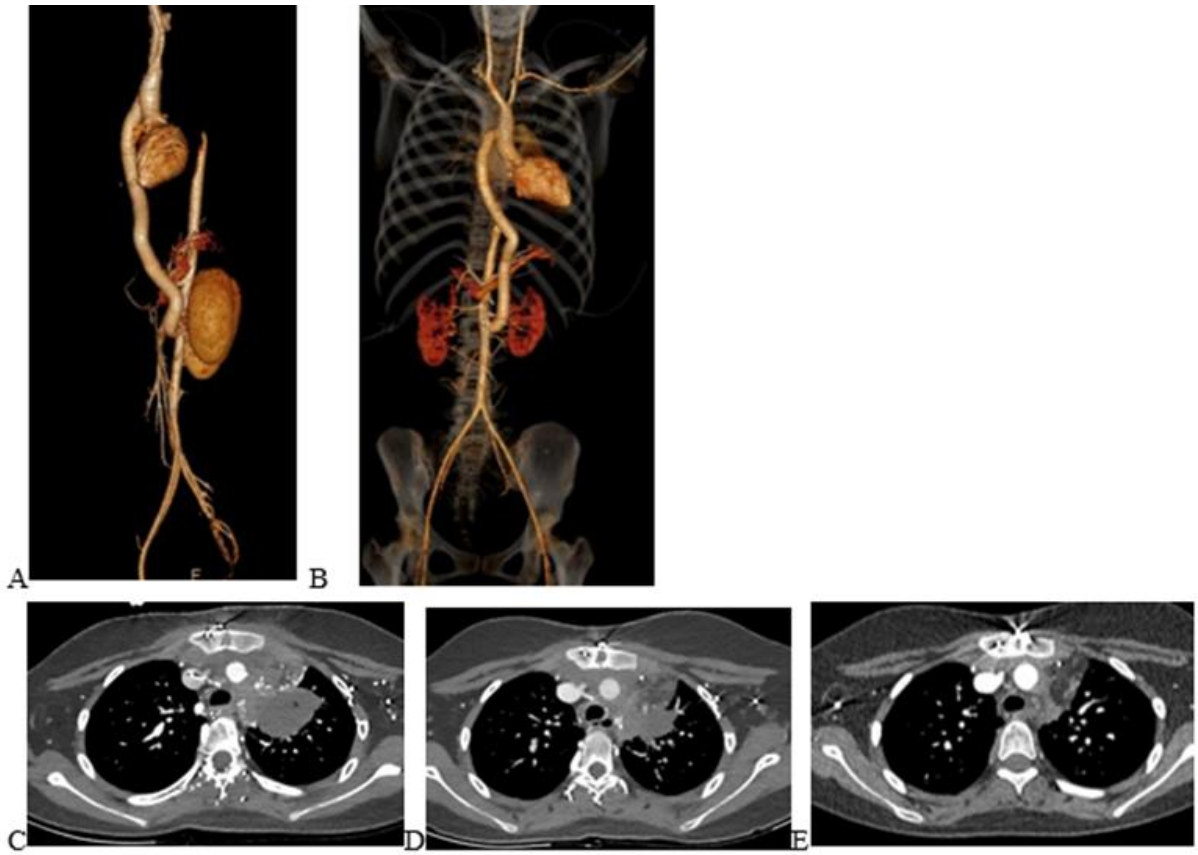


**Figure 3:** CTA of aorta at follow up. 3D CTA shows CTA after 3 months (A) and 24 months (B) showed patency of the extra-anatomic bypass.Transverse view of CTA after 1 month (C), 3 months(D) ,12 months(E) and 24 months(F) showed the residual lesion was absorbed gradually.

## 4. Discussion

Invasive aspergillosis is clinically one of the most serious infections with high morbidity and mortality, especially in immune-deficient patients [5]. The patient was diagnosed with ALL and received chemotherapy,which made her be more susceptible. Although main symptoms of MAA are nonspecific, a focal, contrast-enhancing, saccular lumen, with an indistinct, irregular aortic wall and with mural thrombus on CTA indicated MAA.

The current guidelines have recommended surgical resection is an option for some patients with localized aspergillosis [6]. Empiric antifungal therapy is not recommended for patients who are anticipated to have short durations of neutropenia, and the dosing of antifungals in children with is different and unknown [6]. Endovascular aortic repair was regard as an temporization of MAA rupture in hemodynamic instability cases, while open surgical repair is the reference standard with intraoperative debridement and extra-anatomic bypass. In our case, we choose the open surgical repair with no use of antifungals. At the last follow-up, there had no signs of infection and the graft was patency on CTA at 2 year after the surgery. The present case highlights the availability of open surgical repair in MAA as that can result in favourable outcome.

## 4. Conclusion

The consideration of TMAA in patients with immunosuppressive risk factors presenting with hemoptysis. In patients with high suspicion of TMAA, CTA can guide in initial diagnosis followed by confirmation with culture or histopathology. Excision and extra-anatomic bypass is the more appropriate method of treating a potentially fatal disease.

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