



Recurrent haemoptysis due to pulmonary aspergillosis treated with endovascular embolization – case report

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A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation,

D – Writing the article, E – Critical revision of the article, F – Final approval of the article

Jama G, Szmygin M, Szmygin-Milanowska K, Sojka M, Jargiełło T. Recurrent hemoptysis due to pulmonary aspergillosis treated with endovascular embolization – case report. *Ann Agric Environ Med*. doi:10.26444/aaem/211464

Abstract

Aspergilloma is a disease characterized by the formation of saprophytic fungal colonies in pulmonary cavities. Haemoptysis is the most common clinical presentation which may range from mild to life-threatening. Treatment options include conservative management, surgical resection and bronchial artery embolization (BAE).

Case Report. The case is described of a 66-year-old patient treated for haemoptysis due to aspergilloma for 6 years. Initially, the patient received conservative treatment, which did not yield measurable long-term benefits. He was later referred for minimally invasive treatment – bronchial artery embolization. Following embolization, symptoms reappeared after 5 years and the patient again underwent successful endovascular treatment. This case illustrates the superiority of minimally-invasive treatment over conservative therapy in managing haemoptysis.

Key words

aspergillosis, haemoptysis, endovascular, pulmonary hemorrhage

INTRODUCTION

Aspergilloma is a disease characterized by the formation of saprophytic fungal colonies in the pulmonary cavities [1]. An aspergilloma (fungus ball) consists of fungal hyphae, inflammatory cells, fibrin, mucus, and tissue debris [2]. Conditions predisposing to its development include those that lead to scarring or cavity formation in the lungs, such as lung cancer, cystic fibrosis, bullous emphysema, or lung abscesses [3]. The most common condition preceding aspergilloma is tuberculosis. On X-ray, the primary diagnostic tool, aspergillomas appear as freely mobile masses. Patients may be asymptomatic or present with haemoptysis [4].

Although many treatment options exist, pharmacological management using agents such as telipressin and adrenaline during the acute phase, however, is considered insufficient in many cases. While surgical treatment is highly effective, it also carries a high mortality rate. Currently, the best treatment method during the acute phase is considered to be embolization of the bronchial artery (90% of cases) or the pulmonary artery (10% of cases) [5]. A critical element of embolization is the proper selection of embolic material. The most commonly used include typically polyvinyl alcohol (PVA) particles, coils and tissue glue [6].

CASE REPORT

A 66-year-old patient with a 45-pack-year smoking history presented to the emergency department in 2019 due to haemoptysis. He had multiple co-morbidities: post-inflammatory pulmonary fibrosis (he reported diagnosis of tuberculosis in 1999), anaemia, hypertension, carotid artery atherosclerosis, cerebral circulatory failure, right lung apex aspergilloma (diagnosed a few years previously), as well as spinal osteoarthritis. During hospitalization in the Department of Pulmonology, Oncology, and Allergology, antifungal treatment was initiated. CT imaging showed a 55 mm cavity in the right upper lobe filled with a non-enhancing mass. During hospitalization, progressive anaemia (haemoglobin 8.8 g/dL) and lower limb numbness were observed. Two units of red blood cells were transfused without complications.

Itraconazole (200 mg once daily) was started, along with cyclonamine and tranexamic acid to control bleeding. This led to improved general condition, reduced inflammatory markers (CRP: from 22.9 mg/L on admission to 5.25 mg/L at discharge), and cessation of haemoptysis. Haemoglobin at discharge – 10.4 g/dL.

In 2020, the patient returned to the ED with recurrent symptoms. Laboratory tests again revealed anaemia (Hb 9.1 g/dL). Angiography visualized the aspergilloma as the source of bleeding, and endovascular embolization was performed at the Interventional Radiology Department. The procedure was performed under local anaesthesia with right femoral artery access. Angiography revealed a highly vascular lesion in the upper right lung. Embolization was carried out with particles of 900 and 1,100 µm, embolic glue, and gelfoam. Follow-up angiography confirmed successful

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Received: 30.06.2025; accepted: 29.09.2025; first published:10.10.2025

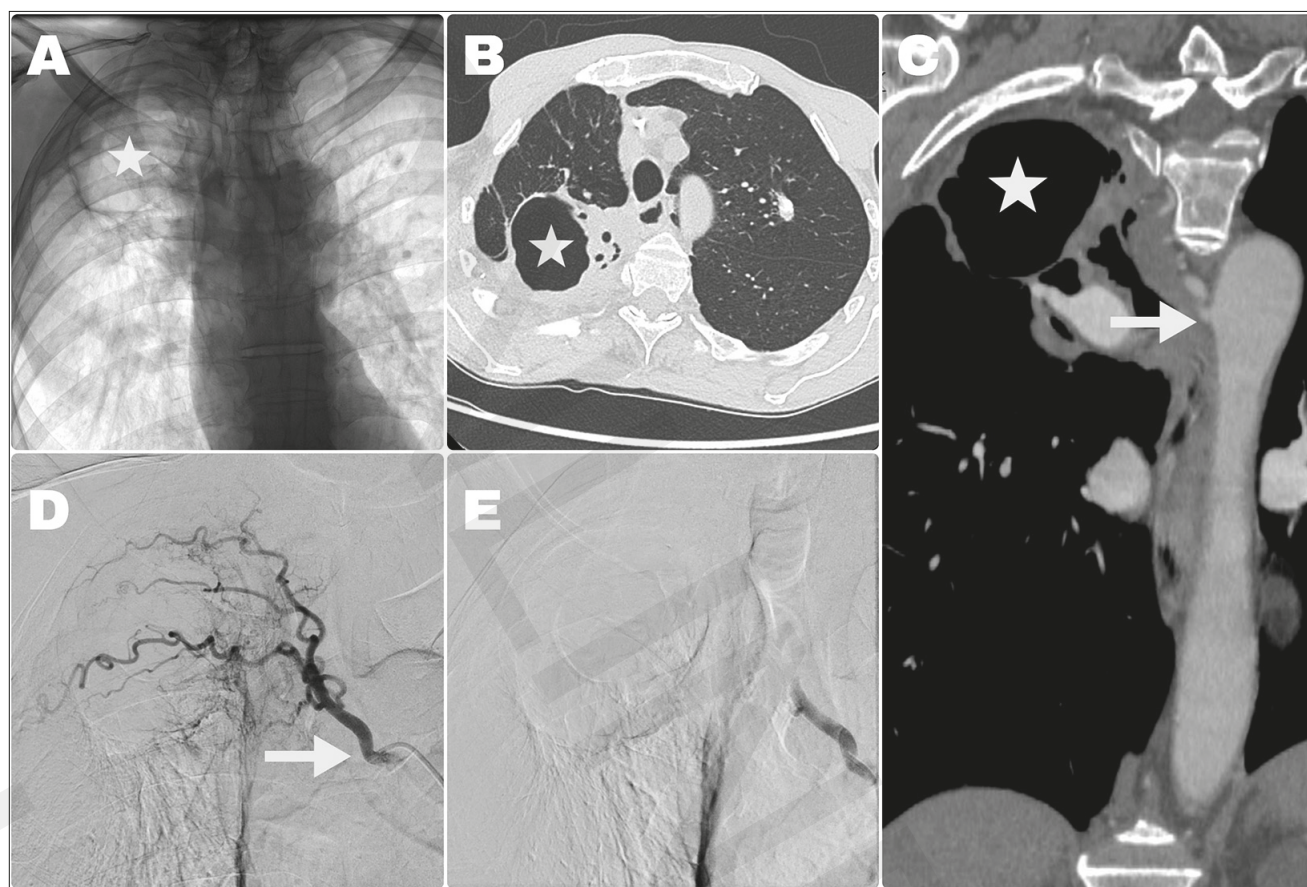


Figure 1. Chest X-ray (A) and CT (B,C) presenting a cavity in the apex of the right lung (white star). Culprit vessel originating from aorta was detected on the contrast-enhanced images (white arrow). Selective angiography disclosed rich blood supply with vascular blush characteristic for patients presenting with haemoptysis (D – white arrow). Control contrast injection confirmed complete occlusion of the vessel and exclusion of the blood supply to the lesion

closure of the abnormal vascular bed. Post-procedure, the patient reported mild shoulder girdle pain, which gradually resolved.

In 2025, the patient presented once again to the ED due to blood in the sputum. Laboratory results showed severe anaemia (Hb 7.7 g/dL) and inflammation (CRP 36.3 mg/L). Imaging (CT and chest X-ray in PA view) showed irregular, thick-walled cavitory lesions in the right lung apex (~70 mm) [Fig. 1A and B – white star]. In addition, angioCT disclosed blood supply originating from a branch of descending aorta [Fig. 1C – white arrow]. Repeated embolization was performed. Culprit vessel was selectively catheterized [Figure 1D – white arrow]. Angiography revealed a richly vascular lesion in the upper right lung and arteriovenous fistulas. Embolization was performed with particles of 700 and 900 μ m. Follow-up imaging confirmed successful closure of the vascular bed and complete stasis in the targeted vessel [Fig. 1E]. Two days post-procedure, laboratory tests (Hb 7.9 g/dL) were performed, and 2 units of red blood cells were transfused. Four days later, haemoglobin improved to 8.5 g/dL. Following the uneventful hospitalization, the patient was discharged in good clinical condition.

DISCUSSION

In the presented case, initial conservative treatment failed to provide long-term benefits. Within a year, symptoms recurred. Embolization on the other hand, led to lasting

improvement, with a 5-year symptom-free period. Although such invasive treatments as lobectomy are considered first-line and potentially curative, they are not suitable for all patients, especially those with comorbid lung diseases, e.g. tuberculosis, pneumoconiosis, or bronchiectasis [7]. These conditions impair lung function and increase surgical risk [6].

Bronchial artery embolization is a highly effective method to control bleeding. According to the study *Bronchial artery embolization in haemoptysis: a systematic review*, which analyzed 22 studies with at least 50 patients each, the immediate clinical success rate of BAE (defined as complete cessation of haemoptysis) ranged from 70% – 99% [8]. However, recurrence rates remain high – between 10% – 57%. Common causes of recurrence include incomplete embolization, recanalization, and new collateral vessel formation. Despite high recurrence rates, BAE remains the first-line emergency treatment for inoperable patients and those with diffuse or bilateral lung disease. Conservative treatment of mild-to-moderate haemoptysis typically targets the underlying disease (e.g., infection), with anticoagulation management also being a key. Antifibrinolytic therapy with tranexamic acid has shown effectiveness [9]. Comparing conservative treatment to BAE, BAE is clearly superior. In the study *Bronchial artery embolization versus conservative treatment for hemoptysis: a systematic review and meta-analysis*, BAE patients had lower recurrence rates (26.5% vs. 34.6%), higher clinical success (92.2% vs. 80.9), and lower haemoptysis-related mortality (0.8% vs. 3.2%), compared with patients treated conservatively. In terms of safety, the

incidence of major complications in patients undergoing BAE remained negligible, while the rate of minor complications was 12.7% [10].

Regarding embolic materials, traditional PVA particles of 300–500 µm are used, but post-2010 literature explores a broader range – 150–1,200 µm. A major risk is non-target embolization, especially of the anterior spinal artery, therefore particles <325 µm are generally avoided. Studies show that BAE with PVA have a clinical efficacy of 85–93%, with recurrence up to 28% [11]. With gelfoam, efficacy was similar (86.6%) and recurrence slightly lower (24.1%) [12]. Fruchter et al., using microspheres and coils, reported high efficacy (92%) but higher recurrence (57.5%) [13]. Other studies indicate that larger microspheres result in high technical (90–100%) and clinical success (87–91.9%) with low recurrence (8–13%) [14,15]. Particularly promising are results using NBCA glue [16]. Baltacıoğlu et al. reported 100% immediate control and 96% 1-month efficacy. Only one recurrence occurred due to an untreated vessel [17]. In Woo et al.'s study of 406 patients, long-term outcomes of PVA vs. NBCA showed higher haemoptysis-free survival at 1, 3, and 5 years for NBCA (88%, 85%, 83%) than for PVA (77%, 68%, 66%). Re-canalization rates were also lower with NBCA (1.8%) vs. PVA (21.5%) [18].

CONCLUSIONS

Bronchial artery embolization is a safe and effective treatment for haemoptysis caused by aspergilloma. While surgery remains the gold standard, it is not always feasible, especially in older, multimorbid patients. In such cases, BAE appears to be the best therapeutic option.

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