Case Report

Dual pulmonary *Aspergillus-Mucor* co-infection in a post-tubercular cavity presenting as recurrent hemoptysis: A case report

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ABSTRACT

A dual pulmonary co-infection with *Aspergillus* and *Mucor* is reported in a 65-year-old female with a history of pulmonary tuberculosis, hypertension, diabetes, and coronary artery disease, who experienced non-progressive hemoptysis for 5 days. Computed tomography revealed a 4 × 4 cm cavitary lesion in the right upper lobe with potential vascular involvement. Following the recurrence of hemoptysis despite embolization, right upper lobectomy was performed. Histopathological examination revealed broad ribbon-like aseptate hyphae consistent with *Mucorales,* along with thin septate hyphae with acute-angle branching consistent with *Aspergillus* species. The patient recovered uneventfully after surgery. This case highlights the importance of considering mixed fungal infections in high-risk patients presenting with cavitary lung lesions.

Key words: Aspergillus, Hemoptysis, Mucormycosis, Post-Tubercular cavity

Opportunistic fungal infections such as Aspergillosis and Mucormycosis may present with high morbidity and mortality rates in susceptible individuals who are at risk for diabetes mellitus, immunocompromised states, corticosteroid usage, and structural lung disease. Diagnosing these infections is more challenging because of their resemblance in terms of clinical and radiological image findings. Dual pulmonary co-infections with *Aspergillus* and *Mucor* species are rare and may result in delayed diagnosis and poor prognosis [1,2].

We present a unique case of dual fungal infection developing in a post-tuberculous cavity with hemoptysis treated with surgical resection. Although pulmonary Aspergillosis and pulmonary mucormycosis are individually well recognized, simultaneous infection by both fungi within a healed post-tubercular cavity is exceedingly rare. The overlapping clinical and radiological features often delay diagnosis, while recurrent hemoptysis may become life-threatening. This case is presented to emphasize the importance of considering dual fungal infection in high-risk patients with residual tuberculous cavities and to highlight the diagnostic value of histopathology together with the role of timely surgical intervention.

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CASE REPORT

A 65-year-old female, a farmer by occupation, presented with the chief complaint of coughing up blood for 5 days. It is sudden in onset and non-progressive, with 2 episodes of 20–30 mL/bout; there were no aggravating or relieving factors. She has a history of pulmonary tuberculosis, 9 months ago treated with anti-tubercular treatment for 6 months under the National Tuberculosis Elimination Program, and she was confirmed cured. Medical history includes hypertension and diabetes for the past 10 years, for which she uses regular medication. She has a history of a coronary artery bypass graft surgery 10 years ago. She has no history of COVID-19 infection, breathlessness, chest pain, wheeze, or fever.

She reports normal appetite and no loss of weight; she has no addictions. Diagnostic investigations are described in Table 1. Contrast-enhanced computed tomography chest revealed a cavitary lesion with an intracavitary soft-tissue density and air-crescent sign in the right upper lobe (Fig. 1a).

The differential diagnosis of a cavitary lung lesion presenting with recurrent hemoptysis included chronic pulmonary aspergillosis (aspergilloma), reactivation pulmonary tuberculosis, bacterial lung abscess, cavitary lung malignancy, and pulmonary thromboembolism. Reactivation tuberculosis was considered less likely as

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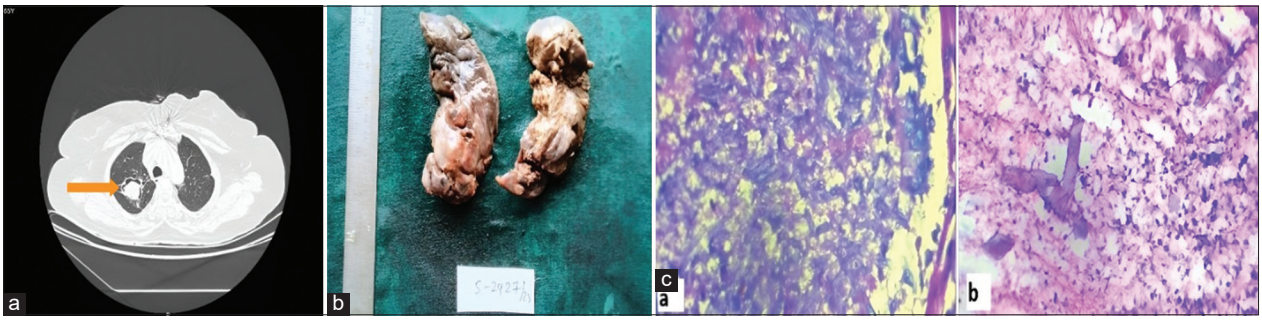


Figure 1: Composite figure showing radiological, gross pathological, and histopathological findings. (a) Contrast-enhanced computed tomography chest showing a lesion and air crescent in the right upper apical region of the lung; (b) Gross right upper lobectomy specimen; (c[a]) Thin septate hyphae with acute-angle branching consistent with *Aspergillus* species (Grocott methenamine silver stain, ×400); (c[b]) Broad ribbon-like aseptate hyphae with right-angle branching consistent with *Mucorales* (Hematoxylin and Eosin, ×400)

Table 1: Summary of diagnostic investigations

Investigation	Result
Hemoglobin	9.8 g/dL
Glycated hemoglobin	9.3%
Red blood cell count	3.4×10^{6}/μL
Contrast-enhanced computed tomography chest	4×4 cm cavitary lesion with central 3.2×2.7 cm soft tissue density and a peripheral thin rim of air giving a crescent appearance in the apicoposterior segment of the right upper lobe. Pseudoaneurysm in the wall of the cavity, possibly from the right upper pulmonary artery branches. (Fig. 1a)
Angiogram	Hypertrophied supreme intercostal arteries with abnormal blush
Bronchoscopy	Normal tracheobronchial tree
Histopathology	Alveoli filled with mixed inflammatory cells and broad ribbon-like aseptate hyphae with right-angle branching consistent with *Mucormycosis*. Grocott methenamine silver stain demonstrated thin septate hyphae with acute-angle branching consistent with *Aspergillus* species. (Fig. 1c)

the patient had completed anti-tubercular therapy, had no constitutional symptoms suggestive of active disease, and imaging favored an intracavitary fungal lesion. A bacterial lung abscess was unlikely in the absence of fever or features of systemic infection. Although cavitary malignancy remained a consideration because of recurrent hemoptysis, histopathological examination excluded neoplasia. Pulmonary thromboembolism was not supported by the clinical presentation or radiological findings. The definitive diagnosis was established by histopathology, which demonstrated both *Aspergillus* and *Mucor* species.

Management of hemoptysis involved embolizing the supreme intercostal arteries with PVA particles and gel foam. Hemoptysis recurred after 1 month, leading to a planned right upper lobectomy (Fig. 1b).

Histopathological examination of the resected specimen confirmed dual infection with *Aspergillus* and *Mucor* species, and the bronchial and vascular resection margins were free of fungal invasion (Fig. 1c[a and b]). Post-surgery, the patient was given medications for pain and infection control and recovered uneventfully.

A follow-up was conducted after 1 week and 3 months with proper guidance. During the 3-month follow-up, the patient remained asymptomatic without recurrence of hemoptysis.

DISCUSSION

Pulmonary co-infections of *Aspergillus* and *Mucor* species are relatively rare and are predominantly reported in immunocompromised individuals [3]. In the present case, diabetes mellitus and a history of treated pulmonary tuberculosis predisposed the patient to fungal colonization within a residual cavitary lesion.

The clinical presentation of mixed fungal infection is often non-specific and may include cough, fever, dyspnea, or hemoptysis. Our patient presented with recurrent hemoptysis, a manifestation attributed to vascular invasion and local tissue destruction by fungal hyphae. The presence of an air-crescent sign within a cavitary lesion on computed tomography (Fig. 1a) raised suspicion for a fungal etiology, although imaging alone cannot reliably distinguish *Aspergillosis* from *Mucormycosis* [4].

Definitive diagnosis relies on histopathological examination. In our case, the coexistence of broad, ribbon-like aseptate hyphae with right-angle branching, consistent with Mucormycosis, and thin, septate hyphae with acute-angle branching, consistent with *Aspergillus* species, confirmed a dual fungal infection. Similar cases reported in the literature have demonstrated an association of *Aspergillus* and *Mucor* co-infection with previous pulmonary tuberculosis, diabetes mellitus, and other immunocompromised conditions [5-9].

However, dual *Aspergillus–Mucor* infection reports occurring within a healed post-tubercular cavity and recurrent hemoptysis as a presentation remain limited. Mostly, described in patients with severe immunosuppression, uncontrolled diabetes, or COVID-19-associated immune dysfunction. The present case is noteworthy because the infection developed within a residual post-tubercular cavity and

ultimately required lobectomy for recurrent hemoptysis. Diagnosis is established by histopathological examination.

Management of mixed fungal infections remains challenging because of their aggressive nature and potential for life-threatening hemoptysis. Surgical resection plays an important role in selected patients with localized disease, recurrent bleeding, or diagnostic uncertainty [10]. In our patient, recurrent hemoptysis despite prior embolization prompted surgical resection, which proved both diagnostic and therapeutic. Our patient underwent right upper lobectomy following recurrent hemoptysis, recovered without post-operative complications, and received itraconazole 200 mg PO BD for 2 weeks after surgery. Subsequent long-term follow-up and optimized glycemic control are essential, as the mortality rate for such invasive pulmonary fungal diseases remains high, often ranging from 40% to 80%. Furthermore, adjuvant systemic antifungal therapy, typically involving amphotericin B and posaconazole, remains a critical component of the treatment regimen to address potential residual disease and systemic dissemination [11]. Given these diagnostic complexities, clinicians should prioritize the early initiation of combined medical and surgical interventions to improve patient outcomes. This case highlights the importance of considering mixed fungal infections in patients with cavitary lung lesions, particularly in immunocompromised individuals. Early recognition and timely surgical intervention increase the chances of favorable outcomes.

CONCLUSION

Histopathological investigation remains an important diagnostic method for establishing the diagnosis of dual infection in the lungs, as the presenting symptoms have similar features and are difficult to differentiate from one another. Pulmonary dual infection caused by *Aspergillus* and *Mucor* is usually suspected in patients with predisposing factors, including diabetes mellitus, prolonged usage of corticosteroid drugs, presence of tuberculous lung cavities, and recent infection with COVID-19. Surgical resection in selected cases with hemoptysis can serve both diagnostic and therapeutic purposes. At the 3-month follow-up, the patient was asymptomatic with no recurrence of hemoptysis, underlining the favorable result that can be achieved by timely intervention.

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