

# Bronchoscopic Removal of Aspergilloma from a Cavitory Lesion of the Lung

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## ABSTRACT

We report a 62-year-old diabetic male who had recurrent episodes of haemoptysis, diagnosed to have Aspergilloma in the right upper lobe cavitory lesion of the lung. Bronchoscopic biopsy revealed a fungal ball (*Aspergillus niger*) in the right upper lobe. Since the patient did not respond to medical treatment, unfit for any surgical interventions, mechanical removal of the fungal ball was done with both rigid and flexible bronchoscopes. Patient improved symptomatically after the removal of the fungal ball; haemoptysis subsided. The patient is still under follow up without any further episodes of hemoptysis. This case report highlights a new alternative treatment option in patients with open cavitory Aspergilloma.

**Keywords:** Aspergilloma, *Aspergillus niger*, Diabetes mellitus, Haemoptysis, Post-tubercular cavitory lesions

## CASE REPORT

A 62-year-old diabetic male presented with history of cough with expectoration, recurrent episodes of massive haemoptysis, chest pain and breathlessness. He had completed Anti Tuberculosis Treatment regularly RNTCP- CAT I for pulmonary tuberculosis few years back and declared cured.

On examination, patient was cachectic. All vital signs were normal except raised respiratory rate-30/min and Sp<sub>o</sub><sub>2</sub> 80-90 % at room air. Respiratory system examination revealed scattered crepitations over right suprascapular, infraclavicular areas and cavernous breath sounds over the left infraclavicular and left suprascapular areas. Clinical examination of other systems was unremarkable. Blood sugars were high at the time of admission, later was kept under control with insulin. Renal function tests and liver function tests were normal. Tests for HIV and HbsAg were negative. Sputum culture and sensitivity for pyogenic organisms and smear for AFB stain were negative. Sputum examination with 10 % KOH revealed fungal mycelia.

CT scan of the chest [Table/Fig-1a, b] showed large cavity (52 x 46 x 30 mm) in the right upper lobe with internal soft tissue density; likely fungal ball. Another large empty cavity was located in left upper lobe (75 x 57 x 50 mm). Bronchoscopy [Table/Fig-2a] revealed an airway leading into a cavity with a mass lesion in the right main bronchus. Transbronchial biopsy was done and histopathology was suggestive of Aspergilloma [Table/Fig-2b]. Fungal culture confirmed the diagnosis as *Aspergillus niger*. Serum IgE antibody to *Aspergillus* was positive. Pulmonary function test was suggestive of obstructive air way disease. Patient was started on Tab. Itraconazole 200 mg twice daily, but there was no improvement with medical treatment. Since patient had recurrent episodes of massive haemoptysis and being declared unfit for any surgical procedures due to low pulmonary

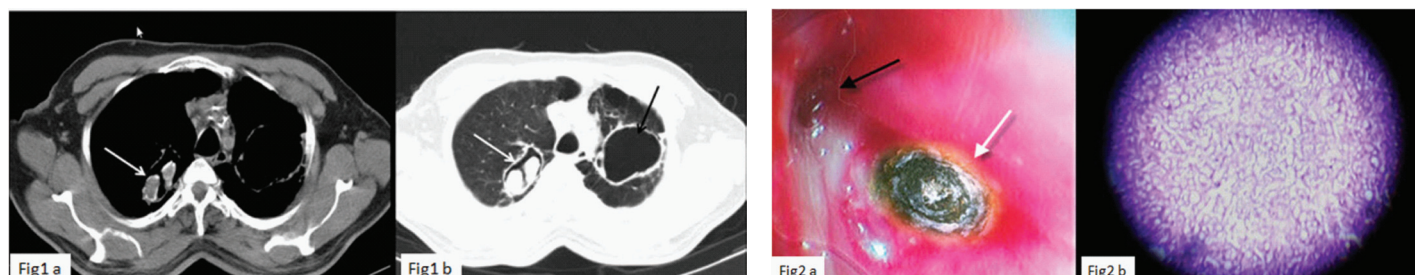
reserve, a trial removal of Aspergilloma with bronchoscopes were planned.

After getting ethical clearance and obtaining informed consent, with proper preoperative precautions, under intravenous anesthetics, bronchoscopy was done after keeping the patient in the right lateral position. Right upper lobe cavity was entered with the help of flexible bronchoscope which was introduced through the rigid bronchoscope. Electrosurgical knife and electro surgical snare forceps were used through flexible bronchoscope to mechanically disrupt the Aspergilloma. Haemoptysis which occurred during the procedure, was managed with coagulation electrode passed through the flexible bronchocope. In view of haemoptysis, the procedure was scheduled for half an hour in three different sittings over a period of eight days.

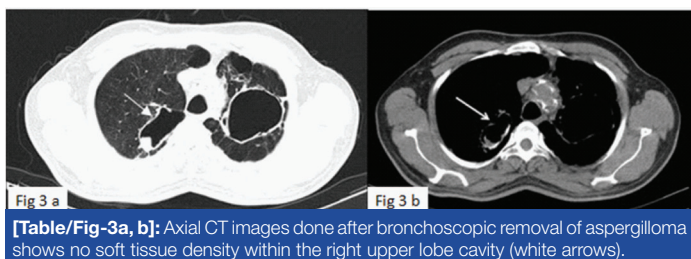
During the postoperative period he had two episodes of haemoptysis which was managed conservatively with packed cells transfusions. Patient was kept in ICU, intubated and later kept on T-piece. He had an uneventful extubation on day three and was discharged with Tab. Voriconazole 200 mg twice daily and advised to review regularly. Repeat CT chest done after one week [Table/Fig-3a, b] showed no soft tissue density in the right upper lobe cavity. No further episodes of haemoptysis were reported. Subsequent pulmonary function tests showed good improvement. Six months of regular therapy and follow-up has revealed a significant improvement.

## DISCUSSION

There are five main clinical syndromes caused by *Aspergillus* species (*A.fumigatus* & *A.niger*), gaining entry via the respiratory tract: Allergic Bronchopulmonary Aspergillosis (ABPA), Allergic Bronchial Asthma, Aspergilloma (fungal ball), Invasive Aspergillosis, Chronic Necrotising Pulmonary Aspergillosis (CNPA). *Aspergillus fumigatus*



**[Table/Fig-1a&b]:** Axial computed tomography (CT) images showing well defined cavity in right upper lobe with intracavitary hyperdense soft tissue within it suggestive of fungal ball (white arrows). Another large cavity also noted in left upper lobe without any intracavitary soft tissue (black arrow). **[Table/Fig-2a, b]:** Showing bronchoscopy picture showing mass lesion present in the right upper lobe bronchus (white arrow) and normal bronchus intermedium (black arrow). **[Table/Fig-2b]:** Showing histopathology picture (haematoxylin and eosin stain) fragments of tissues showing abundant fungal elements with branching septate hyphae lined by respiratory epithelium



**[Table/Fig-3a, b]:** Axial CT images done after bronchoscopic removal of aspergilloma shows no soft tissue density within the right upper lobe cavity (white arrows).

is the most common species causing Aspergilloma, except in diabetes mellitus in whom *Aspergillus niger* is more common with poor prognosis [1]. Aspergilloma can be either primary or secondary, Primary arising within the bronchial tree with proliferation of fungus leading to a pulmonary cavity, which is rare. Secondary aspergilloma is more common, causing fungal ball in pre-existing cavities like tuberculosis, histoplasmosis, blastomycosis, atypical Pneumocystis jiroveci pneumonia, sarcoidosis.

Though most of the patients with pulmonary Aspergilloma are asymptomatic, few of them present with fever, cough, breathlessness and haemoptysis [2]. Aspergilloma was reported in 69% to 80% of post tubercular cavities and majority of the cases presenting with life threatening hemoptysis [3,4].

Eosinophilia and elevated serum immunoglobulin E (IgE) levels may be seen in patients who are allergic to the fungus, but these are non specific. Serum levels of *Aspergillus fumigatus*-specific IgG and IgE are elevated in both ABPA and Aspergilloma, determined by the enzyme-linked immunosorbent assay (ELISA) method. Diagnosing Aspergilloma based on serum IgE is nonspecific.

The radiological signs of Aspergilloma include air crescent sign (Monod's sign) and finger-in-glove appearance. Movement of the fungus ball within the cavity may be appreciated when comparing upright and decubitus images. CT angiography may also provide useful information for patients with hemoptysis by identifying hypertrophic bronchial arteries that often supply the cystic wall of Aspergillomas [5].

The definitive treatment of Aspergilloma is surgical resection. Other surgical methods being tried are segmentectomy, lobectomy and Cavernostomy, which are associated with severe morbidity and mortality [6]. In unstable patients, alternative procedures can be done. Antifungal drugs were unsuccessful as they cannot have minimal inhibitory concentration in the lung cavities due to thick cavitary walls. Cure rate of medical treatment with intravenous antifungal agents like amphotericin-B is very low [7]. Other routes of antifungal therapy like inhalation, intracavitary, endobronchial instillations are less effective [8]. Bronchial artery embolization is reserved for treating acute massive hemoptysis, but it is rarely effective due to collateral blood vessels [9].

As the patient's condition worsened with conservative management, with the chance of Aspergilloma to enlarge and cause significant

haemoptysis, an alternative and new treatment modality was opted to decrease the risk [10]. One of the recent studies showed promising results in bronchoscopic removal of open cavitary Aspergilloma in patients with unilateral lung disease [10]. Bronchoscopic electro-surgical snare have been used to remove endobronchial masses like lipoma and hamartoma in some studies [11,12]. In our patient, we used both electro surgical knife and snare to mechanically disrupt and remove the Aspergilloma. Our case is unique in the sense that patient had bilateral lung disease with less common *Aspergillus niger* being isolated.

The limitations for bronchoscopic removal are bleeding tendency, displacement and soiling of the opposite lung with fragments of Aspergilloma and recurrence of Aspergilloma. We managed the bleeding conservatively with packed cell transfusions and the soiling of the left lung was prevented by keeping the patient on the right lateral position during the procedure. Bronchoscopic removal of aspergilloma is possible only in open cavitary lesion but not in closed cavity. Patient is under regular follow up; so far he didn't have recurrence of clinical symptoms or radiological signs.

## CONCLUSION

In patients with open cavitary Aspergilloma with recurrent massive haemoptysis, who are unfit for any surgical interventions and failed medical management, bronchoscopic intervention shows promising results with minimal mortality and morbidity and possibility of cure. This treatment modality provides an alternative approach for patients who are having open cavitary Aspergilloma.

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