

A Case of Endobronchial Aspergilloma

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Abstract

Pulmonary aspergillosis may be classified under three categories, depending upon whether the host is atopic or immunocompromised: invasive aspergillosis, allergic bronchopulmonary aspergillosis (ABPA) or aspergilloma. However, it is not always possible to effectively categorize this disease. We experienced a case of endobronchial aspergilloma, which was difficult to categorize, in a healthy male patient. The chest X-ray and computed tomography showed an ill-defined nodule mimicking lung cancer. Fiberoptic bronchoscopy revealed an aspergilloma without cavity formation in the left lower laterobasal segmental bronchial orifice. The aspergilloma was removed and the patient's symptoms were relieved. We present this unusual case with a review of the literature.

Key Words: Endobronchial aspergilloma, bronchoscopy

INTRODUCTION

Aspergillus is a ubiquitous fungus. Although it can affect many organ systems, the upper respiratory tract is the most common site of involvement. Depending upon whether the host is atopic or immunocompromised, pulmonary aspergillosis may be classified under three categories: invasive aspergillosis, allergic bronchopulmonary aspergillosis (ABPA) or aspergilloma.¹

Invasive aspergillosis occurs in immunocompromised hosts, particularly in patients with leukemia or lymphoma. ABPA is caused by a hypersensitivity reaction to the fungus residing in the bronchial tree in asthmatic patients.² Most cases of aspergilloma arise from colonization by the fungus of a preexisting parenchymal cavity.³

However, it may be difficult to categorize cases of pulmonary aspergillosis under the specific categories, and sometimes more than one form of the disease may be present at the same time.⁴

We experienced a case of endobronchial aspergilloma in a healthy 33 year-old male patient with chest discomfort and blood-tinged sputum. His simple chest X-ray and computed tomography showed an ill-defined nodule mimicking lung cancer. Fiberoptic bronchoscopy revealed a fungal ball without cavity formation in the left lower laterobasal segmental bronchial orifice. The fungal ball was removed, and was later pathologically diagnosed as aspergilloma. The patient's symptoms were relieved after the removal. We present this unusual case with a review of the literature.

CASE REPORT

A 33 year-old male visited Severance Hospital at Yonsei University College of Medicine due to intermittent blood-tinged sputum and chest discomfort of three months duration. He had undergone surgery for pneumothorax ten years before. He did not smoke and there was no history of other illnesses. His lung sounds were clear on auscultation. No wheezing or rhonchi were heard. Other physical findings were normal. Routine laboratory examinations were performed and no unusual findings were detected. Sputum culture for bacteria and fungus was negative.

The patient's initial chest X-ray showed an ill-defined nodular density at the left infrahilar area (Fig.

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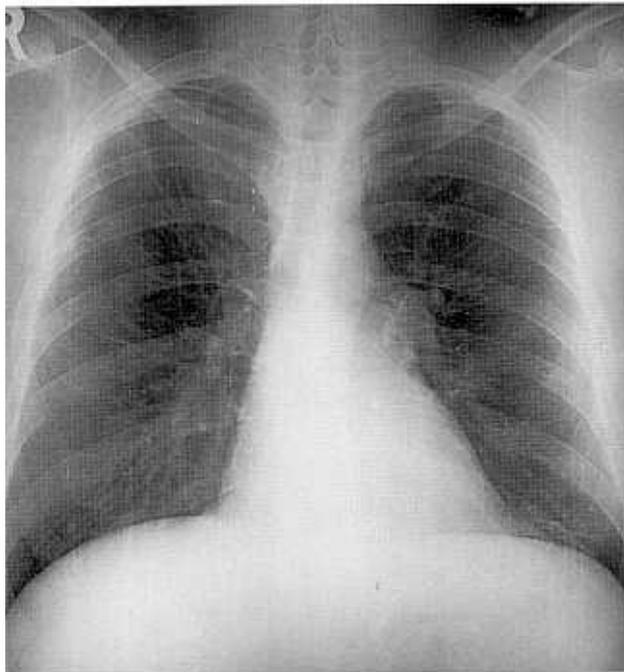


Fig. 1. Chest PA shows an ill-defined nodular density at the left infrahilar area.

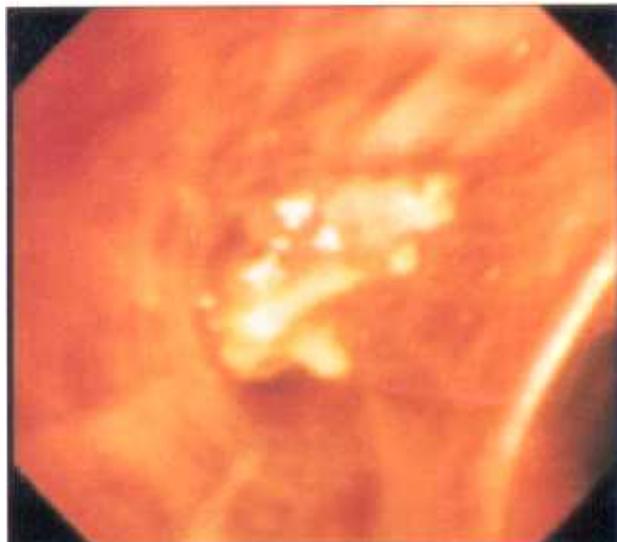


Fig. 3. Fiberoptic bronchoscopy shows an irregularly shaped yellowish mass of approximately 1 cm obstructing the laterobasal segmental bronchial orifice at the left lower lobe.

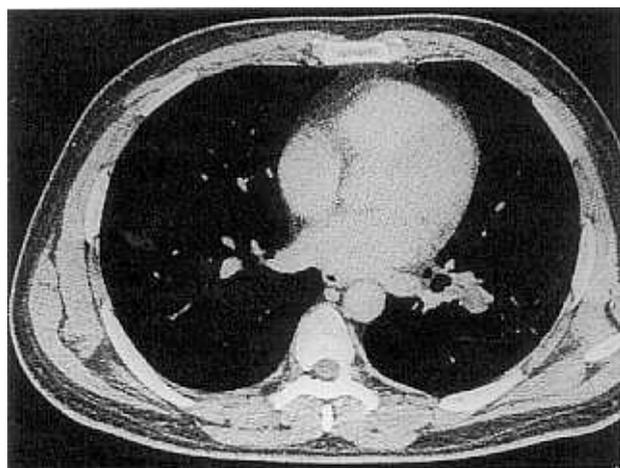


Fig. 2. Chest CT scan (pre-FOB) shows a 1.5 x 2.5 cm sized, relatively well-defined, oval shaped mass at the left lower lobe near the origin of the laterobasal segmental bronchus. No focal calcification or necrosis can be seen within the mass.

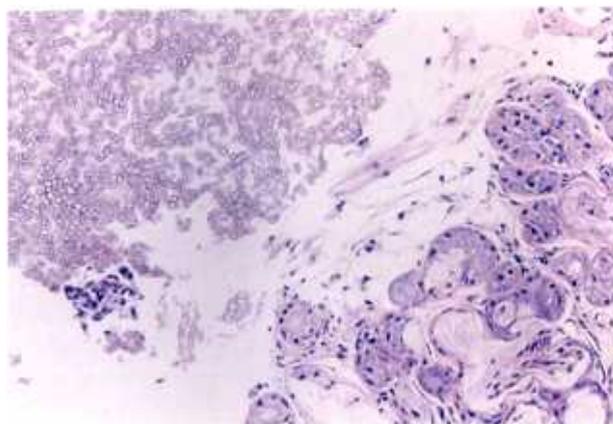


Fig. 4. Microscopic findings of mucosal ulceration and intense mural inflammation with hyperplasia of the submucosal gland and matted growth of the branching septated fungal hyphae (H & E, x200).

1). A chest CT scan was performed for further evaluation of the nodular density. It showed a 1.5 x 2.5 cm sized, relatively well-defined, oval shaped mass at the left lower lobe near the origin of the laterobasal segmental bronchus (Fig. 2). The nodule mimicked lung cancer, and fiberoptic bronchoscopy was per-

formed for further evaluation of the lesion. The bronchoscopy showed an irregularly shaped yellowish mass of approximately 1 cm completely obstructing the laterobasal segmental bronchial orifice at the left lower lobe (Fig. 3). The mass was movable. By using forceps and a basket the mass was removed. Biopsy specimens were obtained at the distal portion of the obstructed site. On microscopy, mucosal ulceration and intense mural inflammation with hyperplasia of the submucosal gland were noted. Matted growth of the branching septated fungal hyphae was seen in the

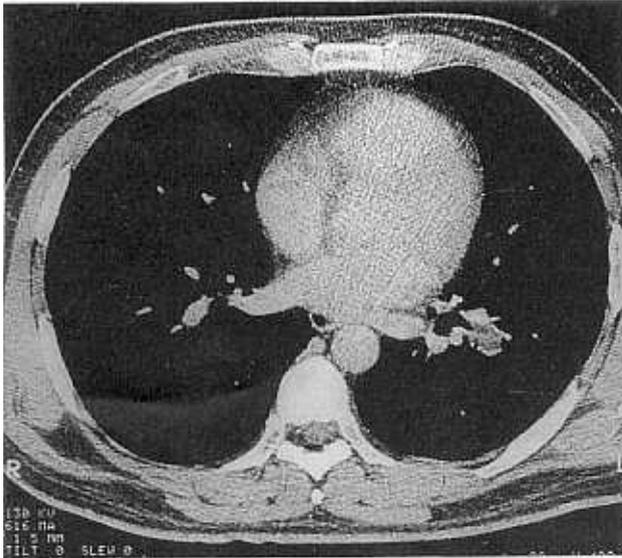


Fig. 5. Follow-up chest CT scan (post-FOB) shows a focal defect at the medial portion of the left lower lobe consistent with the mass removal site. The proximal portion of the left lateral basal segmental bronchus is well demonstrated.

lumen (Fig. 4). An aspergilloma had formed inside the bronchus.

After removal of the fungal ball, the patient's symptoms were relieved and no medications were needed for further management. A follow-up chest CT scan taken two weeks later showed a focal defect at the medial portion of the left lower lobe consistent with the mass removal site. The proximal portion of the left laterobasal segmental bronchus was well demonstrated and without a mass (Fig. 5).

DISCUSSION

Aspergillus has been found to infect almost every human organ.⁵ Pulmonary involvement is the most common, and there are a variety of ways in which these fungi can cause pulmonary abnormalities. Depending upon whether the host is atopic or immunocompromised, pulmonary aspergillosis may be classified under three categories. These are invasive aspergillosis, allergic bronchopulmonary aspergillosis (ABPA) and aspergilloma. These categories were first mentioned by Hinson et al.¹

Invasive aspergillosis is seen in immunocompromised patients. It is usually accompanied by severe debilitating disease, or prolonged therapy with chemo-

therapeutic agents, antibiotics or steroids.⁶ However, the invasive form may also be seen in immunocompetent hosts who are exposed to an overwhelming number of spores. Radiographs of the invasive form show variable findings and may be indistinguishable from pneumonia. Cavitation is common, and chronic infiltrates are seen in almost half of the patients. In 83% of these cases, a cavity and an 'air-meniscus sign' are detectable two weeks after the first appearance of the infiltrate.⁷

Allergic bronchopulmonary aspergillosis is caused by a hypersensitivity reaction to *Aspergillus* leading to bronchiectasis in asthmatic individuals.² Radiographs of this form show variable findings, including infiltrates, atelectasis and bronchiectasis.⁸ Typical radiographic findings, high blood eosinophilia, and elevated serum IgE levels suggest this diagnosis.⁹

Aspergilloma, the most common form, is a fungal ball that develops in a preexisting cavity in an immunocompetent host. The cavity is usually the residue of tuberculosis, sarcoidosis, histoplasmosis, bronchiectasis or emphysema.³ The classic 'air-meniscus sign' is seen on radiographs as a mass partially filling the cavity. This mass is somewhat mobile and may change position within the cavity when the patient is rotated. It is usually single and most often found in the upper lobes. These attributes are somewhat pathognomonic.

In addition to the three types of pulmonary aspergillosis, Geffer et al. described a fourth form, which they termed 'semi-invasive' aspergillosis.¹⁰ This is an intermediate form between aspergilloma and invasive aspergillosis, which is characterized by limited invasion of lung parenchyme. Most patients are mildly immunosuppressed, and radiographic findings of chronic infiltration with progressive cavitation and subsequent aspergilloma formation within the cavity are characteristic.

In pulmonary aspergillosis, more than one form of the disease may be present at one time. For this reason Greene suggested that pulmonary aspergillosis is a spectrum of disease, the precise manifestation of which are determined by the condition of the lung tissue and by the patient's immune status.⁴

The clinical manifestations of pulmonary aspergillosis are diverse. Many patients are asymptomatic, although symptoms such as cough, dyspnea, malaise and weight loss are experienced by some. Hemoptysis is the most frequent symptom, occurring in 74% of

the patients.² If the hemoptysis becomes severe, surgical resection of the lesion is needed. Other associated symptoms include wheezing, chest pain and fever.

Bronchial stump aspergillosis, an unusual sequela of lung resection caused by secondary infection of the silk suture material used to close the bronchus, was first reported by Sasaki et al.¹¹ It usually occurs between six and twelve months following surgery. Patients may present with productive cough, putrid sputum and hemoptysis.

Our patient had not undergone lung resection. Bronchial stump aspergillosis did not fit his condition. He was not immunocompromised nor did he receive prior antibiotic therapy, chemotoxic agents or steroids, thereby precluding invasive aspergillosis. He had no history of atopy. This young man was healthy until the vague symptoms of intermittent blood-tinged sputum and chest discomfort developed three months before. Chest X-ray and computed tomography showed an ill-defined nodule mimicking lung cancer. Fiberoptic bronchoscopy revealed a fungal ball without cavity formation in the left lower laterobasal segmental bronchial orifice. The fungal ball was removed, and was later pathologically diagnosed as aspergilloma. The patient's symptoms were relieved after the removal.

This case was unusual and did not fit neatly into any category of the aforementioned classification system. In our case, an *Aspergillus* colonized in the form of a fungal ball inside the bronchus without a cavity. This differs from other aspergilloma, which forms inside an existing cavity. Tamaki et al. presented a similar case of endobronchial aspergilloma.¹² However, their case did exhibit cavity formation. We suggest that endobronchial aspergilloma be considered as one of the possible causes of ill-defined nodules in patients with mild symptoms who are otherwise healthy.

REFERENCES

1. Hinson KF, Moon AJ, Plummer NS. Broncho-pulmonary aspergillosis. A review and report of 8 new cases. *Thorax* 1952;7:317-33.
2. Glimp RA, Bayer AS. Pulmonary aspergilloma. Diagnostic and therapeutic considerations. *Arch Intern Med* 1983; 143:303-8.
3. Eastridge CE, Young JM, Cole F, Gourley R, Pate JW. Pulmonary aspergillosis. *Ann Thorac Surg* 1972;13:397-403.
4. Greene R. The pulmonary aspergilloses: three distinct entities or a spectrum of disease. *Radiology* 1981;140:527-30.
5. Denning DW, Stevens DA. Antifungal and surgical treatment of invasive aspergillosis: Review of 2,121 published cases. *Rev Infect Dis* 1990;12:1147-201.
6. Zimmerman RA, Miller WT. Pulmonary aspergillosis. *Am J Roentgenol Radium Ther Nucl Med* 1970;109:505-17.
7. Gefter WB, Albelda SM, Talbot GH, Gerson SL, Cassileth PA, Miller WT. Invasive pulmonary aspergillosis and acute leukemia. Limitations in the diagnostic utility of the air crescent sign. *Radiology* 1985;157:605-10.
8. Mintzer RA, Rogers LF, Kruglik GD, Rosenberg M, Neiman HL, Patterson R. The spectrum of radiologic findings in allergic bronchopulmonary aspergillosis. *Radiology* 1978; 127:301-7.
9. Rosenberg M, Patterson R, Mintzer R, Cooper BJ, Roberts M, Harris KE. Clinical and immunological criteria for the diagnosis of allergic bronchopulmonary aspergillosis. *Ann Intern Med* 1977;86:405-14.
10. Gefter WB, Weingrad TR, Epstein DM, Ochs RH, Miller WT. "Semi-invasive" pulmonary aspergillosis: a new look at the spectrum of aspergillus infections of the lung. *Radiology* 1981;140:313-21.
11. Sawasaki H, Horie K, Yamada M, Tajima G, Katsura S, Naito Y, et al. Bronchial stump aspergillosis: Experimental and clinical study. *J Thorac Cardiovasc Surg* 1969; 58:198-208.
12. Tamaki S, Danbara T, Natori H, Kanamori H, Koike M, Motoyama N, et al. A resected case of endobronchial aspergilloma due to *Aspergillus restrictus*. *Jpn J Thorac Dis* 1980;18:464-9.