Intrabronchial *Aspergillus nidulans* Infection in an Immunocompetent Man

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We describe the first report of intrabronchial *Aspergillus nidulans* infection in an immunocompetent patient, which fit the description of bronchocentric granulomatosis. The patient had a history of accidental aspiration of light grade oil. Fiberoptic bronchoscopy revealed that the right B⁴aia was obstructed. Endobronchial biopsy specimens contained fungal hyphae. The fungus was confirmed to be *Aspergillus nidulans* by culture. We suspected that aspiration of light grade oil had injured the bronchial mucosa, after which airborne *Aspergillus nidulans* had entered the lesion and multiplied. Intrabronchial fungal infection can occur in a healthy person without immunologic abnormalities, if a bronchial lesion provides an entry portal. (Internal Medicine 38: 372–375, 1999)

Key words: bronchocentric granulomatosis, light grade oil

Case Report

On August 11, 1997 a previously healthy 60-year-old man presented to our hospital. He was referred to us for further examination of an abnormality in the right middle lobe which had been found on a chest radiograph at another hospital. He had smoked for 20 years but gave up smoking 20 years ago. He had worked in a golf club and accidentally had aspirated several milliliters of light grade oil while at work two years earlier. The results of laboratory studies on admission were normal, and he had no immunologic abnormalities. The serum immunoglobulin E (IgE) level was normal and multiple antigen simultaneous test (MAST) for aspergillus and serum aspergillus antigen was negative. Routine bacterial, fungal, and mycobacterial cultures of sputum were negative. A chest radiograph revealed a rectangular opacity in the right middle lobe (Fig. 1, right). Chest computed tomography (CT) scans showed an intrabronchial finger-shaped opacity in the right B⁴ (Fig. 1, left).

Fiberoptic bronchoscopy revealed that the right B⁴aia was obstructed by yellowish-white material (Fig. 2). Endobronchial biopsy specimens contained fungal hyphae (Fig. 3, left) and necrotic tissue on microscopic examination.

Culture of the endobronchial biopsy material on Sabouraud medium yielded dark green cotton-like colonies. The fungal isolates were stained with lactophenol cotton blue stain, and microscopy revealed conidiophores with metulae and phialides, findings characteristic of *Aspergillus* (A.) *nidulans* (Fig. 4).

The necrotic tissue obtained by transbronchial biopsy revealed multiple small eosinophilic vesicles surrounded by inflammatory cells (predominantly lymphocytes) in the bronchial submucosa (Fig. 3, right).

After partial resection of the lesion, intrabronchial infusion of amphotericin B (15 mg) was repeated five times. We directly cultured the bronchial lesion and observed *A. nidulans* three times. Treatment with oral itraconazole (100 mg/day) was begun on August 26, 1997. Although a chest radiograph transiently showed an infiltrative lesion in the right middle lobe, which might be a drug-induced lung injury, this lesion was resolved within three months. After itraconazole therapy was continued for 7 months, the orifice of the right B⁴aia was improved to normal appearance and there has been no recurrence.

Discussion

Aspergillus species are ubiquitous and occur worldwide. The fungi grow well in many habitats and are commonly found in stored hay and grain, decaying vegetation, soil, dung, and various organic debris. Inhalation of conidia probably occurs regularly, although clinical disease is uncommon (1). Most cases of the previous reports describe infection with *A. fumigatus* or *A. flavus*. Although *A. nidulans* is one of the common causes of infection among the aspergillus species inhabiting the soil worldwide (2), the occurrence of *A. nidulans* in nature rarely has been reported. Because we directly cultured the bronchial lesion on Sabouraud medium and observed fungal hyphae in

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Figure 1. Left: A chest radiograph reveals a rectangular opacity in the right middle lobe. Right: Chest CT scan shows an intrabronchial finger-shaped opacity in the right B⁴.

Figure 2. The right B⁴aii α is obstructed by yellowish-white material on fiberoptic bronchoscopy. The short arrow shows the necrotizing lesion of B⁴aii α .

the biopsy specimen, we concluded that the repeated isolation of *A. nidulans* ruled out contamination. There have been previous reports of intrabronchial aspergillosis (3, 4), but the present patient is the first case of intrabronchial infection with *A. nidulans*.

There are few reports of aspergilloma (5, 6) or chronic necrotizing pulmonary aspergillosis (CNPA) (7) due to *A.*

nidulans. In addition, *A. nidulans* rarely seems to cause invasive systemic disease, and this mainly occurs in children with chronic granulomatous disease (2, 8–13). Catalase-positive fungi, such as aspergillus, are not killed by the neutrophils of patients with chronic granulomatous disease (14). However, our patient had neither abnormal laboratory data nor other evidence of any immunologic abnormalities. We considered that this case fit into the category of bronchocentric granulomatosis (BCG). BCG is a descriptive term coined by Liebow in 1973 (15) to refer to an uncommon histologic reaction chiefly involving the small bronchi and bronchioles. The pathologic features have been described in detail by Katzenstein and her colleagues (16) as well as by Koss and associates (17). Grossly, the lumens of many small airways are filled with soft, yellowish necrotic material, while the surrounding lung parenchyma typically shows patchy areas of nonspecific consolidation. According to Fraser's textbook (18), the intraluminal necrotic material is usually granular and amorphous in appearance. It sometimes contains Charcot-Leyden crystals as well as clumps of homogeneous eosinophilic material that are occasionally surrounded by multinucleated giant cells and are believed to represent degenerated eosinophils.

The present patient had a history of accidental aspiration of light grade oil. Pneumonitis seems to occur as a result of direct aspiration or by absorption of the hydrocarbon from the gastrointestinal tract and its excretion into the lungs (19). A histological study by Gerarde (20) in rats showed that the alveoli are filled with eosin-stained fluid and blood cells. Bray et al reported that turpentine aspiration induced a local inflammatory reaction in the terminal bronchi. In the acini and alveoli turpentine can induce tissue damage and loss of surfactant, along with intra-alveolar hemorrhage (21). In our patient, the tissue specimen obtained by transbronchial biopsy revealed multiple small eosinophilic vesicles surrounded by inflamma-

Figure 3. Endobronchial biopsy specimen from the intrabronchial lesion containing *Aspergillus nidulans* ($\times 200$). Left: The endobronchial biopsy specimen contains fungal hyphae. Right: In the bronchial submucosa, multiple small eosinophilic vesicles (small arrows) are surrounded by inflammatory cells, which are predominantly lymphocytes.

Figure 4. The fungal isolates show conidiophores with metulae and phialides, findings characteristic of *A. nidulans* ($\times 400$).

tory cells (predominantly lymphocytes) in the bronchial submucosa. This appeared to correspond to BCG and though we could not conclusively determine whether the eosinophilic vesicles were degenerated eosinophils or aspirated oil, these changes might have resulted from aspiration of the oil. It seems that BCG, a necrotizing granulomatous response limited to the airway wall, or exudative bronchitis may be seen after aspiration of oil. Corticosteroids are the mainstay of treatment for BCG, and there is little evidence that fungicidal therapy is effective (22). On the other hand, allergic bronchopulmonary aspergillosis (23) and aspergilloma (24, 25) can progress to invasive aspergillosis. In fact, we previously reported a case of intrabronchial pseudallescheriasis (26), which progressed to lobar pneumonia despite oral itraconazole therapy (27). Therefore, we chose intrabronchial infusion of amphotericin B for our patient.

In conclusion, intrabronchial fungal infection can occur in a healthy person without immunologic abnormalities, if a bronchial lesion provides an entry portal.

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