Non-small Cell Lung Cancer Coexisting with Pulmonary Aspergilloma

A 77-year-old male with a long-standing history of smoking and working in mines was referred to our department for the evaluation of an enlarging subpleural mass in the right upper lobe. Both transbronchial and computed tomography-guided biopsies of the mass were non-diagnostic. A partial resection of the right S4 mass under video-assisted thoracic surgery (VATS) confirmed the diagnosis of primary non-small cell lung cancer. VATS right upper lobectomy (ND2a) was then performed for complete resection. Histological examination revealed that the mass composed of adenocarcinoma and the dilated bronchioles contained Aspergillus, the fungal component. Here we report a rare case of non-small cell lung cancer coexisting with pulmonary aspergillosis. The morphologic coexistence pattern of the two pathologies was believed to be the colonization of saprophytic Aspergillus in the bullous air spaces, obstructed by or contained within the tumor, according to the progression of the lung cancer.

Key words: non-small cell lung cancer, aspergilloma

Hideki Itano, MD, Akio Andou, MD, Hiroshi Date, MD, and Nobuyoshi Shimizu, MD.

Aspergillus, the ubiquitous saprophytic mold, commonly occurs on decaying material. Development of an aspergilloma associated with malignant tumors is very unusual. Here, we report a rare case of non-small cell lung cancer coexisting with pulmonary aspergillosis. The co-presence of the two pathologies was believed to be the colonization of saprophytic Aspergillus in the bullous air spaces, that were obstructed by or contained within the tumor, according to the progression of the lung cancer.

Case

A 77-year-old male was referred to our department for the evaluation of an enlarging abnormal shadow in the right upper lobe of the lung; it had been incidentally detected in a screening chest computed tomography (CT) scan 1 year earlier and had been followed up since then. Occupational history of the patient revealed that the patient had worked in a mine for over 30 years and had retired 12 years earlier. He had been a heavy smoker for 56 years, smoking 20 cigarettes per day until 12 months before the consultation. The patient's medical history included chronic atrial fibrillation that had been controlled with anticoagulation agents. A physical examination showed no abnormalities or palpable lymphadenopathy. Laboratory test revealed nothing except for a high carcinoembryonic antigen (CEA) of 5.64 ng/ml. Pulmonary function test showed a nearly normal pattern with % forced vital capacity (FVC) of 125.8%, forced expiratory volume (FEV)1.0 of 2.98 L, and FEV1.0% of 71.1%. Both sputum polymerase chain reaction (PCR) test for acid-fast bacilli and sputum cytology were negative.

On admission, the chest X-ray demonstrated a 26x13 mm ill-defined mass in the right upper lung field, overlapping the right clavicle (Fig. 1). The chest CT demonstrated a 17x13-mm irregular subpleural mass containing internal small cavities without any hilar or mediastinal lymphadenopathy. The adjacent lung parenchyma showed bullous, emphysematous changes. The mass showed minimal contractive changes (Fig. 2). Both transbronchial and CT-guided biopsy of the
mass failed to provide a histological diagnosis. Hence, a video-assisted thoracic surgery (VATS) partial resection of the right S^2 mass was performed for a definitive diagnosis. Intraoperative frozen section of the mass confirmed non-small cell lung cancer. The upper anterior port was enlarged to a 10.5-cm mini-thoracotomy and a VATS right upper lobectomy (ND2a) was then performed for complete resection. Based on the pathological results, itraconazole (100 mg/day) an oral antifungal agent was administered postoperatively for two weeks and discontinued due to development of a rash.

Macroscopically, the cut surface of the resected right S^2 mass comprised multi-lobulated lesions; thus corresponded to the coexistence of a relatively solid neoplastic component and a yellowish, soft fungal component (Fig. 3). The histological diagnosis of the mass was stage IA poorly differentiated adenocarcinoma along with fungal components of *Aspergillus* in the adjacent dilated bronchioles (p0, n0). The Drüse of fungal hyphae occupied the cavities in the lung along with surrounding inflammatory cell infiltration and fibrosis. The inner surfaces of the cavities were partially covered by bronchial epithelium, suggesting that these cavities consisted of dilated bronchioles. There were no findings of caseous granulation or calcification that are specific to tubercular infections (Fig. 4). The hyphae demonstrated frequent septae, dichotomously branching at 45-degree angles, which is a distinct characteristic of *Aspergillus* (Fig. 5).

**Discussion**

Pulmonary aspergillosis is a saprophytic infection and it colonizes the preexisting cavitary lesions. The underlying cause of these cavitary lesions may include treated tuberculosis, other necrotizing infections, bronchiectasis, sarcoidosis, cystic fibrosis, and emphysematous bullae.' The route of transmission of conidia, which are fungal spores, to the human host is via inhalation. Conidia are easily airborne, and their small size (i.e., 2–3 μm) aids in the access to the lower respiratory tract. Cavities and cystic lesions of the lung that communicate with the airway are poorly cleared of secretions and inhaled particles; therefore, these areas are susceptible to saprophytic colonization by fungi such as *Aspergillus*, whose spores circulate in the environment. Some rare cases of aspergilloma developed within the cavitating necrotic

---

**Fig. 1.** Chest X-ray on admission showed an ill-defined mass in the right upper lung field overlapping the right clavicle.

**Fig. 2.** CT scan on admission showed a 15x13-mm irregular subpleural mass containing internal small cavities without any hilar or mediastinal lymphadenopathy (A) and bullous, emphysematous changes in the adjacent lung (B).