Localized Aspergillus Infestation in Primary Lung Carcinoma
Clinical and Pathological Contrasts with Post-Tuberculous Intracavitary Aspergilloma

Fred B. Smith, M.D.; and Debra Beneck, M.D.;

Saprophytic infestation with Aspergillus was observed in pathologic specimens of primary squamous cell lung carcinoma. In one case, the fungus grew in cystic scarred parenchyma and bronchi distal to an obstructing carcinoma of a segment bronchus. In the other, fungi colonized the inner surface of a peripheral cavitary carcinoma. Neither patient had roentgenographic evidence of aspergilloma and neither experienced severe pulmonary hemorrhage or other complications attributable to the presence of fungus. Although both specimens showed colonizing growth within the abnormal air spaces, in neither had the colonies detached to form a separate intracavitary fungus ball. These patients, and eight patients with similar lesions reported in the literature, demonstrate that Aspergillus colonization of a lung neoplasm frequently lacks one or both of the features characteristic of post-inflamatory intracavitary aspergilloma, a loose fungus ball and antifungal serum antibodies. No patient, to date, has developed massive hemorrhage as a complication of this lesion. (Chest 1991; 100:554-56)

Cavities and cystic lesions of the lung which communicate with the airway are poorly cleared of secretions and inhaled particulates and are therefore susceptible to saprophytic colonization by fungi such as Aspergillus, whose spores circulate in the environmental air. Healed tuberculous cavities and other post-inflammatory spaces are colonized in this fashion during formation of pulmonary aspergillomas.1

We recently observed localized Aspergillus infestation in pathologic specimens of primary squamous cell carcinoma of the lung from two patients. Both appeared to represent saprophytic colonization of stagnant air spaces; in one case, the colonization involved the tumor itself, which was cavitary, and in the other it involved cystic scarred parenchyma and bronchi distal to an obstructing tumor. Eight patients with similar lung lesions, localized aspergillosis involving primary lung carcinoma, with no evidence of invasion of viable tissue or systemic spread have been described in published reports.2,3 We wish to report these two additional cases for the following reasons: (1) one patient illustrates a previously undescribed morphologic variant of the lesion (colonization of obstructed air spaces); (2) retrospective review of all the cases suggested that saprophytic aspergillosis involving lung carcinoma deviates significantly in its clinical and pathologic features from post-tuberculous infestation.

Figure 1. Fungal filaments within dilated bronchiole distal to tumor, case 1 (Gomori methenamine silver stain, original magnification ×200).

Intracavitary aspergilloma, in spite of the tendency of authors of textbooks and reports to consider it a variant of aspergilloma.

Case Reports

Case 1

A 60-year-old male smoker complaining of dyspnea and cough was found to have a cavitary left upper lobe mass on chest roentgenograms. Physical and laboratory findings were noncontributory. The surgically excised lobe contained a solid 6-cm tumor which partially occluded the apical posterior segmental bronchus and which was histologically characterized as bronchogenic squamous cell carcinoma, clear cell variant. The residual parenchyma of the segment was scarred and cystic; pasty brown material in many of the cysts and lumens of adjacent small bronchi was comprised microscopically of fungal hyphae consistent with Aspergillus (Fig 1).

Case 2

A 63-year-old male smoker presenting with night sweats, productive cough and a 20-pound weight loss was admitted to the hospital because of a 7-cm cavitary left upper lobe lesion detected on a chest roentgenogram. Physical and laboratory findings and sputum examination were noncontributory. The patient died shortly after admission. Necropsy examination demonstrated a thin-walled cav-

Figure 2. Cavitary squamous cell carcinoma of left lung (case 2) with necrotic lining layer at the right of the photograph (hematoxylin and eosin stain, original magnification ×200).
proven to be a case of Aspergillus sp. infection.

**Discussion**

Pulmonary aspergillosis is characterized by the presence of fungal hyphae within the lung parenchyma, leading to the formation of intracavitary lesions known as aspergillomas. These lesions are typically found in patients with pre-existing lung pathology, such as chronic obstructive pulmonary disease or lung cancer. The fungus, Aspergillus fumigatus, is the most common causative agent, often infecting the lung through inhalation of fungal spores. The disease can manifest as acute or chronic forms, with the chronic form being more common in immunocompromised patients. The chronic form is characterized by the formation of fungal balls, which can be seen on radiographic imaging as cavities filled with fungal material.

In the case presented, the patient was diagnosed with bronchiolitis obliterans organizing pneumonia (BOOP), a type of interstitial lung disease. The presence of fungal hyphae in the tissue specimens was consistent with the diagnosis of aspergillosis. The patient's history of smoking and the site of the lesion (right upper lobe) are indicative of the typical location of aspergillosis in the lung.

### Table 1 - Reported Cases of Saprophytic Aspergillosis in Lung Carcinoma

<table>
<thead>
<tr>
<th>Case</th>
<th>Specimen, Location*</th>
<th>Carcinoma Type</th>
<th>Fungal Growth†</th>
<th>Fungal Ball</th>
<th>Serology‡</th>
<th>Culture‡</th>
<th>Author</th>
<th>Year</th>
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<tr>
<td>1</td>
<td>Lobectomy (LUL)</td>
<td>Squamous</td>
<td>LTC</td>
<td>Yes</td>
<td>+</td>
<td>A fumigatus</td>
<td>Warembourg et al</td>
<td>1965</td>
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<tr>
<td>2</td>
<td>Lobectomy (RUL)</td>
<td>Adenocarcinoma</td>
<td>LTC</td>
<td>Yes</td>
<td>ND</td>
<td>&quot;Aspergillus&quot;</td>
<td>Mays &amp; Hawkins</td>
<td>1967</td>
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<td>3</td>
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<td>Torpoco et al</td>
<td>1976</td>
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<td>4</td>
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<td>Squamous</td>
<td>INT</td>
<td>No</td>
<td>+</td>
<td>&quot;Aspergillus&quot;</td>
<td>Monie</td>
<td>1978</td>
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<td>LTC</td>
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<td>Marcelis et al</td>
<td>1981</td>
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<td>6</td>
<td>Biopsy (RUL)</td>
<td>Squamous</td>
<td>INT</td>
<td>No</td>
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<td>Tsai et al</td>
<td>1984</td>
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<td>McGregor et al</td>
<td>1989</td>
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<td>ND</td>
<td>Smith</td>
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<td>case 2</td>
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* LUL = left upper lobe; RUL = right upper lobe; RLL = right lower lobe.
† LTC = lumen of tumor cavity; INT = infiltration of necrotic tumor; OA = obstructed air spaces.
‡ + = positive; − = negative; ND = not done.
Unusual Diffuse Pulmonary Lymphatic Proliferation in a Young Boy

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We describe a 4-year-old boy who died of an unusual generalized pulmonary lymphatic proliferation. His condition cannot clearly be categorized with any of the previously described pulmonary lymphatic disorders.

(Chest 1991; 100:556-60)

Several rare disorders may affect the pulmonary lymphatic vessels of children, including lymphangioma, lymphatic dysplasia, and congenital pulmonary lymphangectasia. An additional disorder of pulmonary lymphatics, lymphangiomatosis, has been reported only in women of childbearing age. We report the case of a 4-year-old boy who died of a pulmonary lymphatic disorder, the clinical and pathologic characteristics of which seem to share features with several of these disorders.

Case Report

A 3-year-old boy with an uncomplicated perinatal course was reported by his mother to have had a “rattle in the chest” since birth. Pneumonia was diagnosed at age 8 months and treated with antibiotics given orally. At age 18 months, frequent coughing and wheezing episodes developed and asthma was diagnosed. He was treated with bronchodilators and occasionally with prednisone, which produced significant improvement. A second case of pneumonia was diagnosed at age 36 months and again treated with antibiotics given orally. Three months later, the patient had increasing cough, and a chest roentgenogram revealed an enlarged cardiac shadow, bilateral pleural effusions, and interstitial densities (Fig 1). An echocardiogram demonstrated pericardial effusion but normal cardiac anatomy. He underwent pericardiocentesis; however, the pericardial effusion reaccumulated and thoracotomy was performed. A large mediastinal mass was identified and resected and pericardiectomy was performed. The tissue from the pericardium and mediastinum aggregated to 6.5 × 5.5 × 1.3 cm. This tissue was characterized histologically by adipose and fibrous tissue of varying density, containing multiple poorly delimited spindle cell aggregates arranged asymmetrically around ectatic lymphatic channels and blood vessels. The nuclei were cytologically bland, and mitoses were rare. Occasional lymphoid follicles and a moderate number of hemosiderin-laden macrophages were scattered throughout the tissue. A biopsy specimen from the pulmonary trunk demonstrated an identical lesion of spindle cells and ectatic lymphatic channels. A normal 6-g thymus was removed.

Postoperatively, he continued to have bilateral pleural effusions and pulmonary infiltrates, and a second thoracotomy was performed for lung biopsy and pleurodesis. Histologic study of the lung biopsy specimen demonstrated poorly demarcated spindle cell aggregates subpleurally, along interlobular septa, focally within alveolar walls,

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The views expressed in this paper are those of the author and do not reflect the official policy or position of the Department of the Navy, Department of Defense, or the US Government.

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References


Unusual Diffuse Pulmonary Lymphatic Proliferation (Kelso et al)