A 45-year-old man with acute lymphocytic leukemia (ALL) was found to have a solitary pulmonary nodule on routine chest radiograph. He had been diagnosed as having ALL three months previously and underwent induction chemotherapy which included vincristine, prednisone, cyclophosphamide, doxorubicin and intrathecal methotrexate. His leukemia was in remission and he had received no chemotherapy for one month. There was no cough, sputum production, fever, hemoptysis, chest pain or dyspnea. He had no known exposure to tuberculosis and there was no significant travel or occupational history. He had never smoked cigarettes.

On physical examination, he appeared well with a temperature of 37°C. There was a Broviac catheter in place. Findings on the remainder of the physical examination were normal. Screening blood tests were within expected limits. The total white blood cell count was 4,300/cm³ with 60 percent mature neutrophils, 17 percent lymphocytes and 23 percent monocytes. Results of tests for serum cryptococcal antigen and Aspergillus precipitins (by gel immunodiffusion) were negative. The chest radiograph (Fig 1a and 1b) showed a nodular density which was 2 × 1.5 cm in size in the anterior segment of the right upper lobe. The last study performed one month earlier had been normal. Result of transthoracic needle aspiration was negative for malignant cells or organisms on cytologic examination. No cultures were sent because the specimen was insufficient in quantity. Flexible bronchoscopy was performed which showed normal endobronchial anatomy. Washings, brushings and transbronchial biopsy of the involved area showed no evidence of malignancy or infection. A thoracotomy with wedge resection of the nodule was performed.

An Asymptomatic Nodule in an Immunosuppressed Patient*

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Diagnosis: Aspergillus pneumonia with microscopic abscess formation

At thoracotomy, a 2 × 1.5 cm indurated lesion was noted and removed by a wedge resection. Serial sectioning revealed creamy green and yellow material. The periphery of this softened area showed residual pink lung parenchyma. Microscopically, the center of the lesion showed areas of liquefaction necrosis and contained numerous branching fungal hyphae arranged in a radiating pattern around a central zone of necrosis (Fig 2a). The hyphae were septate with acute angle branching consistent with the fungus Aspergillus (Fig 2b). No conidiophores were seen. No major bronchi or blood vessels were involved by the fungus. The lung parenchyma around the lesion showed areas of acute inflammatory cell infiltration and organizing pneumonia.

Invasive pulmonary aspergillosis in the immunocompromised patient is usually a lethal disease. More than 90 percent of cases occur in patients with leukemia and lymphoma. The major predisposing factors are high-dose steroids, cytotoxic chemotherapy and neutropenia. Prolonged periods of neutropenia have recently been demonstrated to be the most significant clinical factor.

Most patients present with pulmonary symptoms. Dyspnea, fever, tachypnea, cough and chest pain occur with varying frequencies. Less than 3 percent of the patients have been reported to be asymptomatic. The most common radiographic patterns are patchy bronchopneumonia, multiple nodular densities and pleural-based wedged shaped infiltrates. A solitary nodule is an uncommon radiographic presentation. Necrotizing bronchopneumonia and hemorrhagic pulmonary infarction are the most common findings at autopsy.

As our case demonstrates, the occurrence of a new nodule in a patient with leukemia and lymphoma should raise the question of Aspergillus even if the patient is asymptomatic. We believe that the Aspergillus infection in our patient was in an early stage and would have developed to progressive invasive disease. Several studies have shown that early treatment of invasive aspergillosis is crucial for a favorable outcome. Diagnosis and treatment are essential to prevent more disseminated disease, particularly in cases where further chemotherapy is planned. Parenteral amphotericin B is the mainstay of therapy. Optimum duration of therapy is unknown and total doses in responding patients have varied from 400 to 3,000 mg. Another important aspect of management is reduction of steroid and cytotoxic chemotherapy as much as possible.

Treatment of an asymptomatic nodule which has been removed surgically is controversial. There is a report of one case where cure without further treat-