Birefringent Crystals in a Lung Cavity
(See page 1806 for Photo Quiz)

Figure 1. CT scan of the chest showing right upper lung cavity

Diagnosis: Pulmonary aspergillosis with calcium oxalate crystals.

Radiography of the patient’s chest showed a right upper lobe cavitary lesion, and a CT scan of the chest was performed (figure 1). The patient had invasive pulmonary aspergillosis, as determined on the basis of results of cytologic analysis and biopsy of the lesion, which revealed calcium oxalate crystals (figure 2) and fungal elements (figure 3). Results of serum tests for the detection of aspergillus galactomannan were positive, with an optical density (OD) index of 1.0 (an OD index of >0.5 was considered to be positive). The results of fungal cultures were negative. However, because of the presence of hyphal elements in the cultures and because the patient had a history of pulmonary Aspergillus fumigatus infection (in November 2003), he was treated with liposomal amphotericin B.

A. fumigatus and Aspergillus niger are directly associated with the production of oxalate crystals [1], presumably through the degradation of oxaloacetate via the tricarboxylic acid cycle [2]. They appear as birefringent, needle-like crystals in pulmonary cytologic specimens and are a reliable marker for detecting pulmonary aspergillosis [3]. Pulmonary oxalosis can cause fatal pulmonary hemorrhage and respiratory failure, as described in a case report by Nakagawa et al. [4].

Pulmonary oxalosis has been reported in patients with sarcoidosis, patients with asbestosis, patients undergoing hemodialysis, and patients with a history of injection drug use [5]. A major problem regarding invasive pulmonary aspergillosis is making a timely antemortem diagnosis. The results of fungal cultures for our patient were negative, but it has been reported that the appearance of crystals can precede positive results of cultures by as much as 1 year [6]. Tests for serum galacto-

Figure 2. Birefringent crystals observed during biopsy of bronchial samples (original magnification, ×100).

Figure 3. Gomori methenamine silver stain showing fragments of fungal hyphae (original magnification, ×200).
mannan may help in the diagnosis [7], and the presence of crystals in the sputum specimens or in a pathologic specimen should prompt the physician to consider aspergillosis in the differential diagnosis.

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