A 42-year-old administrator coughed up about 12 varying-sized stones over a three-week period. His cough was frequent, severe, and nonproductive of sputum. Hemoptyses of small blood clots usually accompanied lithoptysis. His general health was excellent, and he had recently competed in marathon races. Asthma had occurred only in early childhood, but he had noted wheezing during the preceding three weeks, for which he was treated with oral theophylline and inhaled metaproterenol. He had lived in north central Texas during his first 21 years, with frequent exposure to chicken coops, but had never smoked cigarettes.

Results of a physical examination, including chest auscultation, revealed no pertinent findings. Laboratory findings yielded only a mild, unexplained anemia. Fiberoptic bronchoscopy revealed two fleshy polypoid mucosal masses in the right bronchus intermedius and right lower lobe bronchus. Biopsy specimen study of these two lesions showed granulation tissue. Special stains revealed no stainable fungal organisms. No broncholith or extrinsic bronchial compression was seen. Routine chest x-ray films (Fig 1, A and B) showed an area of increased parenchymal density in the right infradiscal region involving the azygosophageal recess. This was well seen on the lateral view. Right hilar tomograms showed a central infiltrate surrounding a segmental right lower lobe bronchus with clusters of calcified lymph nodes. CT chest scan (Fig 2) showed a consolidated medial basal segment of the right lower lobe distal to the obstructing broncholith.

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Fig 1a (left) and b (right). Routine posteroanterior and lateral roentgenograms demonstrate an infiltrate in the azygosophageal recess. The lateral view (b) shows obliteration of the bronchus intermedius wall (arrow). No calcifications are visible.

Fig 2. Thin (0.5 cm) axial CT chest scan one cm apart shows a consolidated right lower lobe distal to the obstructing broncholith (arrow). (A GE 9800 scanner with intravenous enhancement was used.)
Diagnosis: Broncholithiasis due to remote histoplasmosis

One of the broncholiths was decalcified and stained with Gomori's methenamine silver, revealing yeast forms (Fig 3). They were 4 to 6 μ in diameter, rarely showed budding, and a few had PAS-positive capsules. Acid-fast stain failed to reveal stainable bacilli.

Broncholithiasis is usually defined as calcified material within a bronchus or located peribronchially having the potential to erode into the bronchus. Lithioplasty, or expectoration of broncholiths (stones), is a relatively uncommon complaint compared with the prevalence of peribronchial calcified lymph nodes. The pathogenesis might be inflammatory granulomatous necrosis with subsequent deposits of calcium phosphate and calcium carbonate. The cause is predominantly histoplasmosis. In endemic areas, Histoplasma may be identified by staining decalcified broncholiths in all cases. Tuberculosis is an alternate cause, but with its declining prevalence in the United States, it is now rarely implicated. Other rare causative microorganisms are various other systemic fungi.

Clinical manifestations include a cough provoked by endobronchial irritation, hemoptysis of varying amounts (including massive), and signs and symptoms associated with bronchial obstruction and secondary infection. Roentgenographic abnormalities include hilar and mediastinal calcification, atelectasis, parenchymal masses secondary to obstructive pneumonia, and hemorrhage. Routine radiography and 55° oblique hilar tomography will demonstrate calcified masses around or within the bronchus. CT chest scan with thin slices (0.5 cm) is very sensitive for showing calcification of peribronchial, hilar, and mediastinal nodes. A limitation of CT scanning is volume averaging, which may cause a calcified lymph node adjacent to the bronchial wall to appear to be within the bronchus. Atelectasis or distal consolidation is clearly demonstrated with a CT scan.

Fiberoptic bronchoscopy is routinely indicated to determine the presence of obstructing broncholiths. Removal of an obstructing stone is best accomplished with a rigid bronchoscope, although small stones can be removed with fiberoptic bronchoscopy forceps. The YAG laser has been reported to fragment and remove an obstructing bronolith not removable by bronchoscopy alone. Surgical management of broncholithiasis is reserved for serious complications. Thoracotomy may be indicated for persistent bronchial obstruction, excessive hemoptysis, bronchoesophageal fistula, and the possibility of an associated malignancy. To aid in making therapeutic decisions, chest CT scans are indicated to determine the extent of exobronchial broncholiths, which have the potential of eroding into a bronchus, pulmonary artery, or esophagus. These radiographic findings influence whether to observe the patient, to follow serially with chest CT scans, or to intervene surgically.

REFERENCES