DIFFERENTIAL DIAGNOSIS

The differential diagnosis of lung abscesses includes other noninfectious processes that result in cavitary lung lesions, including lung infarction, malignancy, sequestration, vasculitides (e.g., granulomatosis with polyangiitis), lung cysts or bullae containing fluid, and septic emboli (e.g., from tricuspid valve endocarditis).

DIAGNOSIS

The presence of a lung abscess is determined by chest imaging. Although a chest radiograph usually detects a thick-walled cavity with an air-fluid level, computed tomography (CT) permits better definition and may provide earlier evidence of cavitation. CT may also yield additional information regarding a possible underlying cause of lung abscess, such as malignancy, and may help distinguish a peripheral lung abscess from a pleural infection. This distinction has important implications for treatment, because a pleural space infection, such as an empyema, may require urgent drainage.

As described earlier (see "Pathology and Microbiology," above), more invasive diagnostics (such as transtracheal aspiration) were traditionally undertaken for primary lung abscesses, whereas empirical therapy that includes drugs targeting anaerobic organisms currently is used more often. While sputum can be collected noninvasively for Gram's stain and culture, which may yield a pathogen, it is likely that the infection will be polymicrobial, and culture results may not reflect the presence of anaerobic organisms. Many physicians consider putrid-smelling sputum to be virtually diagnostic of an anaerobic infection.

When a secondary lung abscess is present or empirical therapy fails to elicit a response, sputum and blood cultures are advised in addition to serologic studies for opportunistic pathogens (e.g., viruses and fungi causing infections in immunocompromised hosts). Additional diagnostics, such as bronchoscopy with bronchoalveolar lavage or protected brush specimen collection and CT-guided percutaneous needle aspiration, can be undertaken. Risks posed by these more invasive diagnostics include spillage of abscess contents into the other lung (with bronchoscopy) and pneumothorax and bronchopleural fistula development (with CT-guided needle aspiration). However, early diagnostics in secondary abscesses, especially in immunocompromised hosts, are particularly important, because the patients involved may be especially fragile and at risk for infection with a broad array of pathogens and, therefore, less likely than other patients to respond to empirical therapy.

TREATMENT LUNG ABSCESS

The availability of antibiotics in the 1940s and 1950s established therapy with this drug class as the primary approach to the treatment of lung abscess. Previously, surgery had been relied upon much more frequently. For many decades, penicillin was the antibiotic of choice for primary lung abscesses in light of its anaerobic coverage; however, because oral anaerobes can produce β-lactamases, clindamycin has proved superior to penicillin in clinical trials. For primary lung abscesses, the recommended regimens are (1) clindamycin (600 mg IV three times daily; then, with the disappearance of fever and clinical improvement, 300 mg PO four times daily) or (2) an IV-administered β-lactam/β-lactamase combination, followed—once the patient's condition is stable—by orally administered amoxicillin-clavulanate. This therapy should be continued until imaging demonstrates that the lung abscess has cleared or regressed to a small scar. Treatment duration may range from 3–4 weeks to as long as 14 weeks. One small study suggested that moxifloxacin (400 mg/d PO) is as effective and well tolerated as ampicillin-sulbactam. Notably, metronidazole is not effective as a single agent: it covers anaerobic organisms but not the microaerophilic streptococci that are often components of the mixed flora of primary lung abscesses.

In secondary lung abscesses, antibiotic coverage should be directed at the identified pathogen, and a prolonged course (until resolution of the abscess is documented) is often required. Treatment regimens and courses vary widely, depending on the immune state of the host and the identified pathogen. Other interventions may be necessary as well, such as relief of an obstructing lesion or treatment directed at the underlying condition predisposing the patient to lung abscess. Similarly, if the condition of patients with presumed primary lung abscess fails to improve, additional studies to rule out an underlying predisposing cause for a secondary lung abscess are indicated.

Although it can take as long as 7 days for patients receiving appropriate therapy to defervesce, as many as 10–20% of patients may not respond at all, with continued fevers and progression of the abscess cavity on imaging. An abscess >6–8 cm in diameter is less likely to respond to antibiotic therapy without additional interventions. Options for patients who do not respond to antibiotics and whose additional diagnostic studies fail to identify an additional pathogen that can be treated include surgical resection and percutaneous drainage of the abscess, especially in poor surgical candidates. Possible complications of percutaneous drainage include bacterial contamination of the pleural space as well as pneumothorax and hemothorax.

COMPLICATIONS

Larger cavity size on presentation may correlate with the development of persistent cystic changes (pneumatoceles) or bronchiectasis. Additional possible complications include recurrence of abscesses despite appropriate therapy, extension to the pleural space with development of empyema, life-threatening hemoptysis, and massive aspiration of lung abscess contents.

PROGNOSIS AND PREVENTION

Reported mortality rates for primary abscesses have been as low as 2%, while rates for secondary abscesses are generally higher—as high as 75% in some case series. Other poor prognostic factors include an age >60, the presence of aerobic bacteria, sepsis at presentation, symptom duration of >8 weeks, and abscess size >6 cm.

Mitigation of underlying risk factors may be the best approach to prevention of lung abscesses, with attention directed toward airway protection, oral hygiene, and minimized sedation with elevation of the head of the bed for patients at risk for aspiration. Prophylaxis against certain pathogens in at-risk patients (e.g., recipients of bone marrow or solid organ transplants or patients whose immune systems are significantly compromised by HIV infection) may be undertaken.

APPROACH TO THE PATIENT: Lung Abscess

For patients with a lung abscess and a low likelihood of malignancy (e.g., smokers <45 years old) and with risk factors for aspiration, it is reasonable to administer empirical treatment and then to pursue further evaluation if therapy does not elicit a response. However, some clinicians may opt for up-front cultures, even in primary lung abscesses. In patients with risk factors for malignancy or other underlying conditions (especially immunocompromised hosts) or with an atypical presentation, earlier diagnostics should be considered, such as bronchoscopy with biopsy or CT-guided needle aspiration. Bronchoscopy should be performed early in patients whose history, symptoms, or imaging findings are consistent with possible bronchial obstruction. In patients from areas endemic for tuberculosis or patients with other risk factors for tuberculosis (e.g., underlying HIV infection), induced sputum samples should be examined early in the workup to rule out this disease.