

How do I know it's pneumonia?

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Case

A 36-year-old woman presented to the emergency department with symptoms of fever, chills, and a cough that produced yellowish phlegm. She had recently returned from visiting her sister's cottage where she slept in the gazebo for two nights. She also experienced sharp pain in her right chest aggravated by deep breathing. A chest X-ray showed early right lower lobe infiltrate. She was diagnosed with pneumonia and sent home on oral clarithromycin. She continued to feel unwell with fever, chills, night sweats and continuing productive cough and dyspnea. She denied hemoptysis.

Five days later, she presented to the hospital again. A second chest X-ray showed bi-basal dense infiltrates. She was admitted with the diagnosis of community-acquired pneumonia and started on intravenous levofloxacin and clindamycin. She continued to have a high fever that reached up to 39 C, ongoing productive cough and shortness of breath. She was given acetaminophen as required.

A detailed history and examination of the patient revealed:

- No history of recent travel or exposure to tuberculosis (TB);
- A positive Mantoux test in 1976;
- Smokes one pack of cigarettes per day and drinks socially;
- No pets at home;
- Sputum culture showed normal flora; blood cultures remained negative; and
- Sputum Gram stain showed 4+ neutrophils and 1+ normal flora.

After one week of intravenous antibiotics there was no change in her condition. A consultation for bronchoscopy was requested by an internist and a chest surgeon. The internist changed her antibiotics to imipenem-cilastatin sodium. The following day, she underwent bronchoscopy that showed some inflammatory changes in her lower lungs and samples were taken for bacterial and TB cultures.

She continued to have high-grade fever, cough, phlegm, and dyspnea and became hypoxemic and required oxygen supplementation. Two days later, a computed tomography scan of her chest showed bi-basal consolidation with sparing of the apices. Culture results from bronchoscopic specimens were reported to be negative save for pending TB culture results.

more details on the next page

Pneumonia sends over half a million people to the hospital every year.

WHAT'S YOUR DIAGNOSIS?

After five days of intravenous imipenem-cilastatin sodium therapy, there was no improvement in her clinical condition. Another internal medicine consult was requested and, at this point, I became involved in her care.

Physical examination revealed a woman of obese build with a temperature of 39 C, pulse rate of 104 and blood pressure of 114/70 mmHg. There was no lymphadenopathy and heart sounds were normal. Her chest was resonant with decreased breath sounds in bases with egophony in the right lower chest. There were no pleural rubs. There was no clubbing or cyanosis. The rest of the examination was unremarkable other than an obese benign abdomen.

She was evaluated and an arterial blood gas was taken (Tables 1 & 2). Sputum and blood cultures remained negative. Repeat chest X-rays three weeks later showed further deterioration of the bilateral infiltrates with nodular appearance. The radiologist remarked that "the lesions are suspicious of metastases." Sputum cytology showed a large number of acute inflammatory cells without malignant cells.

What's your diagnosis?

Table 1

Arterial blood gas results

Hydrogen ion concentration of 24
Partial pressure of carbon dioxide of 35
Partial pressure of oxygen of 59 with an oxygen saturation in arterial blood of 91%.



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Table 2

Evaluation results

White blood cell count of 18.4 (has been between 13.6 to 20.2)
Hemoglobin of 97 g/L with retic count of 33
D-dimer between 0.25 to 0.50
Erythrocyte sedimentation rate of 120
Normal electrolytes with serum creatinine of 75 mmol/L
Normal aspartate transaminase, alanine aminotransferase, gamma-glutamyl transferase, bilirubin and lactate dehydrogenase
Alkaline phosphatase of 147 (35 to 104)
Negative urinalysis for blood or protein
Negative anti-nuclear antibody

WHAT'S YOUR DIAGNOSIS?

Answer: Acute blastomycosis pneumonia

Her history of sleeping in the woods before the illness, progressive bilateral pneumonia (consolidation) with ongoing high-grade fever, chills, night sweats despite sufficient antibiotic coverage and sputum Gram stain showing a large number of neutrophils without organisms should raise the suspicion of a fungal process such as acute blastomycosis pneumonia. In Northern Ontario, we see two to three cases a year, usually in the summertime.

The presence of a large number of neutrophils on the Gram stain indicates that the sputum specimen was of good quality. When no organisms are seen or cultured from this quality specimen, it should raise suspicion for non-bacterial (fungal, mycobacterial, *etc.*) causes of infection. On clinical suspicion, the local public health laboratory was prompted (five days after bronchoscopy) to do staining on the samples for blastomycosis. The results of the special sputum stains showed organisms consistent with *Blastomyces dermatitides*. The clinical diagnosis was confirmed. The patient began treatment with amphotericin B.

Acute blastomycosis infection is usually acquired by inhalation of fungus from the soil, either decomposed vegetation or rotting wood. Several case clusters have occurred during recreational activities in wooded areas along waterways. The initial portal of entry is the respiratory tract, with inhaled organisms deposited in the peripheral air spaces of the lower lobes. Pulmonary infections are generally asymptomatic. An influenza-like illness is the most common manifestation of acute infection. Clinical symptoms are usually mild in most cases, but acute respiratory distress syndrome can develop, even in immuno-competent hosts. Symptoms include fever, night sweats, weight loss, productive cough, hemoptysis, pleuritic chest pain and variable degrees of respiratory impairment (Table 3). A chest X-ray often reveals patchy, bilateral air-space consolidation in lower lobes. Pleural effusions are not clinically significant. Regional hilar lymph nodes may be enlarged.

The treatment is oral or intravenous antifungal agents, depending on the patient's clinical condition. As our patient has been sick, intravenous amphotericin B for two to three months is the therapy of choice, followed by oral itraconazole 200 mg once or twice a day for six to 12 months. The mortality rate is close to 15 per cent in treated cases. Antifungal therapy in normal hosts is associated with a cure rate of about 90 per cent and a relapse rate of less than 10 per cent. Resolution of X-ray changes may take two to three months.

Hematogenous dissemination with metastatic spread to various sites, such as skin, skeletal system, genitalia and central nervous system may occur during the primary infection. Between 50 per cent to 70 per cent of patients with chronic blastomycosis have simultaneous multiple organ involvement.

The organism may be seen reasonably well with routine hematoxylin-eosin stains, but special fungal stains, such as periodic acid-Schiff and Gomori's methenamine-silver stains are required. **Dx**

Table 3

What are the symptoms?

Fever
Night Sweats
Weight loss
Productive cough
Hemoptysis
Pleuritic chest pain
Variable degrees of respiratory impairment