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A missed opportunity—a near disaster

Abstract: Community acquired pneumonia (CAP) is a common medical problem. Over 1.5 million patients annually will be diagnosed with CAP and treated with empiric therapy initially. The vast majority of patients will improve with a single course broad spectrum antimicrobial agent. Rarely a patient will not improve and some may progress on this regimen. Giving a second course of broad spectrum antimicrobial agent is not warranted until further evaluation is performed to look for the unusual cause of CAP. Blastomycosis is a regionally common community acquired fungal infection. When potential exposure of the patient to an area of high endemicity is recognized appropriate diagnostic studies should be performed.

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During the early days of July a 23-year-old construction worker developed a low grade fever with headache for 3 days and he treated himself with ibuprofen. The feverish feeling improved but he felt weak and went to an Urgent Care Center.

Directed examination showed a healthy appearing young man in no distress. Temperature was 37.7°C (100°F) and all other vital signs were within normal limits. He had a few crackles over the right mid-lung which seemed to clear with coughing. The skin was clear and he did not recall having any tick bites.

As the onset of his illness corresponded to the peak of the deer-tick season, the diagnosis of a tick-borne infection with possible pneumonia was entertained and he was treated with a 7-day course of doxycycline 100 mg twice daily.

No laboratory examination was performed.

During the ensuing 7 days he was not feeling any better, his temperature rose to 38.3°C (101°F) in the early evenings and he developed a cough producing yellowish sputum. After the last dose of the doxyxyclyne he returned

to the Urgent Care Center. His temperature was 38.3°C (100.6°F) and his SpO₂ was 97% on room air. He had crackles over the right lung and a chest radiogram showed a right lower lobe infiltrate (Figure 1). The white blood cell count was 11×10³/mm without a left shift.

The initial diagnosis of a tick-borne infection was then replaced by the tentative diagnosis of community-acquired pneumonia (CAP) and he was given a azithromycin 500 mg the first day, followed by 250 mg for 4 additional days with the instruction to return if his temperature and cough continued or worsened. He started to take the azythromycin but noted no improvement after 2 day and returned to the Urgent Care Center with these complaints. The examining physician was concerned by the lack of improvement and he was started on a planned 10-day course of levofloxacin 750 mg daily.

When he noted no improvement after 3 days of levofloxacin treatment he called the treating physician who immediately referred him to a pulmonary specialist. He was seen that evening by the pulmonologist who ordered a repeat chest radiogram (Figure 2) followed by a CT examination of the chest (Figure 3). He informed the patient that he had a “bad pneumonia” and added amoxicillin-clavulonate to the antibiotic regimen.

Three days later—21 days after the onset of symptoms—he notified the specialist that he was feeling worse and noticed difficulty walking. He was seen immediately and an examination noted mild upper and lower extremity weakness on the left side without sensory changes. A repeat chest radiogram showed marked worsening of the infiltrate and a repeat CT of the chest showed more extensive disease.

A head CT showed a large R hemispheric ring enhancing lesion (Figure 4) and he was admitted to the medical ICU. His temperature was 39.4°C (103°F) and his SpO₂ was 91% at room air.

Additional history was obtained which revealed that he was working on a construction project in northern Wisconsin on the shores of Lake Superior 2 months prior to the onset of symptoms. He was immediately taken to the bronchoscopy suite and a bronchoscopy showed purulent material in both main stem bronchi. The material was sent for Gram’s stain and for culture of bacteria, fungi

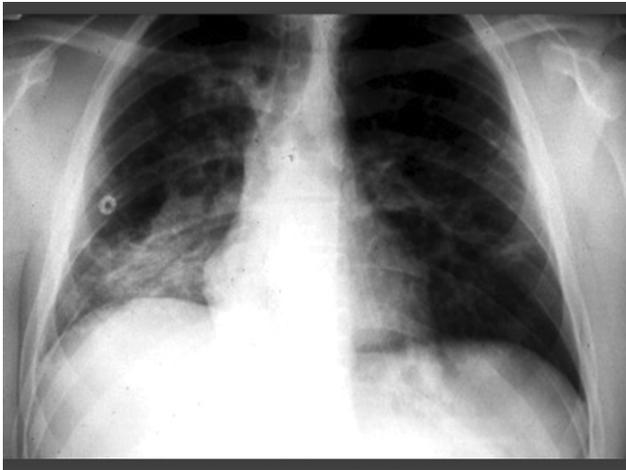


Figure 1 Initial chest radiograph showing a large infiltrate.



Figure 2 Repeat radiograph shows marked worsening and spread to the contralateral side.



Figure 3 CT examination shows the true extension of the infiltrate in both lungs.

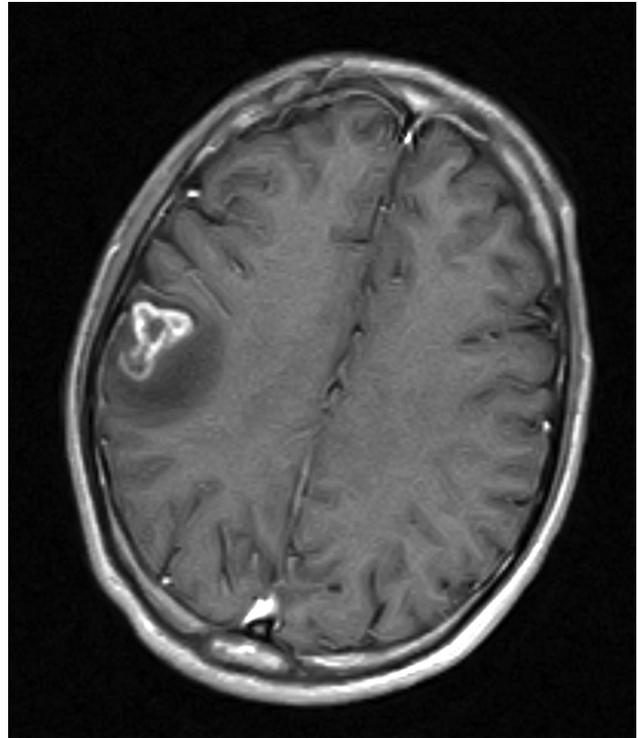


Figure 4 CT of the head shows a large cortical lesion with surrounding edema.

and acid-fast organisms. Vancomycin and piperacillin/tazobactam were given and dexamethasone was started to reduce the brain edema.

During the next 5 days he showed some improvement in weakness and his temperature was now 38.2°C (100.8°F) when the laboratory results showed that a fine, filamentous organism was growing in the fungal culture, and preliminary evaluation suggested *Blastomyces dermatitidis*. Liposomal amphotericin B was started and after 3 weeks he became afebrile and his strength was nearly normal. The patient was placed on voriconazole 400 mg twice daily and showed resolution of the central nervous system abnormalities.

Comments

This patient's course demonstrates a number of diagnostic errors and missed opportunities.

The initial encounter reflected the prevailing situation in the community where the patient lived. In the Minneapolis-St. Paul metropolitan area and in the states of Minnesota and Wisconsin tick-borne infections have become very common, especially Lyme borelliosis and anaplasmosis. As recall of tick exposure is often not

present, initiation of therapy with doxycycline for potential tick-borne infection is common practice.

The fact that crackles were heard on auscultation may have reinforced the need for empiric antibiotic treatment presumed to be effective.

The first error was made at the second visit to Urgent Care when CAP was first diagnosed. While virtually all patients with CAP initially will be treated empirically with broad spectrum antibiotics to cover the possible standard etiologic agents, it should have been noted that he had previously received a 7-day course of a broad spectrum agent and failed to respond. Further investigation should have been initiated, as the possibility that the pulmonary infiltrate was not caused by a “standard” CAP pathogen should have been recognized [1]. This error was further compounded by the third course of broad spectrum agent, offering an antimicrobial spectrum similar to the two previous treatment courses.

Following referral to a specialist the opportunity was present to make a specific diagnosis, as the CT scan of the chest showed progression of the infiltrate with spread to the contralateral side. Once again, it should have been clear that three courses of broad spectrum antibiotics had failed to improve the infection.

When neurologic findings prompted admission and more active management, yet another opportunity was missed. Although a 2-month long residence on the shores of Lake Superior was elicited, the intracerebral lesion was recognized and bronchoscopy produced ample specimen for sputum analysis, the opportunity to make a rapid diagnosis of blastomycosis was missed when the fresh sputum specimen was not submitted for 10% KOH digest and direct staining for fungi [2, 3]. Minnesota and Wisconsin are known endemic areas for blastomycosis and a non-responding pneumonia should always raise this possibility [1, 4]. Fortunately, the patient responded well to treatment and is on the way to recovery.

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