Lung Abscess Caused by 
Legionella micdadei*

Kay M. Johnson, MD; and Jon S. Huseby, MD

We describe a case of lung abscess caused by sporadic infection with *Legionella micdadei* in a patient with AIDS. *L. micdadei* infection can be very difficult to diagnose because the organism stains only weakly Gram negative, requires special culture media, and is not detectable with some direct fluorescent antibody tests that are directed only at *Legionella pneumophila*. Since it can stain acid fast, it may be confused with mycobacteria. The abscess was successfully treated using antibiotics and percutaneous catheter drainage.

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**Key words:** acquired immunodeficiency syndrome; chest tubes; Legionella; *Legionella micdadei*; legionellosis; lung abscess

**Abbreviations:** DFA = direct fluorescent antibody test; FCP = *Pneumocystis carinii* pneumonia

Since patients with HIV infection are often infected by more than one pathogen at a time, lack of response to therapy for one organism must trigger a search for additional pathogens. We describe a patient who was not responding to therapy for his *Pneumocystis carinii* pneumonia (PCP); he was subsequently found to have pneumonia caused by *Legionella micdadei*, which led to the development of a lung abscess. We discuss the difficulties in diagnosing *L. micdadei* infection.

**CASE REPORT**

A 34-year-old homosexual man with HIV infection and a CD4 count of 18/mm³ was admitted to the hospital for evaluation and treatment of progressive pneumonia. There was no history of opportunistic infection. An intermediate grade B-cell lymphoma of the cecum was in remission following chemotherapy.

Two weeks prior to hospital admission, he presented to the clinic with fatigue, cough, and fever. A chest radiograph showed mild diffuse interstitial infiltrates, and an induced sputum was positive for PCP. Despite atovaquone therapy, his dyspnea worsened and he developed daily fevers to 40°C and left-sided pleuritic chest pain.

At the time of hospital admission, his temperature was 38.5°C. He was thin and mildly dyspneic; his chest was clear, and results of the remainder of his physical examination were unremarkable. Admission leukocyte count was 8.2×10⁹/L, and lactate dehydrogenase valve was 492 U/L; results of renal and liver function tests were normal. His chest radiograph revealed a new focal infiltrate in the left midlung field. The sputum was purulent and showed redominant Gram-negative rods that resembled *Haemophilus influenzae*. However, the culture grew only oral flora.

*From the Department of Medicine, and Division of Pulmonary and Critical Care Medicine, University of Washington and Providence Medical Center, Seattle.

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Reprint requests: Dr. Huseby, 1145 Broadway, Seattle, WA 98122

Initially, IV pentamidine and prednisone were given for FCP treatment, along with ceftriaxone for possible *H influenzae* pneumonia. The lingular infiltrate became progressively more dense, and his fevers continued. A BAL revealed many leukocytes, *P carinii*, and also a predominant Gram-negative rod that appeared to be contained in vacuoles within the cytoplasm of leukocytes. This morphologic appearance suggested Legionella, so erythromycin, rifampin, and ciprofloxacin were added. However, the direct fluorescent antibody test (DFA) for *L pneumophila* was negative.

Two days later, the transbronchial biopsy specimen revealed acid-fast organisms inside neutrophils. Isoniazid and ethambutol

**FIGURE 1. Top:** chest radiograph taken on 10th hospital day, showing a large abscess with air-fluid level. **Bottom:** chest radiograph taken 4 days later, after abscess was drained using a CT-guided percutaneous catheter.
were added for possible *Mycobacterium tuberculosis*, and clarithromycin was substituted for erythromycin for better *Mycobacterium avium-intracellulare* coverage. Surprisingly, the bronchoscopy specimen did not grow mycobacteria, but grew *L. micdadei*.

By the following day, the infiltrate had developed a large air-fluid level (Fig 1, *top*). Since his clinical status was deteriorating, this abscess was drained using a CT-guided percutaneous pigtail catheter (Fig 1, *bottom*). The abscess fluid again revealed many WBCs, some of which contained Gram-negative rods as seen in the BAL fluid; this time there was no growth on culture. Ten days after this procedure, the patient was afebrile and was discharged from the hospital with the catheter connected to a Heimlich valve and drainage bag. Subsequently, the catheter was removed; a follow-up radiograph 8 weeks after hospital discharge showed only a small scar where the abscess had been.

**DISCUSSION**

*L. micdadei* is the second most common cause of legionellosis, accounting for 8% of cases.1 This organism was originally called the “Pittsburgh Pneumonia Agent” in 1979, when it was found to cause pneumonia in renal transplant patients.2 *L. micdadei* causes pneumonia principally in immunosuppressed patients, although it can affect normal hosts.3

*L. micdadei* infection can be difficult to diagnose, so clinical suspicion must be high. In our case, legionellosis was suspected based on the morphologic features of the Gram-negative rods seen in the BAL specimen, so appropriate antimicrobial therapy was begun. The suspicion of legionellosis diminished when the DFA was reported to be negative. However, the DFA used was a monoclonal antibody directed toward only *L. pneumophila* serotypes, which would not be expected to detect our patient’s *L. micdadei* infection. Even in patients with proven *L. pneumophila* pneumonia, the reported sensitivity of this DFA is only 25 to 75%. The sensitivity of a Legionella DNA probe, which can detect all members of the genus Legionella, is 50 to 75%, so a negative result for either test does not exclude legionellosis.4 Polyclonal DFA tests directed at multiple species of Legionella, including *L. micdadei*, are available but have not been adequately studied and are of uncertain value.

In this case, culture of the lavage fluid established the diagnosis. Culture using buffered charcoal yeast extract media is the most sensitive and specific test for Legionnaires’ disease.5 Since *L. micdadei* takes 2 to 4 days to grow on this media, concomitant use of a DNA probe may speed the diagnosis.5 Acute and convalescent antibody titers can also be useful to confirm the diagnosis.

*L. micdadei* is the only species of Legionella that can stain acid fast in tissue or sputum specimens. It often loses this characteristic in culture. It can be mistaken for a mycobacterium, as it was in this case and several others in the literature.3,7

Approximately 10% of *L. micdadei* pneumonias in immunosuppressed patients cavitiate,3,8,9 but a large abscess as seen in our case has not been described (to our knowledge). *L. micdadei* pneumonia has been reported in four HIV-infected patients; all had coinfections with either PCP, *L. pneumophila*, or *M. avium-intracellulare*10,11 None of these patients had lung abscesses.

This patient’s status responded dramatically to closed percutaneous drainage. We believe that this procedure not only effected abscess drainage, but also shortened his hospital stay considerably.

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**REFERENCES**