

Loculated pleural effusion caused by *Legionella pneumophila*

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Legionnaires' disease is primarily a pneumonic illness, though gastrointestinal, renal, and hepatic dysfunction are often present. Pleural effusions are relatively common but not clinically significant.¹ We wish to report a case of infection with *Legionella pneumophila* that manifested as a loculated pleural effusion with minimal involvement of the lung.

Case report

A 42-year-old male teacher was admitted to hospital with a three-week history of cough, chills, night sweats, and 10 pound weight loss. Oral ampicillin, 500 mg qid, had been started one week before admission when a right pleural effusion was noted on his chest radiograph and the white blood cell count was found to be $38\,000\text{ mm}^{-3}$. Despite this therapy, his cough became productive of white to yellow sputum and he developed right pleuritic chest pain. He was a 60 pack year cigarette smoker but had had no previous pulmonary illness. He denied seizures, excessive alcohol ingestion, or loss of consciousness. He had cleaned out an attic containing a pool of stagnant water several days before the onset of his symptoms.

On physical examination, he was in no distress. Respirations were 18 per minute, pulse 116, and temperature 37.2°C . Myringitis, rash, and adenopathy were absent. Moderate periodontal disease was noted. The lungs were clear to auscultation and percussion. Cardiac and abdominal examinations were normal. There was a suggestion of clubbing (which had been present since childhood) but cyanosis was absent.

The white blood cell count was $27\,100\text{ mm}^{-3}$ with 85% segmented neutrophils, one band, and no eosinophils. Routine blood biochemistry was normal except for elevation of SGOT to 51 units l^{-1} (normal up to 40), and elevation of the alkaline phosphatase to 212 units l^{-1} (normal up to 85). Arterial blood gases showed a pH of 7.47, a Pco_2 of 31 mmHg, and a Po_2 of 59 mmHg on room air. The chest radiograph (fig 1) revealed several pleural-based densities at the apical, anterior, and posterior aspects of the right upper hemithorax which had progressed in size between 9 and 23 July. Serum

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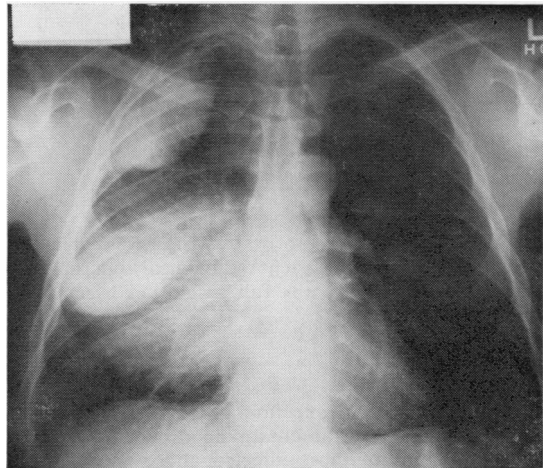


Fig 1 Chest radiograph reveals several pleural-based densities at the apical, anterior, and posterior aspects of the right upper hemithorax.

antibody titre to *Mycoplasma pneumoniae* was $< 1:8$.

Fluid aspirated from the anterior pleural pocket was turbid. Cytology of the specimen was normal. Pleural fluid glucose concentration was less than 5 mg%, protein was 5.9 gm%, and LDH was greater than 1000 units l^{-1} . There were 1440 red cells and 110 white cells per mm^3 . Pleural fluid cultures processed both aerobically and anaerobically for bacteria were negative, as were special stains and cultures for mycobacteria and fungi. Direct fluorescent antibody staining of the pleural fluid, as described by Cherry *et al*,² showed 4+ profusion of coccobacillary organisms both within and outside of neutrophils and macrophages (fig 2). Serum antibodies to *Legionella pneumophila* measured by the indirect fluorescent antibody technique,³ were present at a titre of $\geq 1:512$ in convalescent serum and dropped to 1:128 six months after discharge. Both serum samples retained their level of antibodies to *Legionella pneumophila* after preabsorption with six different stains of *Bacillus fragilis*. Also, serum antibodies to *Bacillus fragilis* were absent.

Although the patient gradually became afebrile and asymptomatic during the three weeks of ampicillin



Fig 2 A macrophage in the pleural fluid contains intracytoplasmic aggregates of *Legionella pneumophila* antigen (Direct immunofluorescent test $\times 400$).

therapy, he was switched to oral erythromycin stearate 500 mg qid because of persistent radiological abnormality. One month later there was full resolution except for residual pleural scarring.

Discussion

Pleural involvement in infection by *Legionella pneumophila* is common. Pleuritic chest pain occurs in approximately one-third of those infected and a pleural rub may be heard.¹⁻⁴ Pleural effusion, usually unilateral, is associated with the pneumonic illness in less than one-third to over one-half of reported cases.⁴⁻⁶ In some cases it has been considered secondary to associated congestive heart failure.⁶ Though effusions may precede the pneumonic infiltrate, most coincide with it.⁴⁻⁵ None has been reported without a pneumonic infiltrate.

Pleural involvement with Legionnaires' disease has not been clinically significant except in patients receiving corticosteroids.⁷⁻⁸ Empyema from *Legionella pneumophila* has not been described, though the organism has been found in pleural fluid.⁹ The few pleural fluid analyses reported showed the effusion to be either an exudate or transudate, to have a variable leucocyte

content, and to have a normal glucose concentration.^{1-4,7,8} Though pulmonary cavitation has occasionally occurred, especially in immunocompromised patients, pleural loculation has not been reported.^{7-8,10}

Our patient had infection with *Legionella pneumophila* documented by demonstration of the organism in pleural fluid and a high convalescent titre of antibodies to the organism. The pleural fluid was an exudate and its glucose concentration was extremely low, even though fluid leucocytosis was minimal. *Legionella pneumophila* must now be considered in the differential diagnosis of both loculated pleural effusions and pleural exudates with low glucose concentrations.

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