Case Report

# Pleural Effusion as a Manifestation of Lyme Disease

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***ABSTRACT.*** We describe a 37-year-old woman who presented with bilateral pleural effusion combined with intermittent low grade fever. Lyme disease was confirmed by seroreactivities against *Borrelia burgdorferi* spirochetes. The unique clinical findings reveal a rare manifestation with a possible association between *B. burgdorferi* infection and pleural effusion. (J Rheumatol 2004;31:811–3)

*Key Indexing Terms:*
ERYTHEMA MIGRANS LYME DISEASE PULMONARY PLEURAL EFFUSIONS

Lyme disease, a tick-borne infectious disease caused by the etiological agent of spirochetes (*Borrelia burgdorferi*), is known to have various cardiovascular, neurologic, and rheumatologic manifestations. However, we found no literature describing Lyme disease infection characterized with pleural effusion.

## CASE REPORT

A 37-year-old Chinese woman with no history of rheumatic disorders was admitted to hospital July 28, 2002. She complained of a 2 week history of low grade fever and malaise, and erythema migrans rash (> 8 cm in diameter) had been observed on her knees for one week (Figure 1). She reported a travel history in England for one month and had returned to Taiwan in early July 2002. She did not recall suffering a tick bite.

Her blood pressure was 110/70 mm Hg, heart rate 78/min, respiratory rate 18/min, and temperature 37.6°C. On examination, breath sounds were mildly symmetrically diminished, and cardiac auscultation revealed normal heart sounds without friction rub or murmur. Abdominal and joint examinations were negative. Admission laboratory tests included a urinalysis, also negative. Her white blood cell count was 5350/mm$^3$ (63% neutrophils, 25% lymphocytes, 7% monocytes); platelet count 245,000/mm$^3$; and erythrocyte sedimentation rate was 12 mm/h. C-reactive protein, rheumatoid factor, antinuclear antibody, and blood chemistry were all normal. Complement levels of C3 and C4 were all within normal limits. A chest radiograph disclosed bilateral pleural effusion and a normal cardiac silhouette (Figure 2A). Abdominal sonography showed bilateral pleural effusion, and an electrocardiogram (EKG) showed normal sinus rhythm.

Due to the presence of pleural effusion of unknown origin, echocardiography was performed and revealed minimal pericardial effusion with a normal ejection fraction. Lyme disease was suspected because of her history and typical skin lesions. Serologic tests revealed a significantly elevated titer of antibody against *B. burgdorferi* measured by an indirect immunofluorescent antibody assay. IgG Western blotting showed the major protein bands at 23, 39, 41, 58, 63, and 66 kDa, and IgM showed a strong 41 kDa and positive reactivities in 58, 66, and 72 kDa bands (Figure 3). The infection of Lyme disease was diagnosed, a disease rarely seen in our country. She was treated with doxycycline 100 mg twice daily for 3 weeks. A followup chest radiograph revealed that the pleural effusion had resolved (Figure 2B). One month after discharge she has continued to do well, with no fever, pleural effusion, or rash.

*Figure 1.* Erythema migrans lesion with central clearing on the left knee.

## DISCUSSION

Our patient satisfied the criteria for the diagnosis of Lyme disease according to the US Centers for Disease Control and Prevention and the Association of State and Territorial Public Health Laboratory Directors[1,2]. Three genospecies of Lyme disease spirochetes (*B. burgdorferi* sensu stricto, *B. garinii*, and *B. afzelii*) are known to cause human infection in the endemic areas of Europe[3]. In our patient, diagnosis of Lyme disease infection was confirmed by the typical travel history, positive reactivity for *Borrelia* antibodies by Western blot assays, and susceptive response to adequate

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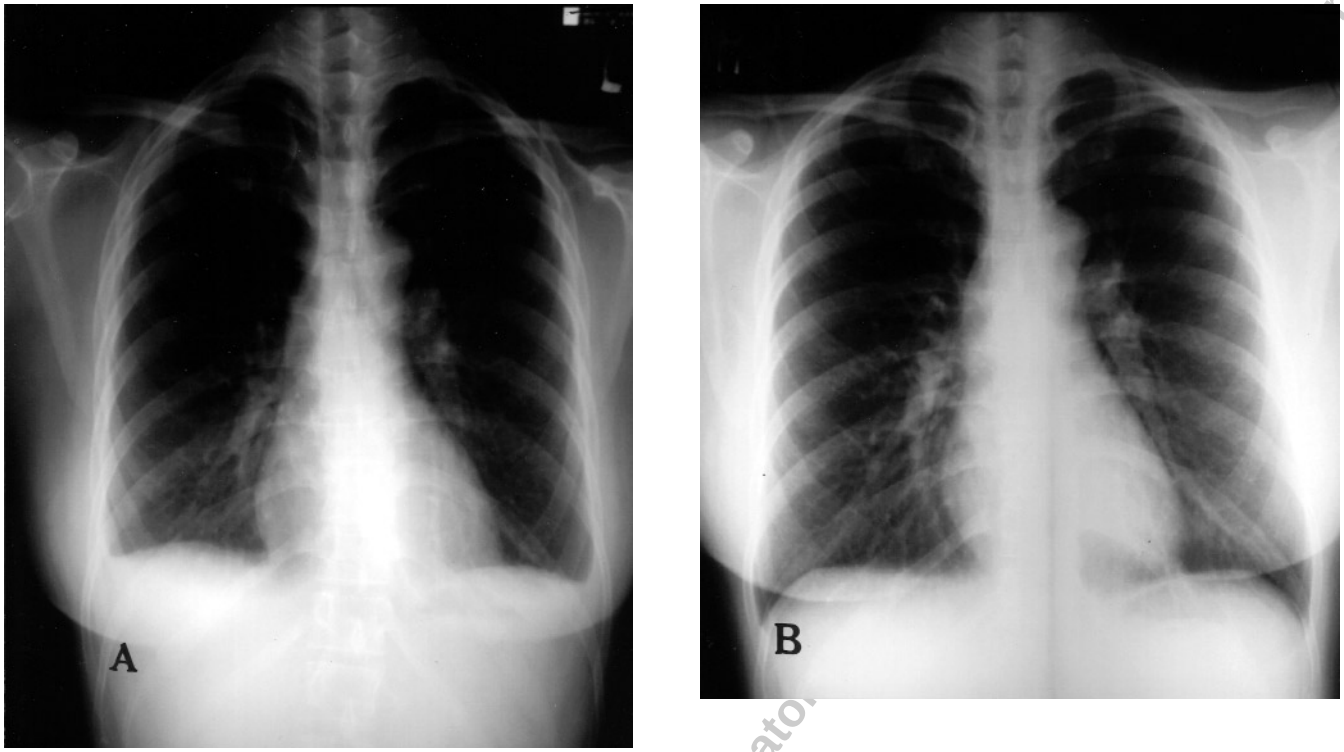


*Figure 2*. A. Chest radiograph showing bilateral pleural effusions on the day of admission. B. Followup radiograph one week later showing resolution of pleural effusion.

antibiotic treatment. In addition, her history and routine laboratory findings showed no other disease that could have explained the pleural effusion[4,5].

Lyme disease is a systemic illness characterized by a pathognomonic rash associated with fever, myalgias, arthralgias, headache, and fatigue[6]. It frequently appears as a localized skin lesion, but it may affect joints, cardiovascular, and nervous systems in its disseminated form[6]. In more than 50% of patients, the early localized symptom is a typical Lyme disease rash, erythema migrans and expanding

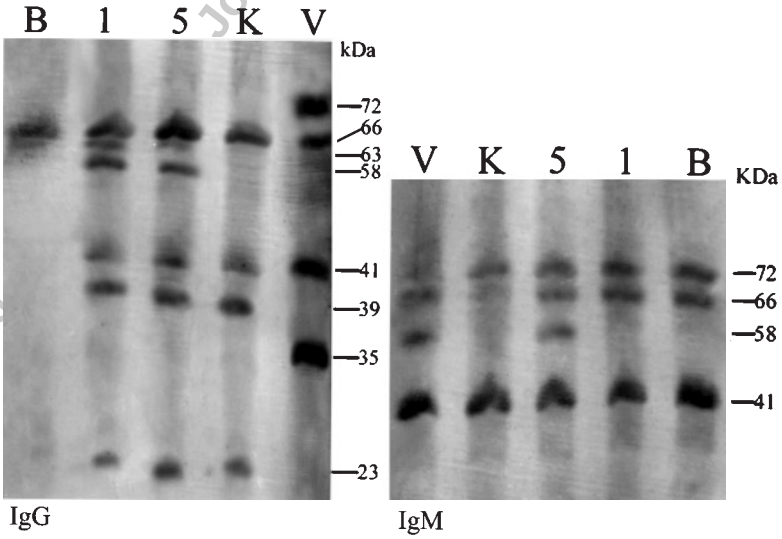


*Figure 3*. Western immunoblot analysis of serum reveals differential reactivities with major antigens of *B. burgdorferi* sensu lato. Lane B, American type strain B31 isolate of *B. burgdorferi* sensu stricto; lanes 1 and 5, Taiwan strain TWKM1 and TWKM5 isolates of *B. burgdorferi* sensu stricto[12]; lane K, K48 isolate of *B. garinii*; Lane V, VS461 isolate of *B. afzelii*.

erythematous rash that often occurs at the site of the tick bite 2 to 40 days after exposure[7].

Early localized disease is usually cured within 3 to 4 weeks of oral antibiotic therapy. Without antibiotic treatment, further complications can develop. In 4% to 10% of patients who are not treated, Lyme carditis develops[8]. Indeed, our patient's erythema migrans and related symptoms were found 3 weeks after returning to Taiwan, and symptoms were resolved after 3 weeks' antibiotic treatment.

Early diagnosis of Lyme disease is very important for successful treatment, and a high index of suspicion should be manifested when a patient reports recent travel to an endemic area. The immunoreactivities of IgM antibodies against *B. burgdorferi* usually indicate a recent infection, and it peaked between the third and sixth week after infection[9]. In contrast, the IgG antibodies may accompany long-standing infection, and are usually markedly elevated in patients with Lyme arthritis[10]. In our patient, the serum IgM antibodies were compatible with an early infection, and the susceptible clinical response to doxycycline therapy supports our diagnosis[11]. However, further evidence of positive culture of *B. burgdorferi* or DNA identification by polymerase chain reaction from the pleural fluid would help to differentiate an active or previous infection of Lyme disease.

Our patient's clinical features of an erythema migrans rash combined with pleural effusion has not to our knowledge been previously reported. Awareness of this rare manifestation may be beneficial to clinicians to identify and treat patients with Lyme disease infection. We speculate that our observations represent an early stage of Lyme disease infection and hope this report may stimulate further investigations.

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