We herein report the first laboratory-confirmed case of Lyme disease during pregnancy in Taiwan. A 32-year-old woman developed multiple expanding annular erythematous skin lesions during the first trimester of pregnancy. Lyme disease was diagnosed based on the clinical manifestations, and seroreactivity against *Borrelia burgdorferi*. The skin lesions gradually resolved after intravenous penicillin treatment. She subsequently delivered a full-term female infant with no congenital defects. (Dermatol Sinica 20: 147-151, 2002)

**Key words:** Lyme disease, Pregnancy, Erythema chronicum migrans, First trimester, Taiwan

**INTRODUCTION**

Lyme disease is a tick-borne multisystem illness caused by a spirochete, *Borrelia burgdorferi*. Its disease is characterized by a distinctive skin lesion, erythema chronicum migrans (ECM), in the early stage of infection and may be followed by rheumatologic, cardiac, or neurologic manifestations. Although cases of Lyme borreliosis had been reported in Taiwan, no case of Lyme disease during pregnancy had been reported. Herein, we report the first laboratory-confirmed maternal case of Lyme disease in Taiwan with typical ECM skin lesions. She was treated with parenteral...
penicillin and delivered a healthy full-term female infant.

CASE REPORT
A 32-year-old pregnant woman presented with a 3-months-history of multiple expanding annular erythematous skin lesions on the trunk and lower limbs. In February 2000, she initially developed an expanding annular erythematous patch on her left hip when she was in the 12th week of pregnancy. She subsequently noted secondary lesions of multiple annular erythematous patches and thin plaques on her abdomen, back, buttocks and bilateral lower extremities in March 2000 (Fig. 1 & 2). The skin lesions were mildly pruritic and increased in number and size over the next three months. There was no systemic symptoms, including fever, headache, stiff neck, fatigue, arthralgia, myalgia, and regional lymphadenopathy. In questioning of travel history, she had been to USA, England, Korea, and Japan during January-February 2000, but did not recall a tick bite. Lyme disease was suspected at the initial dermatologic visit in May 2000. The histopathologic examination of the skin lesion showed a superficial and deep

Fig. 1
Multiple expanding annular erythematous patches and thin plaques on the abdomen and flank areas.

Fig. 2
Close-up of the skin lesion: an annular erythematous thin plaque with central clearing.
perivascular lymphocytic infiltrate. Serologic tests revealed an elevated titer of IgG antibody (1:80) to *B. burgdorferi* by an indirect immunofluorescent antibody assay (IFA) and positive reactivities with *B. burgdorferi* antigens including the following five bands: 28 kD, 30 kD, 41 kD, 58 kD, and 66 kD by a Western immunoblot assay (Fig. 3).

Under the diagnosis of Lyme disease, she was admitted to our hospital on July 17, 2000 when she was in the 32nd week of pregnancy. Physical examination revealed multiple annular erythematous patches and thin plaques with central clearing on the back, abdomen, buttocks, and bilateral lower extremities. In addition, neither neurologic, cardiac, nor rheumatologic manifestations were noted in the previous five months. Laboratory tests including CBC/DC, GOT, GPT, BUN, creatinine, ANA, and VDRL were all within normal ranges or negative. The histopathology of the skin biopsy from the right lower back lesion revealed a superficial and deep perivascular lymphocytic infiltrate (Fig. 4 & 5). The patient was treated consecutively with intravenous penicillin G 3.5 MU every 4 hours for 14 days. The skin lesions gradually resolved after treatment. She finally delivered a healthy female infant in the 38th week of pregnancy.

**DISCUSSION**

Lyme disease is a multisystem infectious disease caused by *B. burgdorferi* and is transmitted by the vector ticks of *Ixodes* species. 1,2 The dermatologic manifestation of ECM occurred in 60–80% of early infected patients. The skin rash usually appears within one month

![Fig. 3](image1.png)

**Fig. 3**

Western immuno blotting of patient's serum reveals differential reactivities with the major antigens of *B. burgdorferi sensu lato*. Lane B, American type strain B31 isolate of *B. burgdorferi sensu stricto*; lanes 1 & 5, Taiwan strain TWKM1 and TWKM5 isolates of *B. burgdorferi sensu stricto*; lane K, K48 isolate of *B. garinii*; Lane V, VS461 isolate of *B. afzelii*.

![Fig. 4](image2.png)

**Fig. 4**

A perivascular cuff of lymphocytes around the superficial and middermal vessels. (H & E 100x)

![Fig. 5](image3.png)

**Fig. 5**

A dense lymphocytic infiltrate can be seen around the vessels. (H & E 400x)
around the site of tick bite and is initially as a red macule or papule which then extends to an annular erythematous rash with a red margin and central clearing. ECM appears as a solitary lesion in most patients, but multiple lesions also occur. Multiple lesions represent dissemination of *B. burgdorferi* from the primary lesion to other skin sites via the blood or lymphatic vessels. The skin manifestation may be accompanied by symptoms of fever, headache, stiff neck, arthralgia, or myalgia. Some patients may also develop into disseminated infection with dermatologic, neurologic, cardiac, or rheumatologic manifestations.\(^3,4,9,15\) Our case presented only with disseminated skin lesions without neurologic, cardiac, or rheumatologic manifestations.

A two-test procedure with serologic tests using a sensitive enzyme immunoassay (EIA) or immunofluorescent assay (IFA) followed by an antigen-specific Western immunoblot was the algorithm of choice for the confirmation of Lyme disease. It is recommended that all tested specimens with a positive or equivocal result by a screening test (EIA or IFA) should be confirmed by an assay of Western immunoblot and specimens with a negative finding by a sensitive EIA or IFA need not be tested further.\(^11\) In addition, the typical histologic feature of ECM is a superficial and deep perivascular and interstitial infiltrate predominated by lymphocytes with a variable admixture of plasma cells and eosinophils.\(^1\) The IFA test in our case was positive and was further confirmed by a Western immunoblot assay. Besides, the histopathologic examination of the skin lesions was consistent with Lyme disease.

The differential diagnosis of suspected ECM may include insect bite reaction, cellulitis, tinea corporis, granuloma annulare, erythema annulare centrifugum, subacute lupus erythematosus, fixed drug eruption, urticaria, Sweet's syndrome, and erythema multiforme.\(^13\) For a pregnant woman, the skin lesion of ECM should be distinguished from the dermatoses of pregnancy, including impetigo herpetiformis, pruritic urticarial papules and plaques of pregnancy, pemphigoid gestationis, and papular dermatitis of Spangler.\(^14\) The skin lesions in our case could be differentiated from those of the above diseases without difficulty.

All stages of Lyme disease can be treated by appropriate antibiotic therapy. Briefly, two to three weeks of oral antibiotic therapy is sufficient for early Lyme disease. Intravenous therapy is usually required in the case of neurologic Lyme disease to achieve a sufficient level of antibiotics in the cerebrospinal fluid. However, the optimal duration of therapy for late Lyme disease infection had not been established conclusively. In addition, treatment for pregnant patients can be identical to that for nonpregnant patients, except that tetracyclines should be avoided.\(^12,15\)

The maternal-fetal transmission of *B. burgdorferi* had been reported in patients with early Lyme disease during pregnancy since 1985. These patients were either untreated or inadequately treated, and all demonstrated adverse outcomes of pregnancy including various congenital abnormalities, premature birth, and even fetal death.\(^16-18\) However, some follow-up studies indicated that maternal Lyme disease was not directly implicated as a cause of fetal malformations,\(^19-21\) and no association could be found between the presence of IgG antibody to *B. burgdorferi* in the cord blood and congenital malformations.\(^22\) Accordingly, all authors recommend that pregnant women with early Lyme disease should be treated with antibiotic therapy\(^21,23-29\).

In summary, our case presented with disseminated ECM lesions but without other systemic manifestations. The serologic testing and histopathologic examination were consistent with Lyme disease. We diagnosed the first case of Lyme disease during pregnancy in Taiwan based on the distinctive skin lesion (erythema chronicum migrans) and a two-step confirmatory serodiagnosis. Due to our case was pregnant with disseminated skin lesions, we elected to treat her aggressively with intravenous antibiotic therapy. Fortunately, the outcome of pregnancy was quite well.
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