

**Case Report**

## **Pregnancy and Lyme Disease**

Nicholas Leslein, BA, M3  
Carver College of Medicine, University of Iowa

**Key Words:** spirochete, *Borellia burgdorferi*, Lyme disease, pregnancy, congenital borreliosis, maternal-fetal transmission

**Abstract:** A literature review of individuals living with or contracting Lyme disease during pregnancy does not support an association with congenital anomalies or adverse pregnancy outcomes provided the patient receives adequate treatment. Currently, the treatment of Lyme disease in pregnant women should not differ from non-pregnant women except tetracyclines, such as doxycycline, are contraindicated and should not be prescribed.

she was found to be positive for Lyme disease enzyme immunoassay screening exam 2 weeks after exposure. Further confirmation using Western Blot provided a negative result for both IgM and IgG. The University of Iowa's Hygienic Laboratory's current criteria for diagnosing Lyme disease is 5 of 10 bands for IgG and 2 of 3 bands for IgM. Convalescent serology was sent 6 weeks following exposure and confirmed the negative Western blot result suggesting that Lyme disease was not the likely diagnosis.

### **Case Presentation**

A 20 year old female, G1P0, at 36 weeks gestation was admitted for evaluation of possible Lyme disease. On admission, she complained of headache, fevers to 102°F for two weeks, and numbness, tingling, and weakness in her right thumb, index, and middle fingers with similar symptoms beginning to present in her left hand. She did not observe any dermatologic findings such as an erythema migrans at the site of tick engorgement. Her possible tick exposure was one month earlier and

### **Discussion**

Why worry about Lyme disease in a pregnant woman? Maternal syphilis, caused by another spirochete, *Treponema pallidum*, results in congenital syphilis in the neonate which can be characterized by lesions of the mucosal layers, maculopapular rashes, condylomas, hepatosplenomegaly, anemia, and osteochondritis among other possible findings.

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**Corresponding author:** Nicholas Leslein, University of Iowa, 200 Hawkins Drive, Iowa City, IA, 52242. [nicholas-leslein@uiowa.edu](mailto:nicholas-leslein@uiowa.edu)

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Fortunately, while prior case reports have suggested a possible association between gestational borreliosis and adverse pregnancy outcome; no specific pattern of teratogenicity has been demonstrated, and a causal relationship has never been proven."<sup>1</sup>

### **BACKGROUND ON LYME DISEASE**

Lyme disease was first identified by Steere, AC et al in 1975 and described as "Lyme Arthritis" after the county in eastern Connecticut where the disease was epidemic.<sup>2</sup> It has since been further described, its etiologic agent – *Borellia burgdorferi* – identified, and classical clinical presentation delineated.

Clinical presentation - these symptoms may overlap or progression of disease may occur in the absence of some of the earlier signs and symptoms.

- 1.) Early localized disease: erythema migrans (EM) is a classical early presentation following a recent tick bite (<1 month). Constitutional symptoms such as myalgias, arthralgias, headache, and fatigue may accompany.
- 2.) Early disseminated disease: multiple EM lesions (occurring days to weeks after infection), neurologic and or cardiac manifestations (weeks to months after infection).
- 3.) Late Lyme disease: intermittent or persistent arthritis involving primarily large joints, neurologic findings such as an encephalopathy or polyneuropathy (typically

several months to a few years after initial infection).

### **LYME DISEASE ASSOCIATED WITH PREGNANCY**

Lyme disease occurring during a pregnancy poses no risk for fetal demise nor does it increase the frequency of congenital anomalies if the mother has been adequately treated. Additionally, if a mother has been previously diagnosed and treated for Lyme disease there is no increased risk for fetal manifestations.

Although several initial retrospective case reports and small studies published in the past suggested congenital manifestations in infants with mothers that contracted Lyme disease newer prospective evidence does not support this association.

- "In a prospective study, 2000 women residing in an endemic area had Lyme serology during their first prenatal visit and at delivery. Neither a history of a tick bite nor serologic evidence of Lyme disease during pregnancy were associated with fetal death, decrease in infant birth weight, premature delivery, or congenital malformations."<sup>3</sup>
- "In a prospective study of pregnant women with erythema migrans treated during pregnancy with ceftriaxone, 51 of 58 (88 percent) delivered normal term babies. Among the remaining seven pregnancies, there was one spontaneous abortion, five premature births, and one term

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- baby with a urologic defect noted at seven months of age.”<sup>4</sup>
- “A retrospective, case-control study of 1500 children, 796 with a congenital heart defect, showed no link between congenital heart disease and a history of maternal tick bite or maternal infection within three months of conception or during pregnancy.”<sup>5</sup>

Transplacental transmission of Lyme disease has been described in several case reports but due to lack of fetal immunologic response there has been little evidence to support an association with congenital anomalies.<sup>6</sup> Similarly, transmission of Lyme disease to a newborn has not been shown to occur by breast-feeding.

Evaluation of a pregnancy that has been complicated by Lyme disease may include examination of the placenta to detect *Borellia* (spirochetes) within the cord vessel. Additionally, culture, immunohistochemistry staining, and indirect immunofluorescence may be of benefit in determining the presence of *Borellia* during a pregnancy.

### **DIAGNOSIS OF LYME DISEASE**

The diagnosis (and treatment) of Lyme disease during pregnancy is the same as in the nonpregnant patient. Although Lyme disease can be diagnosed on a clinical basis if there is evidence of erythema migrans, patients suspected of Lyme disease often undergo laboratory testing. The current gold standard is to first perform an enzyme-linked immunosorbent assay (ELISA)

which has been associated with a sensitivity of 68-84% and a specificity of 83-100%. Due to the high false positive rates of this test a second confirmatory test is then performed by Western Blot testing to detect antibodies to the organism. Typically, IgM antibodies to *B. burgdorferi* are present within 2-4 weeks after the tick bite. IgG antibodies appear after 6-8 weeks but unlike the IgM antibodies, the IgG antibodies remain elevated indefinitely.<sup>7</sup> It is important to note that although these tests may indicate the presence of antibodies to this organism they may not be indicative of active disease.

### **TREATMENT OF LYME DISEASE IN PREGNANCY**

The optimal treatment for Lyme disease in pregnant women has not been defined and the Infectious Diseases Society of America has suggested that treatment in pregnant women should not differ from those of non-pregnant women with the exception of doxycycline.<sup>8</sup> Amoxicillin and third generation cephalosporins are safe in pregnant women. If there are neurologic complications as seen in late Lyme infection, IV ceftriaxone for 14-28 days should be used. 1st-degree AV block responds to oral treatment while more serious manifestations require IV treatment. Treatment of women who are seropositive for antibodies to *B. burgdorferi* at the time of conception is not warranted.

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**Conclusion**

Given the probability for false positives with the screening exam and our patient's negative confirmatory exam the literature would not support giving our patient antibiotics at this time. For future reference, if patients are found to be positive for Lyme disease by Western Blot, amoxicillin 500 mg PO TID for 14 (range 14-21 days) days is recommended. While not first line, macrolides can be given in penicillin-allergic individuals. Third generation cephalosporins could be substituted in the event of allergy. Tetracycline and doxycycline are not recommended as they are contraindication during pregnancy.

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