CASE REPORT

Acute *Borrelia burgdorferi* infection in pregnancy

Stephen Senthan Rasiah, Niamh Condon, James Michael O'Brien

ABSTRACT

Introduction: There is a paucity of information regarding the potential complications and sequelae regarding intrauterine exposure to Borrelia burgderfori. Borrelia infection continues to be of increasing concern, with endemic regions now spanning the United States, and a continual increase in the number of documented cases of infection annually. Case Report: A 26-year-old gravida 1 para 0 who presented at 21 weeks 2 days gestational age to her primary care provider and was diagnosed and treated for a right knee Lyme monoarthritis. Antenatal course was complicated with fetal growth restriction and concern for a congenital cardiac malformation. The patient underwent induction of labor and delivered a viable male infant at 39 weeks. The patient had an uncomplicated postpartum course and was discharged home on postpartum day two. She followed up with her rheumatology providers at three months and showed improvement in her right knee Lyme monoarthritis. Her neonate underwent an echocardiogram following delivery which showed a small atrial septal defect, patent ductus arteriosus, patent foramen ovale, and a pericardial effusion. Repeat echocardiogram was performed at three months of age and

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Received: 25 March 2019 Accepted: 16 April 2019 Published: 03 July 2019 showed resolution of those abnormalities and no evidence of any other cardiac abnormalities. The infant is currently meeting all expected developmental milestones. Conclusion: There remains a gap in knowledge regarding the potential adverse maternal, fetal, and neonatal outcomes that can result from acute infection with *Borrelia burgdorferi*. Given the potential for severe sequelae, providers must be aware of the appropriate treatment regimens for these patients during pregnancy, especially in endemic areas.

Keywords: Borrelia burgdorferi, Lyme, Pregnancy

How to cite this article

Rasiah SS, Condon N, O'Brien JM. Acute *Borrelia burgdorferi* infection in pregnancy. Case Rep Int 2019;8:100061Z06SR2019.

Article ID: 100061Z06SR2019

doi:10.5348/100061Z06SR2019CR

INTRODUCTION

There remains a paucity of information regarding the potential complications and sequelae regarding burgderfori. intrauterine exposure Borrelia to Historically, the majority of concern is founded in the knowledge known regarding other spirochete infections in pregnancy, most specifically, infection with Treponema pallidum [1]. Borrelia infection continues to be of increasing concern, with endemic regions now spanning the United States, and a continual increase in the number of documented cases of infection annually [2]. Literature reveals that there are neonatal and fetal outcomes that can be of concern in the setting of acute infection, therefore there are treatment guidelines for pregnancy endorse by several governing organizations [3–6]. We present a

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case of confirmed first trimester infection with *Borrelia burgderfori*, that was appropriately treated, and had an antenatal course complicated by fetal growth restriction and concern for a congenital cardiac malformation.

CASE REPORT

A 26-year-old gravida 1 para 0 who presented at 21 weeks 2 days gestational age to her primary care provider for evaluation of right knee arthralgia and edema for one week duration. Her past medical history was unremarkable and her pregnancy course was uncomplicated. She denied fevers, chills, rash, recent travel, or tick exposure. On examination, her right knee was noted to have a moderate effusion and increased warmth, but no erythema. Knee X-ray showed no underlying osseous or articular abnormalities. Joint aspiration was performed and testing revealed no crystals or organisms. Rheumatology was consulted. She was noted to have a non-specific elevated ANA 1:320 titer, ESR 44 mL/h, CRP 0.82 mg/dL, and an elevation in antiscleroderma 70 antibodies 77.11 units/mL. Evaluation furthermore showed positive IgM and IgG antibodies for Borrelia burgdorferi. She did not endorse any activity or behavior that would have elevated her risk for Borrelia exposure. She was appropriately treated for Stage 1 Borrelia burgdorferi with oral amoxicillin 500 mg TID for 28 days.

Given the concerns for potential first trimester exposure to Borrelia, the patient subsequently had serial growth ultrasounds during the pregnancy and also had a fetal echocardiogram. She had an ultrasound at 30 weeks which showed growth restriction at the fourth percentile. She underwent a fetal echocardiogram which suggested constriction of the ductal arch and intermittent growth restriction with normal umbilical artery. Doppler studies were noted during the pregnancy and ultrasound at 39 5/7 weeks which showed growth restriction less than the third percentile. She subsequently underwent induction of labor and delivered a viable male infant weighing 2585 grams with Apgars of 8 and 9 at 1 and 5 minutes, respectively. Birth weight confirmed a small for gestational age neonate. Placental pathology showed marked purulent chorioamnionitis, even though there was no concern for clinical chorioamnionitis during her labor course. Warthin Starry staining was negative for spirochetes, but was significant for high background inflammation, therefore per pathology, the diagnosis of placental spirochetemia was challenging.-

The patient had an uncomplicated postpartum course and was discharged home on postpartum day two. She was doing well at her six week postpartum visit. She followed up with her rheumatology providers at three months and showed improvement in her right knee Lyme monoarthritis. Her neonate underwent an echocardiogram following delivery which showed a small atrial septal defect, patent ductus arteriosus, patent foramen ovale, and a pericardial effusion. Follow-up was recommended. Repeat echocardiogram was performed at three months of age and showed resolution of those abnormalities and no evidence of any other cardiac abnormalities. The infant is currently meeting all expected developmental milestones.

DISCUSSION

Lyme disease is an infection caused by the spirochete *Borrelia burgdorferi*, and is transmitted from animals to humans by the Ixodes tick. There are three clinical stages of Lyme disease. Stage one is an early localized infection marked by the erythema migrans of the skin, along with associated symptoms which include arthralgia, conjunctivitis, fever, headache, lymphadenopathy, and myalgia. Stage two consists of neurological manifestations and disseminated infection, and stage three results from persistent infection which results in polyradiculoneuritis [7].

There are several case reports in the literature of maternal infection with *Borrelia burgdoferi* during pregnancy. There have been documented complications such as congenital cardiac malformations, growth restriction, presence of spirochetes through various fetal organs, and death [3–6]. However, the vast majority of these reports come from cases of patients who were not adequately treated for Lyme disease during their pregnancy.

Despite case reports and series, there continues to be a paucity of definitive information regarding the potential adverse maternal, fetal, and neonatal outcomes resulting from acute infection with *Borrelia burgdorferi* in pregnancy. Some studies show that pregnancies in Lyme endemic areas had normal antepartum courses with no significant changes in neonatal malformations or outcomes [8–11]. However, other studies show an increased incidence of perinatal mortality, as well as an increased incidence of congenital heart diseases in women in endemic Lyme areas [6, 7].

An important aspect of *Borrelia* infection in pregnancy is prevention and detection of initial exposure. Guidelines for obstetric patient populations are the same as those for non-obstetric populations. Education for prevention is especially important for women in endemic areas. The United States Center for Disease Control and Prevention recommends using insect repellants contain 20-30%DEET. An alternative to DEET is permethrin, and both of these options are safe in pregnancy. In addition, thorough tick examinations and showering after possible tick exposures are also helpful techniques to help detect exposures [12, 13].

Current literature suggests that pregnant patients with suspected stage one infection by *Borrelia burgdorferi* should be treated with at least a three week course of amoxicillin 500 milligrams three times daily or with cefuroxime twice daily in cases of patients with

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penicillin allergies [10]. Patients who are diagnosed with more advanced stages of disease have different degrees of treatment recommendations, which based upon the severity, can include inpatient hospitalization and the administration of intravenous antibiotics.

Our case presents a patient who was adequately treated for Borrelia burgdorferi infection during her pregnancy. Her pregnancy was complicated with fetal growth restriction as well as concern for congenital cardiac malformations. Interestingly, although the placenta showed signs of severe chorioamnionitis, there were no spirochetes were identified on Warthin Starry staining. Furthermore, although there was initial concern for neonatal cardiac malformation, subsequent evaluation showed spontaneous closure of the atrial septal defect. The infant is currently doing well and meeting all developmental milestones. The lack of spirochetes on the placental staining is reassuring that she was adequately treated for Borrelia. However, the antenatal concern for fetal growth restriction and the initial neonatal concern for congenital cardiac malformation in the setting of acute infection are noteworthy, since there are reports of these adverse outcomes in the setting of acute infection with Borrelia burgdorferi.

CONCLUSION

Although this case report contributes to the literature, there remains a gap in knowledge regarding the potential, adverse maternal, fetal, and neonatal outcomes that can result from acute infection with *Borrelia burgdorferi*. Given the potential for severe sequelae, providers must be aware of the appropriate treatment regimens for these patients during pregnancy, especially in endemic areas.

REFERENCES

- 1. Wicher V, Wicher K. Pathogenesis of maternal-fetal syphilis revisited. Clin Infect Dis 2001;33(3):354–63.
- 2. Stone BL, Tourand Y, Brissette CA. Brave New Worlds: The expanding universe of Lyme disease. Vector Borne Zoonotic Dis 2017;17(9):619–29.
- 3. MacDonald AB, Berger BW, Schwan TG. Clinical implications of delayed growth of the Lyme borreliosis spirochete, Borrelia burgdorferi. Acta Trop 1990;48(2):89–94.
- Weber K, Bratzke HJ, Neubert U, Wilske B, Duray PH. Borrelia burgdorferi in a newborn despite oral penicillin for Lyme borreliosis during pregnancy. Pediatr Infect Dis J 1988;7(4):286–9.
- Lakos A, Solymosi N. Maternal Lyme borreliosis and pregnancy outcome. Int J Infect Dis 2010;14(6):e494– 8.
- Nadal D, Hunziker UA, Bucher HU, Hitzig WH, Duc G. Infants born to mothers with antibodies against Borrelia burgdorferi at delivery. Eur J Pediatr 1989;148(5):426-7.
- 7. Mylonas I. Borreliosis during pregnancy: A risk for the unborn child? Vector Borne Zoonotic Dis

2011;11(7):891-8.

- Silver RM, Yang L, Daynes RA, Branch DW, Salafia CM, Weis JJ. Fetal outcome in murine Lyme disease. Infect Immun 1995;63(1):66–72.
- Figueroa R, Bracero LA, Aguero-Rosenfeld M, Beneck D, Coleman J, Schwartz I. Confirmation of Borrelia burgdorferi spirochetes by polymerase chain reaction in placentas of women with reactive serology for Lyme antibodies. Gynecol Obstet Invest 1996;41(4):240–3.
- Strobino BA, Williams CL, Abid S, Chalson R, Spierling P. Lyme disease and pregnancy outcome: A prospective study of two thousand prenatal patients. Am J Obstet Gynecol 1993;169(2 Pt 1):367–74.
- Maraspin V, Cimperman J, Lotric-Furlan S, Pleterski-Rigler D, Strle F. Erythema migrans in pregnancy. Wien Kin Wochenschr 1999;111(22–23):933–40.
- Wylie BJ, Hauptman M, Woolf AD, Goldman RH. Insect repellants during pregnancy in the Era of the Zika virus. Obstet Gynecol 2016;128(5):1111–5.
- 13. Center for Disease Control and Prevention. How many people get Lyme disease? 2018. [Available at: https://www.cdc.gov/lyme/stats/humancases.html]

Author Contributions

Stephen Senthan Rasiah – Conception of the work, Design of the work, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Niamh Condon – Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

James Michael O'Brien – Conception of the work, Design of the work, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Guarantor of Submission

The corresponding author is the guarantor of submission.

Source of Support

None.

Consent Statement

Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest

Authors declare no conflict of interest.

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Case Rep Int 2019;8:100061Z06SR2019. *www.casereportsinternational.com*

Data Availability

All relevant data are within the paper and its Supporting Information files.

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