

Lyme Disease Association of Australia

Together we can fight Lyme Disease and win

Peer Reviewed Journal Articles regarding transmission of Lyme & associated diseases transplacentally

Gestational Lyme borreliosis. Implications for the fetus.

MacDonald AB.

Rheum Dis Clin North Am, 15(4):657-77. 1989.

Autopsy and clinical studies have associated gestational Lyme borreliosis with various medical problems including fetal death, hydrocephalus, cardiovascular anomalies, neonatal respiratory distress, hyperbilirubinemia, intrauterine growth retardation, cortical blindness, sudden infant death syndrome, and maternal toxemia of pregnancy.

Borrelia burgdorferi in a newborn despite oral penicillin for Lyme borreliosis during pregnancy.

Weber K, Bratzke HJ, Neubert U, Wilske B, Duray PH.

Pediatric Infectious Disease Journal, 7:286-9. 1988.

We have found *B. burgdorferi* in human neonatal brain and liver although the mother had been treated with an orally administered penicillin for LB during early pregnancy.

Congenital infections and the nervous system.

Bale JF Jr, Murph JR.

Pediatr Clin North Am Aug;39(4):669-90 1992

Despite vaccines, new antimicrobials, and improved hygienic practices, congenital infections remain an important cause of death and long-term neurologic morbidity among infants world-wide. In addition, several other agents,

such as the varicella zoster virus, human parvovirus B19, and *Borrelia burgdorferi*, can potentially infect the fetus and cause adverse fetal outcomes.

Maternal-fetal transmission of the Lyme disease spirochete, *Borrelia burgdorferi*.

Schlesinger PA, Duray PH, Burke BA, Steere AC, Stillman MT.
Ann Intern Med. 1985 Jul;103(1):67-8. PMID: 4003991

We report the case of a woman who developed Lyme disease during the first trimester of pregnancy. She did not receive antibiotic therapy. Her infant, born at 35 weeks gestational age, died of congenital heart disease during the first week of life. Histologic examination of autopsy material showed the Lyme disease spirochete in the spleen, kidneys, and bone marrow.

Culture positive seronegative transplacental Lyme borreliosis infant mortality.

Lavoie PE, Lattner BP, Duray PH, Barbour AG, Johnson HC.
Arthritis Rheum, Vol 30 No 4, 3(Suppl):S50. 1987.

"Transplacental infection by *Borrelia burgdorferi* (Bb), the agent of Lyme Borreliosis (LB), has recently been documented (L.E. Markowitz, et al; P.A. Schlesinger, et al). Fetal infection confirmed by culture has been reported by A.B. MacDonald (in press) from a highly endemic region (Long Island, NY).

We report a culture positive neonatal death occurring in California, a low endemic region. The boy was born by C-section because of fetal distress. He initially appeared normal. He was readmitted at age 8 days with profound lethargy leading to unresponsiveness. Marked peripheral cyanosis, systemic hypertension, metabolic acidosis, myocardial dysfunction, & abdominal aortic thrombosis were found. Death ensued. Bb was grown from a frontal cerebral cortex inoculation. The spirochete appeared similar to the original Long Island tick isolate. Silver stain of brain & heart was confirmatory of tissue infection.

The infant was the second born to a California native. The 20 m/o sibling was well. The mother had been having migratory arthralgias and malaise since experiencing horse fly & mosquito bites while camping on the Maine coast in 1971. The family was seronegative for LB by ELISA at Yale. Cardiolipin antibodies were also not found."

Stillbirth following maternal Lyme disease.

MacDonald AB, Benach JL, Burgdorfer W.
N Y State J Med, Nov;87(11):615-6 1987

This report describes a clinicopathologic investigation of a stillborn fetus that led to a retrospective diagnosis of Lyme disease contracted during the first trimester of pregnancy.

The infectious origins of stillbirth.

Goldenberg RL, Thompson C.

Am J Obstet Gynecol. 2003 Sep; 189(3):861-73. 2003. PMID: 14526331

Toxoplasma gondii, leptospirosis, Listeria monocytogenes, and the organisms that cause leptospirosis, Q fever, and Lyme disease have all been implicated as etiologic for stillbirth.

Lyme disease during pregnancy.

Markowitz LE, Steere AC, Benach JL, Slade JD, Broome CV.

JAMA Jun 27;255(24):3394-6. 1986.

Of the 19 pregnancies, five had adverse outcomes, including syndactyly, cortical blindness, intrauterine fetal death, prematurity, and rash in the newborn. Adverse outcomes occurred in cases with infection during each of the trimesters. Although *B burgdorferi* could not be implicated directly in any of the adverse outcomes, the frequency of such outcomes warrants further surveillance and studies of pregnant women with Lyme disease.

Infections in Obstetrics: Lyme disease during Pregnancy

Helayne M. Silver, MD

Infectious Disease Clinics of North America Vol 11 Number 1 1 March, 1997

The infant had severe congenital cardiac defects resulting in neonatal death at 39 hours of life. The neonatal autopsy revealed hypoplastic left side of heart and other cardiac anomalies. Spirochetes compatible with *B. burgdorferi* were found in the spleen, kidneys, and bone marrow; however, no inflammatory response to the organisms was seen.

Human fetal borreliosis, toxemia of pregnancy, and fetal death.

MacDonald AB.

Zentralbl Bakteriol Mikrobiol Hyg [A]. Dec; 263(1-2):189-200. 1986. PMID: 3554838

Congenital relapsing fever (*Borrelia hermsii*).

William A. Dittman

Sr, Sacred Heart Medical Center, Spokane, WA.

Blood, 15 November 2000, Vol. 96, No. 10, pp. 3333-3333

A 35-week infant was delivered by cesarean section because of fetal distress. Her mother presented to Sacred Heart Medical Center early because of decreased fetal movement. At delivery, the child demonstrated respiratory depression requiring intubation and manual resuscitation. Apgar scores were 1 at one minute and 5 at five minutes. The "admitting" diagnosis was sepsis with shock. Cord blood counts revealed a white blood cell count at $8.2/\mu\text{L}$, hemoglobin level at 16.4g/dL, hematocrit level at 48.8%, and platelet count at $8/\mu\text{L}$. Nucleated red blood cells were 88 per 100 white blood cells. During verification of the platelet count with the blood film, multiple spirochetes were seen (A), many in clumps (B). These spirochetes were further classified and confirmed by immunofluorescent antibody staining as *Borrelia hermsii*.

No organisms were seen on multiple blood films of the mother. Although the placenta was grossly and microscopically normal, silver stains demonstrated spirochetes.

A review of the prenatal history identified an episode of fever, chills, aching, headache, and fatigue which occurred at week 16 of the pregnancy. The mother recalled a similar one-day illness at week 19. There were no other untoward events until presentation.

The child was treated with fluids for the septic shock. Ampicillin and cefotaxime were given initially, and erythromycin was added when the spirochetes were found. Dexamethasone was administered for the septic shock and thrombocytopenia. Improvement was progressive until day 9 when hypotension, pallor, and abdominal distension occurred. Autopsy revealed bleeding into a liver abscess with subsequent rupture of a subcapsular hematoma. No organisms were found in the abscesses at autopsy.

Relapsing fever (tick-borne *Borrelia hermsii*) is endemic to the western United States. It is transmitted by the *Ornithodoros hermsii* tick.

Tick-borne relapsing fever and pregnancy outcome in rural Tanzania.

Jongen VH, van Roosmalen J, Tiems J, Van Holten J, Wetsteyn JC.

Acta Obstet Gynecol Scand. Oct; 76(9):834-8. 1997. PMID: 9351408

The impact of tick-borne relapsing fever (TBRF) on pregnancy outcome was investigated in a case-control study of 137 pregnant women and 120 non-pregnant women infected with this condition and treated at a rural hospital in Tanzania's Tabora region during 1985-95. The risk of premature delivery during TBRF was 58%, with a perinatal mortality of 436 per 1000 births. Total pregnancy loss, including abortions, was 475 per 1000. The case-fatality rate was 1.5% in pregnant women compared with 1.7% in non-pregnant controls. The relapse rate was 3.6% in pregnant women and 1.7% in controls. Pregnant women with TBRF had higher densities of spirochetes than controls, and the risk of delivery during an attack was significantly correlated with increasing spirochete density and gestational age.

Complications of pregnancy and transplacental transmission of relapsing-fever borreliosis.

Larsson C, Anderson M, Guo BP, Nordstrand A, Hagerstrand I, Carlsson S, Bergstrom S.

J Infect Dis. 2006 Nov 15;194(10):1367-74. Epub 2006 Oct 3. PMID: 17054065

Relapsing-fever borreliosis caused by *Borrelia duttonii* is a common cause of complications of pregnancy, miscarriage, and neonatal death in sub-Saharan Africa.