Summer 2015

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Jana Keller
Otterbein University, jana.keller@otterbein.edu

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Lyme Disease: A Tick’s Risky Bite
Jana Keller, RN, BSN

Introduction
Lyme Disease is a bacterial infection transmitted primarily by the deer tick and is common in the United States. It is an infectious disease caused by the bacterium Borrelia burgdorferi, which is a spirochete (Pearson, 2014). Lyme disease’s prevalence is confirmed by the Centers for Disease Control and Prevention, which estimates that 300,000 people per year are diagnosed with Lyme disease in the United States (Moore, 2015). It is imperative that primary health care workers (such as Nurse Practitioners) are familiar with this disease and the early signs and symptoms, if early signs and symptoms go unnoticed or misdiagnosed by a healthcare professional. The epidemiology of ticks may be fatal (Moore, 2015).

Pathophysiological Process
Lyme Disease is transmitted when the bacterium Borrelia burgdorferi enters the body (most commonly through a tick bite). Studies have shown there is a delay of sixty-three hours from the time the tick attaches to the host to transmission of the spirochete to the host (Nichols, Marchese, Bockenstedt, 

Pathophysiological Significance
During transmission, when the spirochetes bind to the tick’s salvia, the protein carrier that is formed works as a shield against the host’s antibodies and complement. If the Borrelia genome does not have virulence factors or toxins, therefore the clinical signs of Lyme disease is a result from the immune response to the infection (Bockenstedt & Worringer, 2014). The Borrelia spreads through the blood and lymphatic system to other organs or skin sites and can cause joint inflammation, cardiac involvement, as well as neurological symptoms (Marchese & Primer, 2011).

Case Study
A 52-year-old pregnant woman from southeastern Connecticut presents to her physician in July at 26 weeks’ gestation because of a skin lesion. She reports she had fatigue, arthralgia, and headache for 2 days and a rash in her left axilla for 1 day. She lives in a wooded area and works in her garden frequently. Six weeks earlier, she had removed a small tick that was attached behind her right knee. On physical examination, she is afibrile. She has an erythematous, oval macular lesion, 7 to 8 cm in diameter, in her left axilla, with enhanced central erythema (Shapiro, 2014). The patient is evaluated for Lyme Disease.

Signs and Symptoms
There are three different phases of Lyme disease. The first phase, early localized, consists of a dermatological involvement, such as erythema migrans rash. This rash is described as a “bull’s eye” rash. This is the most identifiable and earliest sign presenting days to weeks after the initial tick bite, but does not present in all cases. Other early symptoms may be flu-like, headache, fever, malaise or fatigue, a rash, or a headache with recent tick exposure (Grisanti, 2015). As the infection advances, especially if untreated, it affects the body systemically via the lymphatic system or blood. The early disseminated phase of Lyme disease can be difficult to diagnose because the symptoms may often mimic other diseases. The late phase of Lyme disease includes arthritis and advanced neurologic symptoms with worsening encephalomyelitis and peripheral neuropathy (Wright, Riedel, Talawai & Gilliam, 2012).

Nursing Implications
It is imperative for healthcare professionals to be aware of Lyme disease to start antibiotic treatment early and prevent late phase development. Lyme disease can be difficult to diagnose as the causes may often mimic other diseases. The healthcare professional should be mindful to ask the patient about possible exposure to ticks and wooded areas. High Lyme disease endemic areas are considered to be the northeastern part of the United States from Maine to Maryland, as well as Wisconsin and Michigan (Snow, 2013). Healthcare professionals in these areas should be aware of the increased incidence of Lyme disease. Patients with active lifestyles that enjoy camping, hiking, or any activities in wooded areas should be made aware of the risks of Lyme disease and the importance of checking for ticks. For the reason that the tick must be attached for greater than 24 hours to transmit Borrelia burgdorferi, the removal of ticks right away is of utmost importance (Muschert & Blomberg, 2015).

Conclusion
Lyme Disease is the most commonly reported vector borne disease in the United States (Shapiro, 2014). It is important for healthcare workers to be aware of exposure risks and early diagnosis of Lyme disease for their patients. The nonspecific symptoms make the illness difficult to diagnose. The non-specific manifestations of Lyme disease may occur as a reaction to the host inflammatory response to the Borrelia burgdorferi pathogen. With early diagnosis and treatment, patient’s outcomes can be successful. Late diagnosis without treatment can lead to the later phases of the disease, which leads to much more severe and lifelong complications. Continuing research about Lyme disease and the pathophysiological process of the late phases are continually being studied.

References