

PHARMCON

freeCE Monograph

Overview of Lyme Disease

0.25 HOUR CE



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During the summer, we get doxycycline prescriptions for Lyme disease on most days in the pharmacy. I always ask the patient what their diagnosis is, and if they mention Lyme disease or ticks, I steer them to our permethrin spray. Most patients are terrified of Lyme disease and are happy to purchase a product that will protect them.

A lot of deer and turkey hunters tell me there is no scent, and the wild game cannot detect the spray. Most of the outdoorsmen, fishermen, and hunters have a real respect for *Ixodes scapularis* and frequently apply the permethrin to their hunting and fishing garb. We just need to get the gardeners and picnickers on board!

The next time the weather warms, I would like the prescribers who read this column and the pharmacists who dispense the antibiotics to recommend this amazing product to the people that come to the clinic or pharmacy with an antibiotic to treat Lyme disease.

Lyme Disease

In my home state of Pennsylvania, we love our sports teams. The Eastern Side of the state has the Phillies, Eagles, and Flyers; the western side has the Pirates, Steelers, and Penguins. These teams over the years have been number 1 in their respective sports. In fact, the whole state is number 1, for the past 12 years, leading the nation in number cases of Lyme disease. During the heat of summer, everyone heads to the great outdoors for

Figure 1. Leg of a patient with erythema migrans rash.



picnics, hiking, camping, and, even less enjoyable, gardening and mowing the lawn!

This past year, Pennsylvania had a very mild winter and a wet spring, which led to increases in the tick population. There are as many as 3 million cases per year, and there was not a letdown this past summer. Lyme disease is the most common vector-borne disease in the United States.

As such, many of our patients present to our pharmacies/offices with questions about Lyme disease.

Cause

Lyme disease is caused by the bacterium *Borrelia burgdorferi* and is transmitted to humans through the bite of infected black-legged ticks (*Ixodes scapularis*). Symptoms of Lyme disease include fever, headache, fatigue, and a characteristic skin rash called erythema migrans (**Figure 1**), which typically appears 3-30 days after the tick bite.

The rash

The erythema migrans rash associated with Lyme disease may occur anywhere on the body and is observed in approximately 70-80% of infected individuals. This distinctive rash typically begins at the site of a tick bite, manifesting after a delay of 3-30 days, with an average onset of about 7 days. The rash gradually expands over a period of days, reaching up to 12 inches or more (30 cm) across. While it may feel warm to the touch, it is rarely itchy or painful. As the rash progresses patients may observe a target or “bull’s eye” appearance.

Prevention

When venturing into tick-prone areas, it's advisable to take preventive measures such as wearing high socks, long pants, and long-sleeve, lightweight shirts, preferably in white or very light colors for easier tick detection. Walking in the center of trails and avoiding tall grasses in fields and meadows can minimize exposure. Regularly check legs and feet for ticks, especially nymphal ticks that are as small as a poppy seed, using bright light and a magnifying glass, if needed. It's

important to check each other, especially in hard-to-see areas and skin folds. For pets, incorporate preventive measures like using tick-killing shampoo on a scheduled basis and brushing them daily outdoors to reduce the risk of tick bites inside the house.

Inspection

After returning indoors from tick-infested areas, taking prompt action can reduce the risk of tick bites. Bathing or showering within two hours helps wash off and facilitates the discovery of crawling ticks. A thorough tick check is essential, using a hand-held or full-length mirror to inspect all parts of the body. For children, parents should pay extra attention to areas like under the arms, in and around the ears, inside the belly button, behind the knees, between the legs, around the waist, and, particularly, in their hair. Additionally, it's crucial to examine gear and pets, as ticks can be transported into the home on clothing and pets, later attaching to individuals. To eliminate any remaining ticks, tumble clothes in a dryer on high heat for an hour.

Tick removal

When removing a tick, it's important to use tweezers and a magnifying glass for precision. Wearing gloves, position the tweezers on the tick's head as close to the skin as possible. Pull the tick out slowly, steadily, and in an upward motion, avoiding twisting, squeezing, jerking, or crushing. Preserve the tick in a jar or vial. After removal, clean the site with soap and water (**Figure 2**). Avoid using matches, petroleum jelly, gasoline, kerosene, or nail polish remover for removal. It's worth noting that testing ticks for *B. burgdorferi*, the bacterium causing Lyme disease, is not recommended, as the presence of the bacterium in ticks doesn't reliably predict infection in humans.

Insect repellants

DEET (N,N-diethyl-3-methylbenzamide)

Patients should choose repellents containing 20-30% DEET. Apply repellents on both exposed skin and clothing to provide lasting protection for several hours. Adhere to

product instructions diligently. Parents should be responsible for applying these products to their children, ensuring avoidance of hands, eyes, and the mouth.

Permethrin

Utilize products containing permethrin for treating clothing. Apply products with 0.5% permethrin to clothing and gear such as boots, pants, socks, and tents. This protective treatment persists through multiple washings. Permethrin is available over the counter (OTC) as a solution for application to clothing under brands like Sawyer Clothing Insect Repellent, Ranger Ready, or Repel Clothing and Gear. Once applied, it remains effective for up to 6 weeks, even after several launderings. This is particularly beneficial for clothes exposed to tick-infested areas and is effective against ticks carrying Lyme disease and Rocky Mountain Spotted Fever. Apply the repellent outdoors, prior to wearing the clothing; hang the clothing, spray, and allow it to dry for 2 hours (4 in humid conditions).

Permethrin for Pets

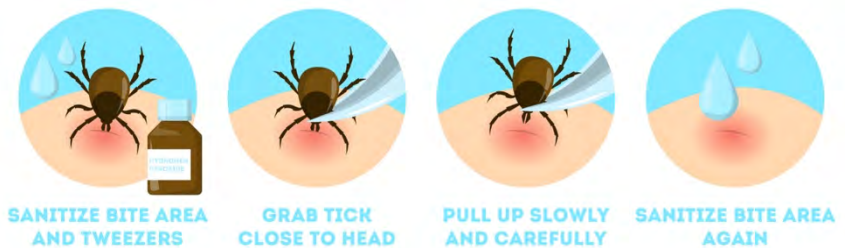
Permethrin spray at a concentration of 0.5% is demonstrated to be safe for dogs. Begin spraying at the tail and proceed forward until the entire body is covered. This application of permethrin on your dog proves effective in controlling fleas and lice for 35 days and ticks for 6 weeks. Be sure to cover the dog's legs and underbelly and fluff the hair with your hand so the spray penetrates the fur and reaches the skin. It's essential to note that permethrin should not be used on felines (cats) or any aquatic animals, as it can be toxic to them.

Pharmacological prophylaxis of Lyme disease

The Infectious Disease Society of America recommends prophylaxis for a tick bite only under specific conditions. This includes identifying the attached tick as an adult or nymphal deer tick (*Ixodes scapularis*) and estimating that the tick has been attached for 36 or more hours, as it takes at least 36 hours for the tick to transmit the spirochete.

Figure 2. How to remove a tick.

HOW TO REMOVE TICK



Additionally, the antibiotic should be administered within 72 hours of tick removal. Prophylaxis for a tick bite should only be used when the local tick infection rate with *B. burgdorferi* is equal to or greater than 20%. It's crucial to ensure that doxycycline is not contraindicated, and it should not be given to pregnant, nursing, or pediatric patients. The recommended dose is doxycycline 100 mg (2 tablets) daily as a single dose with food, with a dispensation of #2 tablets.

Pharmacological treatment of Lyme disease

The initial sign of infection typically manifests as the erythema migrans (EM) rash. While this rash may feel warm, it is not usually painful. Some patients may develop additional EM lesions in different body areas. For early erythema migrans, treatment options include doxycycline (Vibra-tab) 100 mg twice daily for 14-21 days (avoid if pregnant), amoxicillin (Amoxil) 500 mg three times daily for 14-21 days, cefuroxime (Ceftin) 500 mg twice daily for 14-21 days, or erythromycin (Ery-tab) 250 mg four times daily for 14-21 days. Notably, 10 days of treatment may be as effective as 20 days.

Since pharmacists are indeed the “drug experts” as well as the “cost experts” consider the following:

I prefer to use doxycycline tablets due to the choking hazard of the capsules. Some European countries ban capsules for this reason. I have had two students in my class say they had esophageal burns due to capsules getting stuck in the throat.

Remember to avoid doxycycline in children whose teeth are not fully erupted.

Amoxicillin is equally effective as doxycycline, but it needs to be dosed three times a day. This is the best option for pediatrics and pregnant women. Amoxicillin should NOT be used for prophylaxis (as doxycycline is). Amoxicillin might also be a better choice for patients who experience photosensitivity on previous doxycycline therapy.

Have a great day on the bench!!

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Test Questions Pharmacist, Pharmacy Technician

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1. **How long does it take for the tick to transmit the spirochete?**
 - a. 24 hours
 - b. 36 hours
 - c. Instantly
 - d. 48 hours
2. **What is the correct treatment option for Lyme disease?**
 - a. Doxycycline 100 mg PO twice daily for 14-21 days
 - b. Ceftriaxone 1g IV for 21 days
 - c. Vancomycin 1250 mg IV for 14 days
 - d. Amoxicillin 500 mg PO three times daily for 3 days

PHARMACIST LEARNING OBJECTIVES

1. Differentiate between prophylaxis treatment and actual treatment of Lyme disease

PHARMACY TECHNICIAN LEARNING OBJECTIVES

1. Differentiate between prophylaxis treatment and actual treatment of Lyme disease
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OVERVIEW

Micro-learning opportunities were created in response to evidence that learning is maximized when delivered in short and focused 'bursts.' In this session, Lyme disease is broadly discussed with an emphasis on treatment and prevention.

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TARGET AUDIENCE

Pharmacist, Pharmacy Technician

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