

# Lyme Disease

## (Lyme Borreliosis)

### Basics

#### OVERVIEW

- One of the most common tick-transmitted diseases in the world
- Caused by spirochete species of the *Borrelia burgdorferi* group (such as *B. burgdorferi*, *B. afzelii*, *B. garinii*, *B. bavariensis* and others)
- Dominant clinical feature (dogs)—recurrent lameness due to inflammation of the joints (known as “arthritis”); sometimes lack of appetite (known as “anorexia”) and depression; may develop kidney disease
- Reported in people, dogs, horses, and occasionally in cats
- Also known as “Lyme borreliosis” or “borreliosis”

#### GENETICS

- Certain dog breeds (such as the Bernese mountain dog) are reported to develop severe kidney failure following infection with *Borrelia*

#### SIGNALMENT/DESCRIPTION OF PET

##### Species

- Dogs and rarely cats

##### Breed Predispositions

- Kidney disease (severe failure): Labrador, Golden retriever, Bernese Mountain dogs

##### Mean Age and Range

- Experimentally, young dogs (puppies) appear to be more susceptible to disease than do adult dogs

#### SIGNS/OBSERVED CHANGES IN THE PET

- Recurrent lameness due to inflammation of the joints (arthritis)
- In studies, sudden (acute) form lasts for only 3–4 days; recurs days to weeks later in the same or in other legs (known as “shifting-leg lameness,” characterized by lameness in one leg, then that leg appears to be normal and another leg is involved); one or more joints may be swollen and warm; a pain response is elicited by feeling the joint; responds well to antibiotic treatment
- Affected dogs may refuse to walk or stand or may walk stiffly, with an arched back, and be sensitive to touch
- Long-term (chronic) inflammation of several joints, in which the bones around the joints are not destroyed (known as “non-erosive polyarthritis”) is found in pets with prolonged infection without adequate treatment; may persist despite antibiotic therapy
- Fever, lack of appetite (anorexia) and depression may accompany inflammation of the joints (arthritis)
- Superficial lymph nodes close to the site of the infecting tick bite may be swollen
- Kidneys—reported glomerulonephritis with immune-complex deposition in the glomeruli leading to fatal kidney disease; “glomerulonephritis” is inflammation and accompanying dysfunction of glomeruli (plural of



glomerulus) of the kidney; each kidney is composed of thousands of nephrons (the functional units of the kidney, each consisting of the glomerulus [a tuft of blood capillaries—the “blood filter”] and a series of tubes and ducts, through which the filtered fluid flows, as urine is produced); inflammation most commonly is due to the presence of immune complexes in the glomerulus

- Kidneys—loss of protein through the kidneys (condition known as “protein-losing nephropathy”) with resulting low levels of albumin (the type of protein lost through the kidneys) in the blood (condition known as “hypoalbuminemia”)
- Kidney failure (signs include vomiting; diarrhea; lack of appetite [anorexia]; weight loss; increased urination [known as “polyuria”] and increased thirst [known as “polydipsia”]; fluid buildup in the tissues, especially the legs and under the skin [known as “peripheral edema”] or fluid buildup in the abdomen [known as “ascites”])

## CAUSES

- *Borrelia burgdorferi*—transmitted by slow-feeding, hard-shelled tick species of the genus *Ixodes* (such as *Ixodes scapularis* [the deer tick], *Ixodes pacificus*, *Ixodes ricinus*, *Ixodes persulcatus*)
- Infection—only after a tick (nymph or adult female) carrying *Borrelia* has been attached to the host for at least 18 hours
- Ticks have 2-3 year life cycle, nymphs and adults feed on dogs and other hosts; females each lay about 2,000 eggs; males do not usually attach or feed

## RISK FACTORS

- Roaming in tick-infested environment, where Lyme borreliosis is common (known as an “endemic area”)

# Treatment

## HEALTH CARE

- Outpatient
- Keep pet warm and dry

## ACTIVITY

- Reduced activity advisable until clinical signs improve

## DIET

- No change needed

## SURGERY

- Tapping the joint and removing joint fluid (known as “aspiration of synovial fluid”) may be considered for diagnostic purposes

# Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

- Most commonly used antibiotics—doxycycline, amoxicillin, or azithromycin
- Doxycycline—preferred in pets that have both *Borrelia* and *Anaplasma phagocytophilum* infections at the same time (*Anaplasma* is another tick-borne agent that causes disease)
- Antibiotics do not eliminate the infection; consequently, persistent infection with a very low bacterial burden remains; treatment significantly improves clinical signs and disease
- Recommended treatment period—4 weeks
- Steroids—initially may cause signs to improve; may cover up or mask effects of antibiotics for diagnostic purposes; may increase clinical signs later by decreasing the ability of the pet to develop a normal immune response (known as “immunosuppression”)
- Nonsteroidal pain medications—will be used judiciously to avoid covering up or masking signs; use only as directed by your pet’s veterinarian

# Follow-Up Care

## PATIENT MONITORING

- Improvement in sudden (acute) inflammation of the joints caused by *Borrelia* (known as “Lyme arthritis”) should be seen within 2–5 days of antibiotic treatment
- If no improvement within 2–5 days or if signs worsen, the veterinarian will consider a different diagnosis

## PREVENTIONS AND AVOIDANCE

- Mechanical removal of ticks—groom pets daily; discuss appropriate technique for removing ticks from your pet with the veterinarian
- Prevention of tick attachment—products to kill ticks (known as “acaricides”) and tick repellents are available commercially as spot-on topical products, sprays or collars; any such product should be used only according to label directions (*do not use permethrin on cats*)
- Vaccines—are available commercially for dogs; talk to your pet's veterinarian about the vaccine and vaccination protocols; protection improves over time as each booster induces higher vaccine titers
- Tick population control in the environment—restricted to small areas; limited success by reducing deer and/or rodent population

## POSSIBLE COMPLICATIONS

- Fatal kidney failure

## EXPECTED COURSE AND PROGNOSIS

- Recovery from sudden (acute) lameness expected 2–5 days after initiation of antibiotic treatment
- Disease may be recurrent with intervals of weeks to months; responds again to antibiotic treatment

## Key Points

- Treatment of Lyme disease requires regular administration of antibiotics as prescribed by your pet's veterinarian
- Prevent tick attachment—products to kill ticks (acaricides) and tick repellents are available commercially; any such product should be used only according to label directions (*do not use permethrin on cats*)
- Diagnosis of Lyme disease (Lyme borreliosis) in a pet increases the risk to people living in the same area, as the people may be infected with *Borrelia* if they come into contact with ticks in the environment; they too should prevent tick attachment to themselves and should inform their personal physician of the pet's diagnosis if they become ill; the bacteria does not transmit directly between pets and people, but via ticks that can attach to different species (once it starts feeding, it stays on one host)