Lyme Borreliosis

Classic case: Puppy w/ anorexia & arthritis - quickly resolves on its own

Presentation:

- **Dogs**
  - 95% of seropositive dogs – asymptomatic
  - 5% of seropositive dogs – usually younger dogs
    - Warm, swollen, painful joints, fever, lymphadenopathy
    - Lyme nephropathy (less common) – dehydration, ascites, edema, aortic thromboembolism, dyspnea, retinal hemorrhage/detachement
    - Hypertension
    - Vasculitis
    - Protein-losing nephropathy
  - Labs, golden retrievers, Shetland sheepdogs, Bernese mountain dogs may be predisposed
    - Cardiac form – conduction abnormalities and bradycardia
    - Neurologic form – facial paralysis, seizures, aggression
- **Cats** – asymptomatic
- **Horses**
  - Most cases subclinical
  - Low-grade fever, arthritis, shifting lameness, swollen joints, myalgia, chronic weight loss
  - Neurologic signs, skin lesions, uveitis, cardiac disease, hepatitis, laminitis, abortion also reported
- **Cattle**
  - Fever, lameness, stiffness, possible joint swelling
  - Decreased milk production
  - Erythema, warmth, swelling, and hypersensitivity of udder
  - Laminitis, chronic weight loss, uveitis, abortions
  - Occurs most often in first calving heifers
- **Rabbits** (experimentally infected) – skin lesions, polyarthritis, carditis
- **Humans**
  - Erythema migrans
    - Macule with distinctive, intense borders, but not raised
    - Widens and develops into bluish-red rash that expands over days or weeks
  - Flu-like symptoms (malaise, fatigue, fever, stiff neck)
  - Arthritis – intermittent pain of one or a few joints (usually large weight-bearing joints)
  - Meningoradiculitis.

Ixodes scapularis ticks are…. tiny.
*Adult ticks* are approximately the size of a *sesame seed.*
*Nymphal ticks* are approximately the size of a *poppy seed.*

Image courtesy, USDA.
DDX: Other causes for lameness, nephropathy, meningitis, heart disease

Test(s) of choice: Difficult to definitively diagnose

- Antibodies to C6 peptide are specific to natural exposure (but do NOT occur after vaccination)
- IFA no longer recommended because of low specificity
- ELISA antibody detection
- *New Lyme multiplex assay – distinguishes between acute and chronic infection and antibodies from vaccination.
- Urinalysis for proteinuria, microalbuminuria or protein/creatinine ratio (always check in sero-pos dogs)
- Radiographs of affected joint – non-erosive arthritis
- Arthrocentesis – nonseptic suppurative inflammation

Diagnosis is presumptive in most cases, based on:

- Positive for natural exposure antibodies (C6 peptide)
- Consistent clinical signs
- Ruling out other differentials
- Response to treatment (however, Lyme nephropathy generally does not respond well)

Rx of choice:

- **Doxycycline or amoxicillin**
  - **LONG Rx-** four weeks
  - Only use if patient is symptomatic or has proteinuria
- For nephropathy
  - Angiotensin-converting enzyme (ACE) inhibitor
  - Low-dose aspirin
  - Omega-3 fatty acids
  - Supportive care

Prognosis:

- Arthritis – good, immediate response to treatment
- Nephropathy – guarded to poor, usually fatal

Prevention:

- Tick control and prevention
- Vaccination is **controversial**
  - Because most serious form of disease has an immune-mediated process
  - Recombinant outer surface protein A (rOspA) vaccine is licensed for dogs
  - Prevents spirochete transmission from ticks, however, it has been shown that the organisms stop producing OspA when tick attaches to animal
  - Young dogs should be vaccinated **before** natural exposure occurs
    - Why? Postinfection vaccination has little-to-no beneficial effect on established infections.
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Pearls:

- CONFUSING and difficult to definitively diagnose
- If dog does NOT respond to Rx, likely a misdiagnosis (though Lyme nephropathy may not respond well)
- **If dog DOES respond to treatment is not an indication of diagnosis**
  - Rickettsial and other diseases with similar symptoms may respond to doxycycline.
  - Doxycycline has anti-inflammatory properties
- Lyme nephropathy is probably due to immune-mediated complexes in glomeruli
- Persistent carriers may or may not be clinically ill
- Tickborne co-infections are common (e.g., anaplasmosis)
- Caused by gram negative, anaerobic spirochete *Borrelia burgdorferi*
- Incubation period
  - Humans – 10-14 days (up to 36 days)
  - Dogs – 2-5 months LONG
- Reservoir hosts: White-footed mouse, short-tailed shrews, eastern chipmunks, brush mouse, western gray squirrel. Rarely birds and lizards
- Vectors: *Ixodes scapularis* in Midwest and northeast; *Ixodes pacificus* on Pacific coast
- Lyme disease may be overdiagnosed in small animals
- **Zoonosis**: but pets are NOT source of infection to people
  - Although dogs and cats can get Lyme disease,
  - There is no evidence that they spread Lyme disease directly to their owners.
  - However, pets can bring infected ticks into your home or yard

Refs: Côté, Clinical Veterinary Advisor, 2nd ed, pp 146-147; The Center for Food Security and Public Health, Iowa State University: Lyme Disease; Merck Manual, 10th ed (online): Lyme Borreliosis

My Notes: