

SYMPTOMS OF TICK-BORNE DISEASES



Tick-borne diseases are notoriously challenging to diagnose because of the wide range of symptoms they can present, as well as the similarity of symptoms across diseases. Moreover, even a single infection, such as Lyme disease, can look vastly different from one patient to another.

But it's impossible, and cost-prohibitive, to test for every disease. The purpose of this document is to help physicians provide a more accurate clinical diagnosis of their patient, so that they can provide optimal guidance for testing and treatment.

LYME DISEASE

Lyme disease is the most well-known tick-borne illness and one of the fastest growing infectious diseases in the United States, infecting 476,000 people annually.



EARLY STAGE

- Gradual onset of initial (viral-like) symptoms, making it difficult to pinpoint when the infection began
- Fever, chills, headache, fatigue, muscle and joint aches, and swollen lymph nodes
- Slow response to treatment, with an initial symptom flare in most (Herxheimer-like reaction)
- Erythema migrans (EM) rash, which takes on a "bull's-eye" appearance, in 25% to 50% of cases
- EM rash may appear on any area of the body, may feel warm to the touch, but is rarely painful

LATE STAGE

- Severe headaches and neck stiffness ("Lyme shrug")
- Migratory: first a knee will hurt, then an elbow or shoulder, and later headaches occur.
- Bell's palsy (loss of muscle tone or droop on one or both sides of the face)
- Irregular heart beat (Lyme Carditis)
- Episodes of dizziness or shortness of breath
- Inflammation of the brain (Encephalitis) and spinal cord
- Problems with short-term memory
- Afternoon fevers and tiredness

BABESIOSIS

Unlike other tick-borne diseases, Babesiosis is caused by microscopic parasites that infect red blood cells. This makes it similar to malaria.



- Rapid onset of high fever, severe headaches, sweats and fatigue
- Headaches can be severe - dull, global (involves the whole head, described like the head is in a vise)
- Air hunger, need to sigh and take a deep breath; dry cough without reason
- Fatigue is prominent, does not clear with rest, and is made worse with exercise
- Mental dullness and slowing of reactions and responses
- Dizziness or tippy feeling, but not vertigo or purely orthostasis
- Symptoms cycle rapidly, with flares every four to six days
- Hypercoagulation
- Very severe Lyme disease can be a clue to Babesiosis infection, as it will make Lyme symptoms worse and Lyme treatments less effective
- *Babesia* parasites infect red blood cells, and can cause hemolytic anemia (from the destruction of red blood cells)
- Babesiosis can be a severe, life-threatening disease, particularly in people who:
 - Do not have a spleen
 - Have a weak immune system for other reasons (such as cancer, lymphoma, or AIDS)
 - Have other serious health conditions (such as liver or kidney disease) or are elderly

TICK-BORNE RELAPSING FEVER (TBRF)

It looks like Lyme, behaves like Lyme, but it's not Lyme. Is it TBRF? Some of the *Borrelia* that cause TBRF are transmitted by the same ticks that transmit *B. burgdorferi*, the causative agent of Lyme disease.



- Recurring bouts of fever, each lasting about three days. The fever then goes away for about one week before returning.
- Very high fever (up to 106.7°F) is possible, making patients delirious, agitated, tachycardic and tachypneic
- Drenching sweats and a rapid decrease in body temperature, resulting in patients becoming transiently hypotensive
- Headaches, muscle pain, joint pain, chills, vomiting, and abdominal pain
- Bacterial presence tends to be greater among pregnant women
- In more extreme cases, TBRF can cause death, especially in childbearing mothers and neonatal infants

RICKETTSIOSIS

Rickettsiosis is classified by two main biogroups: the spotted fever group and the typhus group. The most serious and commonly reported spotted fever group in the United States is Rocky Mountain spotted fever (RMSF).



- A dark scab at the site of tick bite, known as an eschar
- Fever, headache, rash, muscle aches, and exhaustion
- Nausea, vomiting and a hacking cough may also develop
- Abdominal pain
- Inflammation of the airways (pneumonitis) and pneumonia
- Heart damage
- Anemia
- Severe low blood pressure

EHRlichiosis / ANAPLASMOSIS

Ehrlichiosis and Anaplasmosis are caused by intracellular bacteria belonging to the family *Anaplasmataceae*. In general, Anaplasmosis leads to milder disease than Ehrlichiosis, even though the two are similar.



- Symptoms begin about 12 days after a tick bite
- Fever, chills, muscle aches, weakness, nausea and/or vomiting, cough, headache, and malaise
- A rash may develop on the torso, arms, and legs with Ehrlichiosis, but is uncommon in people with Anaplasmosis
- Headaches are sharp, knife-like, and often behind the eyes
- Muscle pain, not joint pain, which can be mild or severe
- Low WBC, low platelet count, elevated liver enzymes, and (rarely) inclusions seen in the WBCs
- Rarely see diffuse vasculitic rash, including palms and soles (less than 10%)
- Symptoms of both infections are more severe in people with a weakened immune system
- May cause blood clotting (disseminated intravascular coagulation), failure of several organs, seizures, and coma

BARTONELLOSIS

Bartonellosis is primarily associated with fleas, lice, and ticks. Several species of *Bartonella* cause serious diseases in humans, such as Cat scratch disease (CSD), endocarditis, trench fever, and Carrion's disease.



- Gradual onset of initial illness
- Central Nervous System (CNS) symptoms are out of proportion to musculoskeletal ones
- CNS irritability can include muscle twitches, tremors, insomnia, seizures, agitation, anxiety, mood swings, and antisocial behavior
- GI involvement may present as gastritis or abdominal pain (mesenteric adenitis)
- May have papular or linear red rashes (like stretch marks that do not always follow skin planes), especially in those with GI issues
- Sore soles, especially in the morning
- Tender sub-cutaneous nodules along the extremities, especially outer thigh, shins, and triceps
- Occasional lymphadenopathy
- Morning fevers around 99 degrees with occasionally light sweats
- Elevated vascular endothelial growth factor (VEGF) can occur, and the degree of elevation may be used to monitor treatment
- Rapid response to antibiotic treatment, but relapses occur within days if medication is withdrawn early



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It's clear that tick-borne diseases can be difficult to diagnose without testing. For over 30 years, IGeneX has been at the forefront of diagnostic testing for Lyme disease and other tick-borne illnesses. IGeneX is certified by CLIA (Clinical Laboratory Improvements Amendments of 1988) to perform high-complexity tests on human samples in all 50 states. Including New York. This demonstrates that IGeneX meets the quality of standards at state and federal levels. Contact us today to get started.

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