

IN THIS ISSUE: TICKBORNE DISEASES: ANAPLASMOSIS

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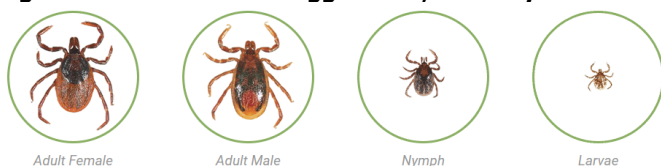
Introduction

This series of Epi News articles aims to bring awareness and education about tickborne diseases including identification, diagnosis, and treatment in human populations.

Epidemiology

Anaplasmosis is caused by the bacterium *Anaplasma phagocytophilum* which enters the body through infected tick bites from the Blacklegged tick (*Ixodes scapularis*) or the Western Blacklegged tick (*Ixodes pacificus*) [Figure 1]. While less common, anaplasmosis can also be transmitted through blood infusions and organ transplants.¹

Figure 1: Western Blacklegged Tick, *Ixodes pacificus*

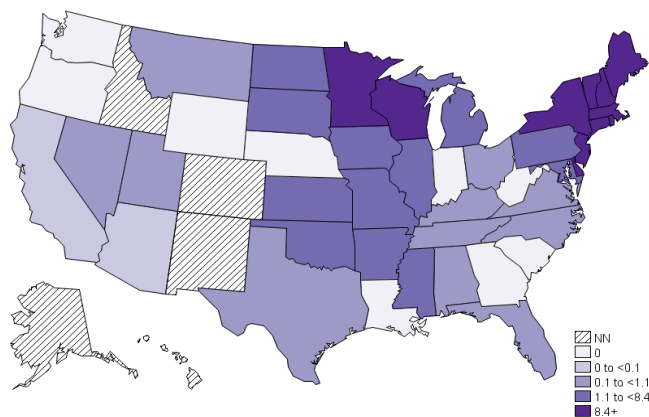


Source: Tick Safety. Accessed July 2021

<https://ticksafety.com/tick-identification/western-deer-tick/>

Transmission mainly occurs in the Northeastern and upper Midwestern states; however, it can occur in the Western states [Figure 2].

Figure 2: Annual Reported Incidence (per million population) for Anaplasmosis- United States, 2018



Source: CDC Anaplasmosis Statistics. Accessed July 2021

<https://www.cdc.gov/anaplasmosis/stats/index.html#geography>

Anaplasmosis has a seasonal period (June-November) during which infected cases are most often reported. There are typically two peaks of

increased case reporting. The first peak occurs in June-July, during the nymph stage of development. The secondary peak occurs during October-November when adult blacklegged ticks have matured.^{1,2}

Reported cases of anaplasmosis occur within areas that also have a large distribution of other *Ixodes scapularis* species. Due to the common-vector, co-infections may occur with *A. phagocytophilum* and *B. burgdorferi*, *Babesia microti*, *B. mayonii*, *B. miyamotoi*, *Ehrlichia muris eauclairensis* or Powassan virus. Anaplasmosis co-infection is rare and reported in less than 10% of patients.³

Signs & Symptoms

Symptoms vary from person to person and are rarely severe or life-threatening. The incubation period usually begins within 5-14 days following a bite from an infected tick. Signs and symptoms include fever, chills, rigors, severe headache, malaise, myalgia, and in a small percentage of cases gastrointestinal symptoms may be present. In rare instances, cases may also report a rash and involvement of the nervous system (meningoencephalitis, focal paralysis, etc.). Rashes may indicate a concurrent infection with Lyme disease.^{4,5}

If treatment is delayed, the disease may become severe and include renal or respiratory failure, peripheral neuropathies, disseminated intravascular coagulation (DIC)-like coagulopathies, rhabdomyolysis, and hemorrhage.⁵

Diagnosis & Testing

Presumptive diagnoses of anaplasmosis are often based on clinical signs and symptoms. Early recognition and treatment are important and should not be delayed pending receipt of laboratory test results or withheld based on initial negative laboratory results, if clinically compatible symptoms are present. Providers should remain on alert during spring and summer months when treating persons who present with non-specific febrile illness of unknown origin.

Testing for anaplasmosis should be considered if a person has known risk factors such as living near or recent travel to an area with ticks, illness occurring during high-tick activity times of year (summer, spring, fall), or those who remember getting bitten by a tick. Diagnostic tests depend on onset of symptoms and the types of specimens available for testing.⁶

- **Blood-smear microscopy:** during the first week of illness, examination of peripheral blood smears may show microcolonies of anaplasmae (morulae) in the cytoplasm of granulocytes. Smears may be insensitive and should not be used solely to diagnose illness.⁶
 - Morulae may not differentiate between Anaplasma and Ehrlichia species.
- **Immunohistochemical assays and culture (UHC):** only available from specialized laboratories, can be applied to autopsy tissues specimens, and can be used for diagnosis if using a bone marrow biopsy specimen.⁶
- **Persistent antibodies:** antibodies may remain elevated for several months after disease has resolved. Titers have been observed up to four years after acute infection. Healthy individuals may also show elevated titers due to past exposures to *A. phagocytophilum* or similar organisms.⁶
- **Serology:** indirect immunofluorescence antibody (IFA) assay of IgG is the standard diagnostic test for anaplasmosis. IgG assays should be performed on a paired acute and convalescent serum samples that are collected 2-4 weeks apart to demonstrate a fourfold seroconversion.⁶

Note: Antibody titers are frequently negative in the first 7 to 10 days of illness. Acute antibody results cannot independently be relied upon for confirmation.

Note: IgM antibodies are less specific than IgG antibodies and are not indicators of acute infection.

- **PCR:** this method is most sensitive during the first week of illness. A negative PCR result does not rule out diagnosis and treatment should not be withheld.⁶

Treatment

Clinical suspicion of anaplasmosis is sufficient to begin treatment with doxycycline for both adults and children. Doxycycline has shown to be highly effective in treating multiple tickborne diseases. Any delay may result in severe illness or death. Treatment typically

lasts 10-14 days to provide appropriate length for possible incubating co-infection with Lyme disease.⁷

Reporting

The list of reportable communicable diseases and reporting forms can be found at:

<http://tinyurl.com/WashoeDiseaseReporting>

Report communicable diseases to the Washoe County Health District. To report a communicable disease, please call 775-328-2447 or fax your report to the WCHD at 775-328-3764.

Acknowledgement

Thank you to all health care providers, infection control practitioners, laboratory staff, as well as schools and daycares for their reporting and collaboration to make this work possible.

References

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