Anaplasmosis Table of Contents

Anaplasmosis

Case Definition – 2024 Case Definition - Anaplasmosis

Overview

- ***Agents*** – Anaplasmosis is caused by the bacteria *Anaplasma phagocytophilum*.
- ***Reservoir*** – Anaplasmosis reservoirs include deer, ruminants, small rodents, and dogs.
- ***Occurrence*** – Anaplasmosis is commonly reported in North and South America as well as parts of Asia and Europe. Within the U.S., anaplasmosis is more frequently reported from the upper-Midwest and northeastern regions.
- ***Risk Factors –*** Individuals aged 40 and older or those are immunocompromised are considered high risk and may experience more severe illness. Individuals that spend a lot of time outdoors for work/recreation are also considered high risk due to increased tick exposures.
- ***Mode of Transmission*** – Transmission primarily occurs through the bite of an infected tick. Anaplasmosis is transmitted by *Ixodes* species of ticks. Most commonly, transmission is associated with the blacklegged tick (*Ixodes scapularis*) in the upper-Midwest and northeastern regions of the U.S., but can also occur with the Western blacklegged tick along the west coast. Risk of transmission through blood, organ, or tissue donation is also possible.
- ***Incubation Period*** – 7-14 days
- ***Clinical Illness*** – Most individuals who become infected are asymptomatic. If disease develops, it can range from mild febrile illness to severe illness and even death. Commonly reported symptoms are non-specific and include acute onset of fever, headache, malaise, and myalgia. Laboratory findings may include leukopenia, thrombocytopenia, and elevated liver enzymes.
- ***Laboratory Testing*** – Testing for tickborne diseases, including anaplasmosis, can be obtained through many commercial laboratories. The Missouri State Public Health Laboratory (MSPHL) does not currently conduct tickborne disease testing. In special cases, arrangements can be made to send specimens to CDC for testing.
- ***Treatment*** – Doxycycline is the antibiotic of choice to treat most tickborne diseases including anaplasmosis. Alternative antibiotics may be used if doxycycline is contraindicated, but use of other antibiotics may not reduce the likelihood of death.
- ***Priority –*** Routine.

Quick References / Factsheets

- Health Professionals:
  - Diagnosis and Management of Tickborne Rickettsial Diseases: Rocky Mountain Spotted Fever and Other Spotted Fever Group Rickettsioses, Ehrlichioses, and Anaplasmosis – United States (CDC MMWR)
  - Tickborne Diseases of the United States – A Reference Manual for Health Care Providers, Sixth Edition, 2022 (CDC)

- Web-Based Training (CDC): Diagnosis and Treatment of Ehrlichiosis and Anaplasmosis – WB4504R
- Ehrlichiosis and Anaplasmosis among Transfusion and Transplant Recipients in the United States (EID article)
- Diagnostic Testing and Interpretation Resources (CDC):
  - YouTube video
  - Fact sheet
- Research (CDC): Doxycycline and Tooth Staining

Forms

- Disease Case Report (CD-1) PDF format Word format
- Tickborne Rickettsial Disease Case Report Form
- Missouri Outbreak Report Form (MORF)

Reporting Requirements

- Anaplasmosis is a Category 3 disease and shall be reported to the local health authority or to the MDHSS within three (3) calendar days of first knowledge or suspicion.
- Anaplasmosis is a nationally notifiable condition in the standard reporting category. The MDHSS reports confirmed and probable cases to the CDC by routine electronic transmission.
- Anaplasmosis reporting includes the following:
  1. For all cases, complete a Disease Case Report (CD-1).
  2. For confirmed and probable cases, complete the Tickborne Rickettsial Disease Case Report Form.
  3. All outbreaks or suspected outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the District Epidemiologists.
  4. Within 90 days from the conclusion of an outbreak, submit the final outbreak to the District Epidemiologists.

Laboratory Testing and Diagnosis

Laboratory confirmation of infection is vital to understanding the epidemiology and public health impact of tickborne rickettsial diseases (e.g., ehrlichiosis, anaplasmosis, and Rocky Mountain spotted fever). Confirmatory testing by polymerase chain reaction (PCR) testing is available for anaplasmosis. PCR testing is most sensitive during the first week of illness. PCR sensitivity can decrease after tetracycline-class antibiotics are administered, so this testing should be conducted prior to starting antibiotic treatment. For testing that occurs after the first week of illness, it is recommended to obtain paired, appropriately timed acute and convalescent specimens for

serological analysis. A single serologic test does not provide the diagnostic strength of paired acute and convalescent specimens or confirmatory testing by PCR.

Routine anaplasmosis diagnostic testing is available through commercial laboratories. The Missouri State Public Health Laboratory (MSPHL) does not perform any tickborne disease diagnostic testing. In special situations, testing for anaplasmosis can be conducted by CDC. All requests for anaplasmosis testing to be performed by CDC should be coordinated through the Zoonotic Disease Program.

Conducting the Investigation

1. **Verify the diagnosis**. What laboratory tests were conducted, and what were the results? Obtain demographic, clinical, and laboratory information on the case from the provider, laboratory, and/or patient. Complete both the Disease Case Report (CD-1) and the Tickborne Rickettsial Disease Case Report Form.

   In addition to PCR or antibody testing, patients may have had complete blood cell count or comprehensive metabolic blood testing done that may indicate anemia, thrombocytopenia, leukopenia, and/or liver enzyme elevation. If the patient was hospitalized during their illness, verify the availability of these results as part of the investigation.

   Regarding antibody testing, patients may lack detectable antibody titers in the first 7 days of illness. Positive IgG titers or index values can indicate a past infection or early response to a current infection. IgM tests are not specific, and detectable IgM may persist for months or longer. For these reasons, IgM titers or index values without detectable IgG response should be interpreted with caution.

2. **Establish the extent of illness.** The investigation should consider family members, pets, and other contacts who have or have recently had a febrile illness and shared environmental exposures with the patient.

3. **Establish the source of infection.** Prior to symptom onset:
   - What was the case's travel history (including specific travel dates)?
   - Are there household or other contacts with a similar illness?
   - Was the case's tick exposure in-state, out-of-state, or out-of-country?
   - Rule out non-tick transmission pathways (which may fall outside the two week timeframe):
     - Does the case work in a laboratory or clinical setting?
     - Is the case a neonate, pregnant, or breastfeeding?
     - Has the case recently received any blood, blood products, tissues, or organs?
   - If the case is a recent organ, tissue (e.g., corneas, skin), or blood donor or recipient within the last 30 days:
     - Notify the Zoonotic Disease Program.

- Assure that relevant partners (blood collection agencies, hospitals, etc.) have been notified.
- Determine the patient/donor identification numbers and any other available details regarding blood products/organs received.
- Assure quarantine of any remaining co-component blood or tissues.
- If necessary, investigate all recipients of transfused co-components from the implicated donation and other potentially contaminated donations from implicated donor(s).

Control Measures

In the United States, there is currently no licensed vaccination to prevent anaplasmosis. Even with a reported tick exposure or attachment, treatment for anaplasmosis is not recommended by CDC unless compatible symptoms develop. Prophylactic antibiotic treatment in the absence of symptoms has not been demonstrated to prevent infection from occurring and may prolong the onset of symptoms in some patients. Aside from cases associated with blood donation, tissue, or organ transplants, contact tracing is not required because anaplasmosis infections are not transmitted person-to-person.

The best way to avoid infection with anaplasmosis is to avoid tick bites. Key personal prevention methods for avoiding tick bites include:

- Whenever possible, avoid tick habitat during the peak time of year when ticks are most active (generally April through September). Ticks are generally found in areas with tall grass, brush or in heavily wooded areas. However, they can also be present in neighborhoods and backyards!
- Use an insect repellent product with at least 20% DEET, picaridin, or other EPA-registered active ingredients labeled specifically for ticks.
  - The American Academy of Pediatrics has recommended that repellents containing up to 30% DEET are safe for children over 2 months of age.
  - For other active repellent ingredients, check the product label for minimum age requirements before applying to children.
  - EPA offers an insect repellent search tool that can be used by the public to identify repellent products that work best for their needs.
- Weather-permitting, wear long sleeves and pants to help reduce the amount of exposed skin. This will make it harder for ticks to find a place to attach.
  - Wearing light-colored clothing can make it easier to spot ticks that may be crawling on clothing when you are outdoors.
- Consider applying permethrin to clothing, boots, and outdoor gear when spending time in tick habitat. Permethrin binds tightly to fabric and will remain effective after multiple washings.
  - This product should not be applied directly to the skin. Product directions and labels should be read carefully before use.

Resources

1. American Academy of Pediatrics. [Ehrlichia, Anaplasma, and Related Infections]. In: Kimberlin DW, Barnett, ED, Lynfield, R, Sawyer, MH, eds. *Red Book: 2021 Report of the Committee on Infectious Diseases*. 32nd ed. Itasca, IL: American Academy of Pediatrics; 2021: [308-311]
2. American Public Health Association. [Ehrlichiosis]. In: Heymann DL, ed. *Control of Communicable Diseases Manual*. 21st ed. Washington, DC: American Public Health Association; 2022 [189-193]
3. Centers for Disease Control and Prevention. Anaplasmosis. https://www.cdc.gov/anaplasmosis/about/ (7/24)