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Healthy Insights

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Prevention news for the medical community of New Hampshire

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Lyme Disease and Other Tick-Borne Diseases Are ***Preventable***

Main Messages:

1. Rate of Lyme disease in NH is among the highest in the nation and in most NH counties over 50% of deer ticks are infected with the bacteria causing Lyme disease.
2. Removal of a deer tick within 36 hours of attachment can prevent disease transmission.
3. During early stages of Lyme disease (bulls eye rash) treatment should be based on clinical suspicion as all serology tests (including IgM) may be falsely negative.
4. All tick-borne diseases, confirmed or suspected, should be reported to the Division of Public Health Services (DPHS) within 72 hours. To report please call 603-271-4496 (after hours 1-800-852-3345, x5300). Please document the occupation of the patient so work-related tick-borne diseases can be tracked.

During recent years we have seen an increase in the number of reported cases of Lyme disease. During 2010, 826 confirmed (and 509 probable) cases of Lyme disease were reported with the highest disease rate occurring in Rockingham, Hillsborough, and Strafford counties. Lyme disease data and maps by county and town are available at http://www.dhhs.nh.gov/dphs/cdcs/lyme/publications.htm Reporting of other tick-borne diseases was less frequent: anaplasmosis 19 cases, babesiosis 10 cases.

Lyme disease, babesiosis, and anaplasmosis are transmitted by the bite of the black-legged tick (*Ixodes scapularis*), commonly called the deer tick. The greatest risk for these diseases is between May and August when the nymph (juvenile) stage of the deer tick is active; nymphs are very small (< 2mm) and often go unnoticed while attached to people. A single tick can be co-infected with any of the above pathogens and thus transmit multiple diseases during a single bite which should be considered when testing for a tick-borne disease.

The risk of infection depends on the abundance of ticks and their rate of infection. Based on tick surveillance, performed during 2007-2010, deer ticks are common in southeastern NH, less common in southwestern and mid-central NH, and rare in northern and mid-western NH. Over 50% of the ticks tested in all NH counties with the exception of Belknap, Carroll, and Coos counties were infected with the bacteria causing Lyme disease, though infected ticks were also found in Belknap and Carroll counties. The pathogen causing babesiosis was detected in ticks collected from southeastern and mid-central NH. The pathogen causing anaplasmosis was detected in ticks collected from southeastern NH.

Clinical presentation: Immediately after a tick bite there could be redness around the attachment site due to an inflammatory response. This reaction by itself does not warrant treatment. Depending on prevalence of Lyme disease in the community and time from tick bite you can consider prescribing prophylaxis with single doxycycline dose if not contraindicated (see attached prophylaxis recommendations)

Lyme Disease is caused by the bacteria *Borrelia burgdorferi.* Incubation period is 3-30 days after tick exposure. In approximately 70% of patients, illness first manifests with a red rash that expands slowly, often with central clearing (erythema migrans = EM or bulls eye rash). Early systemic manifestations may include malaise, fever, headache, stiff neck, muscle and joint pains, and lymphadenopathy. At this stage serologic testing is often negative and treatment should be based on clinical diagnosis and would generally lead to full and rapid recovery. Individuals who are not treated at this stage of infection may develop a variety of symptoms over days to weeks including aseptic meningitis, cranial neuritis, and cardiac abnormalities such as heart block or myopericarditis. Weeks to years after onset a patient may develop chronic or intermittent episodes of arthritis and / or neurological symptoms. Within 4 weeks of disease transmission the production of specific antibodies is high enough to be detected and the clinical diagnosis should be supported by two-stage serologic testing using FDA approved methods: ELISA, as a screening test, confirmed by Western Blot if positive. A patient is considered to have positive Lyme serology if 2 of the following 3 IgM bands are reactive: 24, 39, 41 kDa OR if 5 of the following 10 IgG bands are reactive: 18, 21, 28, 30, 39, 41, 45, 58, 66, 93 kDa.
In November 2006, the Infectious Disease Society of America (IDSA) updated their guidelines for tick-borne diseases and these can be accessed at http://cid.oxfordjournals.org/content/43/9/1089.full.pdf+html. A summary of treatment recommendations based on these guidelines is attached.

Anaplasmosis [Human granulocytic anaplasmosis (HGA), previously human granulocytic ehrlichisosis] is an infection of neutrophils caused by the rickettsia *Anaplasma phagocytophilum*. Clinical manifestations are nonspecific and may include fever, chills, headache, and myalgia. Some people, particularly elderly persons or those with weakened immune systems, may have a more severe illness. Symptoms typically occur 5-21 days following the bite of an infected tick. People can be successfully treated with antibiotics (see attached treatment guideline table).

Babesiosis is caused by the intraerythrocytic protozoa *Babesia microti*. Most people infected with Babesia are asymptomatic or experience a viral infection–like illness with fever, chills, sweats, myalgia, arthralgia, anorexia, nausea, vomiting, or fatigue. Severe and fatal cases most often occur in patients who are older or have a weakened immune system, such as those without a spleen. Symptoms typically occur within one to four weeks following the bite of an infected tick. People can be successfully treated with antimicrobial therapy (see attached treatment guideline table)

Educate your patients on tick-borne diseases prevention: Avoid tick-infested areas when feasible, wear light-colored clothing that covers arms and legs so ticks can be more easily seen, tuck pants into socks and apply tick repellent to exposed skin, and after being outdoors search the body for ticks and remove them promptly. Removal of ticks within 36 hours of attachment can prevent disease transmission. Persons who have removed attached ticks from themselves should be monitored for signs and symptoms of tick-borne diseases for 30 days. It is important to document the patient's occupation in order to better recognize and understand the potential risk factors associated with the patient's work and his or her illness.

Attachments: 1. Tick-borne diseases treatment table
2. Lyme Prophylaxis guidelines following tick bite

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NH Division of Public Health Services (DPHS): Treatment recommendations for tick-borne diseases Infectious Disease Society of America (IDSA) guidelines (2006)

Disease	Treatment Regimens for Adults	Treatment Regimens for Children
Lyme disease	Oral options: Doxycycline 100 mg PO bid - preferred	Doxycycline 2 mg/kg PO bid (max 100 mg/dose) **only if 8 years and older**
	Amoxicillin 500 mg PO tid	Amoxicillin 50 mg/kg/d in 3 divided doses (max 500 mg/dose)
	Cefuroxime axetil 500 mg PO bid	Cefuroxime axetil 30 mg/kg/d in 2 divided doses (max 500 mg/dose)
	Parenteral: Ceftriaxone 2g IV qd - preferred	Ceftriaxone 50-75 mg/kgIV qd (max 2g) – preferred
	Cefotaxime 2g IV q8h	Cefotaxime 150-200 mg/kg/d IV in 3-4 divided doses (max 6g/d)
	Penicillin G 3-4 MU IV q4h	Penicillin G 200-400K U/kg/d divided every 4h (max 18-24MU/d)
	Choice of regimen, route and length of treatment for Lyme depends on symptoms and stage of disease	
Anaplasmosis	Doxycycline 100 mg PO bid for 10 days Alternatives: <u>Severe OR coinfected with Lyme:</u> Amoxicllin / cefuroxime axetil (dose as above for Lyme disease) <u>No coinfection and mild disease:</u> Rifampin 300 mg PO bid for 7-10 days	**8 years and older:** Doxycycline 2 mg/kg PO bid for 10 days (max dose 100mg) **Under 8 years old:** <u>Severe disease:</u> Doxycycline (dose as above) for 4-5 days then complete a 14 days course with Amoxicillin OR Cefuroxime axetil (doses as above) <u>Mild disease:</u> Rifampin 10 mg/kg PO bid (max 300 mg/dose) for 7-10 days
Babesiosis	Atovaquone 750 mg PO bid + Azithromycin 500-1000 mg on day 1 then 250 mg PO qd <u>Severe disease:</u> Clindamycin 300-600 mg IV q6h (or 600 mg PO q8h) + Quinine 650 mg PO q 6-8h. Consider exchange transfusion.	Atovaquone 20 mg/kg PO bid (max 750 mg/ dose) + azithromycin 10 mg/kg/d on day 1 (max 500 mg/d) then 5 mg/kg/d (max 250 mg/d) <u>Severe disease:</u> Clindamycin 7-10 mg/kg q6-8h PO or IV (max 600 mg/dose) +quinine 8 mg/kg PO q8h (max 650 mg/dose). Consider exchange transfusion.

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Tick bites and single–dose doxycycline as prophylactic treatment for Lyme disease

Based on the 2006 Infectious Disease Society of America guidelines

A full course of antimicrobial treatment, as used in the treatment of active Lyme disease (i.e., 10-14 days), is NOT recommended for prevention of Lyme disease after a recognized tick bite in the absence of clinical symptoms. A single dose of doxycycline (200 mg) may be offered to adult patients and to children ≥8 years of age (4 mg/kg up to a maximum dose of 200 mg) when ALL of the following conditions exist.

1. **The attached tick is a black-legged tick (deer tick, *Ixodes scapularis*).** Tick identification is most accurately performed by an individual trained in this discipline. However, black-legged ticks are very common in southeastern and central New Hampshire and there are many images available online to help in general identification.

2. **The tick has been attached for at least 36 hours.** This determination is most reliably made by an entomologist, but simply asking the patient about outdoor activity in the time before the tick bite was noticed can often lead to an accurate estimate of attachment time. Unengorged (unfed) black-legged ticks are typically flat. Any deviation from this "flatness," which is often accompanied by a change in color from brick red to a gray or brown, is an indication that the tick has been feeding.

3. **Prophylaxis can be started within 72 hours of the time that the tick was removed.** This time limit is suggested because of an absence of data on the efficacy of prophylaxis for tick bites following longer time intervals after tick removal.

4. **Doxycycline treatment is not contraindicated.** Doxycycline is contraindicated in pregnant women and children less than 8 years old. The other common antibiotic treatment for Lyme disease, amoxicillin, should NOT be used for prophylaxis because of an absence of data on an effective short-course regimen for prophylaxis and the likely need for a multiday regimen and its associated adverse effects.

5. **The geographic site where the tick was acquired has a local black-legged tick infection rate with *Borrelia burgdorferi* of at least 20%.** Tick studies in New Hampshire between 2007-2010 suggest that greater than 20% of black-legged ticks in all NH counties are infected with *Borrelia burgdorferi,* with the exception of Coos county where there is insufficient data to estimate infection rates. A map showing tick data by county is available at: http://www.dhhs.nh.gov/dphs/cdcs/lyme/publications.htm

Note that single-dose doxycycline is not 100% effective for prevention of Lyme disease; consequently, patients who receive this therapy should monitor themselves for the development of Lyme disease as well as other tick-borne diseases including anaplasmosis and babesiosis.

Testing of ticks for tick-borne infectious agents is not recommended for guiding individual patient's prophylaxis or treatment decisions.