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Lyme Disease Outcomes with Immediate, Short Duration Antibiotic Use Versus Delayed, Longer Duration Use.

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Abstract

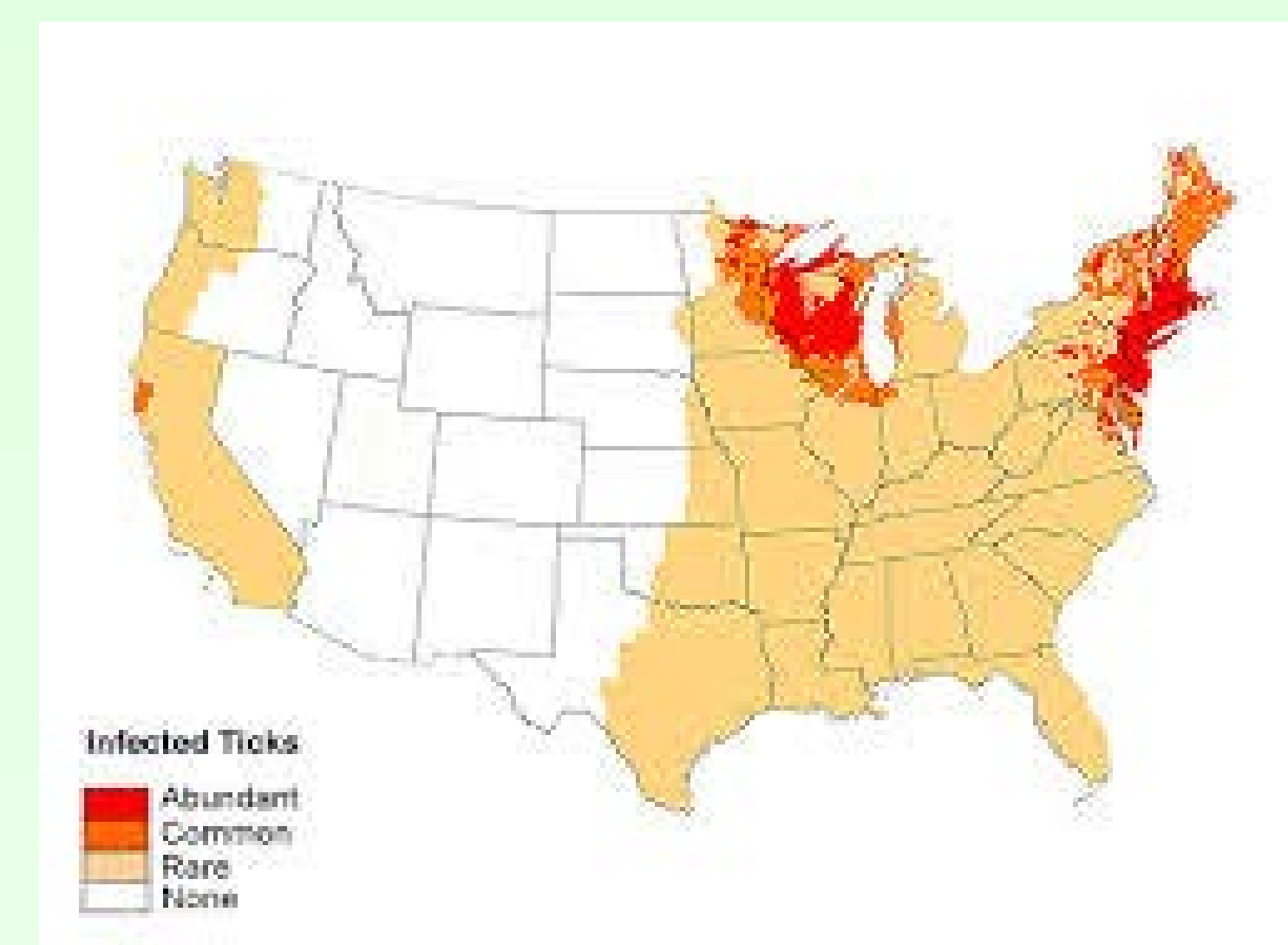
Lyme disease is the fastest growing vector-borne disease in the United States, according to the Infectious Disease Society of America (IDSA). The guidelines for diagnosis provided by the IDSA include evidence of erythema migrans rash with validation of a positive two-tier serology testing. With no established treatment standards, decreased sensitivity of testing and inconsistency of observing the rash, practitioners following the guidelines may delay treatment of antibiotics. This delay could cause progression of severity of symptoms.

The purpose of this study is to compare implementation and duration time of antibiotics and establish the treatment protocol for best clinical outcomes for Lyme disease. Diagnosis will be based on practitioner's clinical judgment with or without positive serology testing and erythema rash. Review of literature will define late, chronic and recurrent Lyme disease, describe recurrent treatment of Lyme disease, compare and contrast present protocols with different duration and types of antibiotics, and examine markers and subjective reports as evidence of improvement. Guidelines and recommendations will be provided from Lyme disease experts.

Significant results found that early implemented, shorter duration antibiotic use provided the greatest clinical improvement long term.

Research Questions

- In patients with clinical symptoms of Lyme disease, is early intervention (within 4-6 weeks of clinical diagnosis) of antibiotics more beneficial in reduction of subjective symptoms than treatment implemented after 6 weeks?
- In patients with clinical symptoms of Lyme disease, would shorter duration antibiotics (14 days) be more beneficial than longer duration (28 days) in reduction of subjective symptom?



Discussion

- Early implemented (two to six weeks after tick bite), shorter duration antibiotics (14 days) provided the greatest clinical improvement, long term for Lyme disease.
- Resolution of erythema migrans rash and systemic symptoms could be achieved with 10 days dosage as readily as 20 days so minimal antibiotics are as effective as longer term use.
- Longer term use of antibiotics (greater than four weeks) may be useful and justified in people with persistent symptoms and co-infection of the tick.
- Time of implementation of the antibiotic is a component of successful treatment, emphasis on prompt treatment (no later than 6 weeks).
- Tetracycline, doxycycline, or amoxicillin antibiotics should be used in the acute phases. Ceftriaxone (especially for neurological symptoms) and intravenous penicillin have been shown to be beneficial for later stages and more advanced symptoms.
- Due to lack of exact consistent presentation of symptoms; clinical data, history, and physical exam become especially important.
- Clusters of symptoms (pattern recognition) all in the same time frame is more indicative of Lyme disease versus one symptom.
- Using patient's symptom report to monitor success of the treatment could make decision making easier for the practitioner and help with individualized care.
- No test for a cure so knowing when to discontinue antibiotics is difficult.
- Unknown if chronic Lyme disease is an active persistent infection or the result of the acute Lyme process. Treatment protocol would differ and could include combination of antibiotics for persistent strains.
- Possible future diagnostic tool using the C6 antibody marker.

Applicability to Clinical Practice

- Practitioners need to be educated in proper diagnosis and treatment of Lyme disease by pattern recognition instead of unreliable serology tests and presence of rash. This will provide flexibility in the care and prompt treatment of the Lyme patient.
- Early detection of Lyme disease could allow for prompt antibiotic treatment of shorter duration allowing for better use of medical resources. The patient would benefit from less antibiotic use with improved symptoms, without the fear of antibiotic resistance or other side effects.
- Conclusions gathered from studies analyzed are to educate communities to recognize the signs and symptoms of Lyme disease in order to be advocates in prompt, shorter duration treatment for best clinical outcomes.

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Introduction

- According to the Centers of Disease Control and Prevention (CDC, 2008) 40,792 Lyme disease cases were reported in the US in 2001-2002, a 40% increase from the previous year. Individual Lyme clinics indicate that the number of Lyme disease cases may be ten times higher.
- The guidelines for diagnosis provided by IDSA contribute to misdiagnosis as erythema migrans rash is not observed in up to 60% of cases with sensitivity of two-tier serology testing (ELISA and Western Blot) being 50%.
- Delay in treatment could cause progression to chronic Lyme disease which is more resistant to treatment with more severe symptoms.
- Debate continues about appropriate use of antibiotics, including type, implementation time and duration in order to reach maximal benefit of symptom relief.
- Appropriate protocols for use of antibiotics are necessary for improved treatment of Lyme disease.

Statement of the Problem

Appropriate treatment protocols for Lyme disease have not been established for best clinical outcomes. Comparisons have been made of immediate, short duration antibiotic use versus delayed, longer duration use. Concern arises regarding long term antibiotic use and antibiotic resistance so evidence is needed to validate appropriate treatment choices.

Literature Review

- *Borrelia burgdorferi*, the Lyme spirochete, is transmitted to humans by the bite of an infected Ixodes scapularis tick, which travels on white mice and deer.
- The common symptoms after a tick bite include an erythema migrans or bull's eye rash and joint swelling, typical of arthritis.
- Four to six weeks after the bite, the flu like systemic infection begins.
- Symptoms may progress to include paresthesia and other neurologic symptoms.
- Classifications of Lyme disease: early stage, occurring days or weeks after initial infection, is a localized, single erythema with no other symptoms. Early disseminated stage includes multiple rash lesions, and other symptoms involving joints, muscles, hearing or nerves; and lymphadenopathy; occurring weeks to months after infection. The late or chronic disseminated stage Lyme disease presents months to years after infection.
- The ELISA is the first screening test and if negative, practitioners are advised to not proceed to the Western Blot even though this test is highly specific to antibodies for Lyme disease.
- Delayed treatment is strongly associated with treatment failure (up to 58%) and a major risk factor for developing chronic Lyme disease.
- Length of treatment is practitioner specific, associated with classification of Lyme disease.
- The defense of the effectiveness of a short course of antibiotics was validated in various studies.

thanks . . .

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