Reinfection of Lyme Borreliosis Presenting as Lyme Meningitis

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INTRODUCTION

Lyme disease (LD), a condition originally identified in Lyme/Old Lyme, Connecticut, has various clinical manifestations and severity. Therefore, early diagnosis and treatment can be challenging even though it is the most common arthropod-borne infection. Here we present a case of Lyme borreliosis reinfection with atypical presentation.

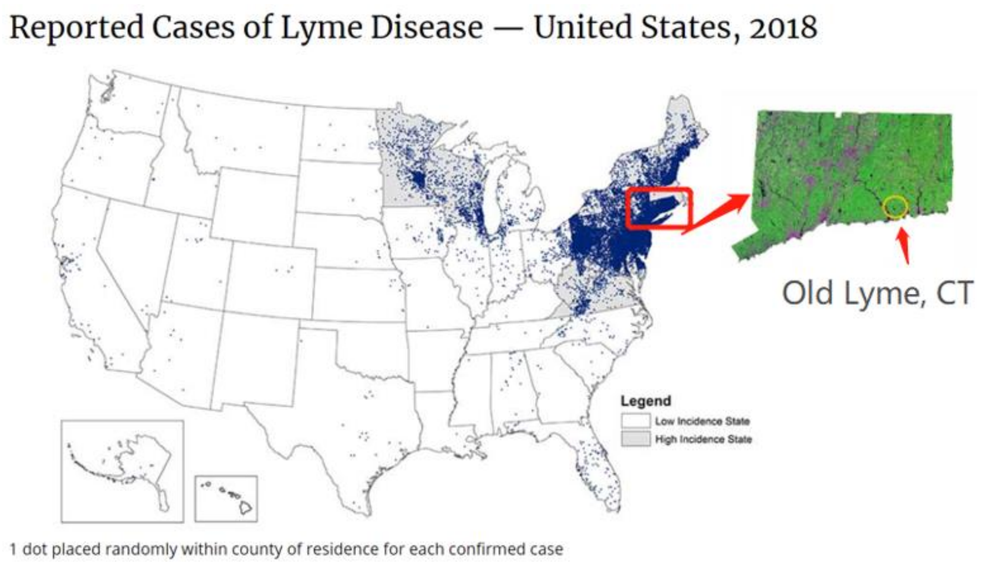

Figure 1. Geographic distribution of human Lyme disease in the United States [4][5]

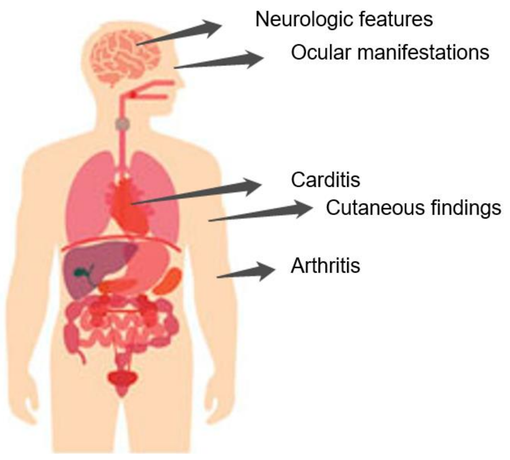

Figure 2. Clinical manifestations of human Lyme Disease [6]

Case Description

A 43-year-old man from **Connecticut** with a past medical history of hypertension, obstructive sleep apnea, presented with **altered mental status** and **garbled speech.**

Initially, he started to have a fever at 38C with generalized weakness and diaphoretic. The following day, the patient was found out to be very confused and acted oddly. He stared into blank spaces and spoke gibberish.

He remained hemodynamically stable. Lab work was unremarkable. Chest X-ray and computed tomography scan of the head were normal. CSF analysis showed **leukocyte 100, glucose 77, and protein 71**. CSF PCR of enterovirus, HSV 1 and 2 were negative. HIV and syphilis were also negative. Further brain MRI did not find evidence of meningitis or encephalitis. The patient was empirically treated with acyclovir.

On further questioning, we learned that the patient had **two episodes of LD infections** after a witness tick bite with a classical bull eye sign. He completed the last treatment about five years ago. The CSF antibody index was positive. Serum Borrelia burgdorferi C6 Peptide Antibody assay was also positive. LD testing of Western Blot revealed IgG 10/11, IgM 2/3 positive, which was different from the previous result. This **confirmed the diagnosis of aseptic meningitis secondary to LD reinfection.**

The patient underwent **doxycycline treatment** for six weeks and his mental status gradually improved.

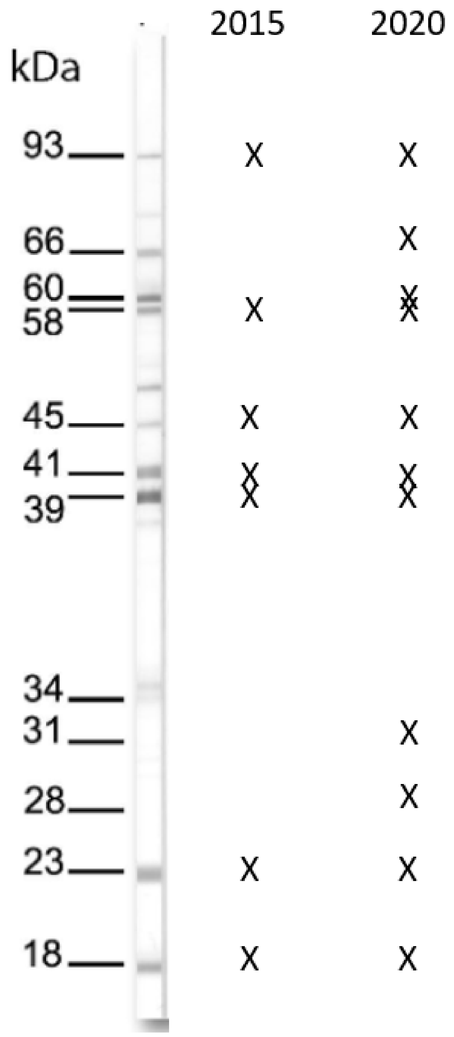

Figure 3. 2015 and 2020 Western blot results [7]

CONCLUSIONS

Our case highlights the importance of considering Lyme neuroborreliosis in LD endemic states.

- Lyme neuroborreliosis can occur within the disseminated or late disease stage.

  Lyme neuroborreliosis has **various presentations** and **meningitis is the most common** form of central nervous system involvement.

  Lyme meningitis usually presents similar to viral meningitis.

- Routine CSF analysis and image study cannot distinguish them. **Serology and CSF antibody and PCR can confirm the diagnosis**.

- Since it takes time for the antibody and PCR test to return, clinicians should have a high level of suspicion especially in the endemic area and initiate treatment **without WAITING**.

REFERENCES

1. Hildenbrand P, Craven DE, Jones R, Nemeskal P. Lyme neuroborreliosis: manifestations of a rapidly emerging zoonosis. AJNR Am J Neuroradiol. 2009 Jun;30(6):1079-87. doi: 10.3174/ajnr.A1579. Epub 2009 Apr 3. PMID: 19346313; PMCID: PMC7051319.

2. Hatchette TF, Davis I, Johnston BL. Lyme disease: clinical diagnosis and treatment. *Can Commun Dis Rep*. 2014;40(11):194-208. Published 2014 May 29. doi:10.14745/ccdr.v40i11a01

3. Pachner AR. Early disseminated Lyme disease: Lyme meningitis. Am J Med. 1995 Apr 24;98(4A):30S-37S; discussion 37S-43S. doi: 10.1016/s0002-9343(99)80042-4. PMID: 7726190

4. A Brief History of Lyme Disease in Connecticut. (n.d.). Retrieved September 27, 2020, from https://portal.ct.gov/DPH/Epidemiology-and-Emerging-Infections/A-Brief-History-of-Lyme-Disease-in-Connecticut

5. Lyme Disease Maps: Most Recent Year | Lyme Disease | CDC. (n.d.). Retrieved September 27, 2020, from https://www.cdc.gov/lyme/datasurveillance/maps-recent.html

6. Radiation and Your Health. (n.d.). Retrieved September 27, 2020, from https://www.cdc.gov/nceh/radiation/default.htm

7. *CDC scientist: Why bands 31 and 34 aren't used in Lyme disease testing*. (n.d.). Retrieved September 27, 2020, from https://lymescience.org/bands-31-34-lyme-testing/

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