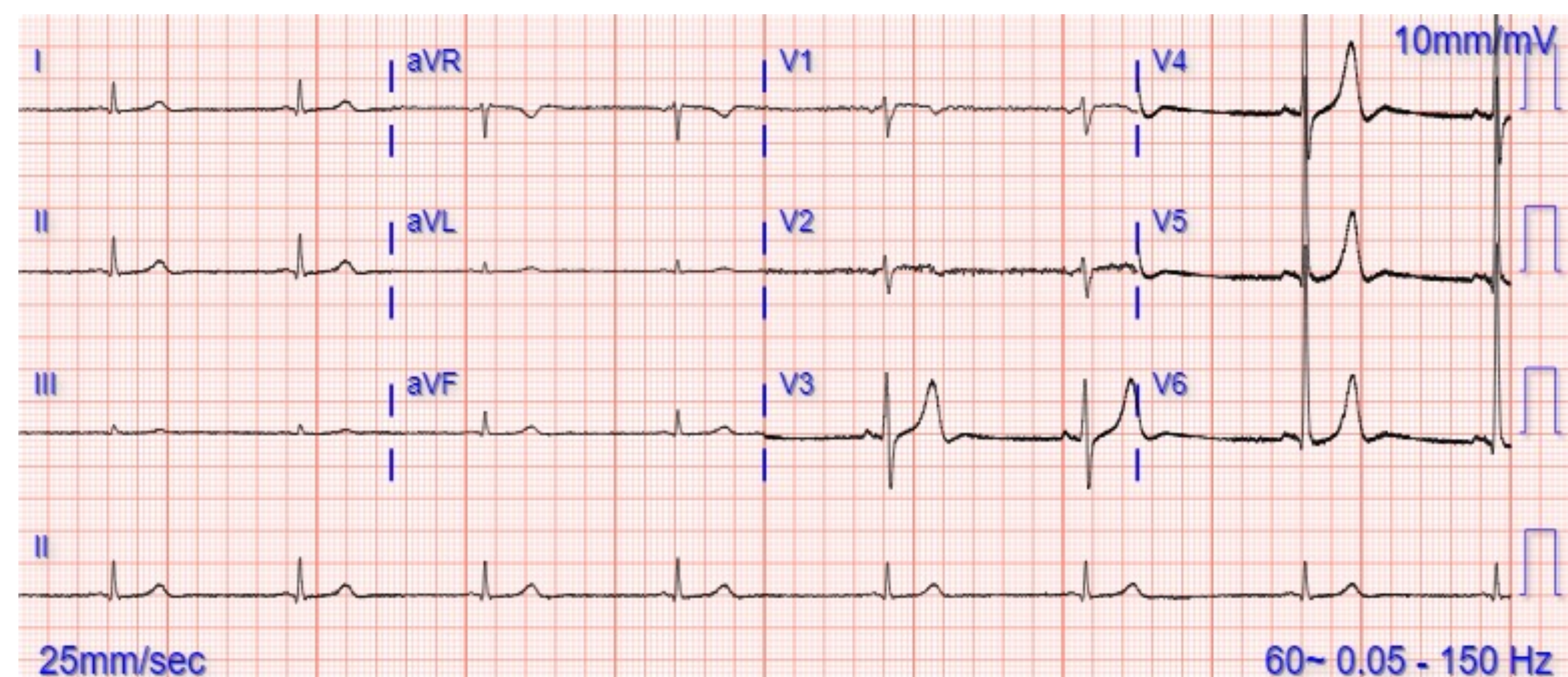


Introduction

- This case report highlights an elusive presentation of Lyme Carditis in which a patient presented to the hospital with symptomatic bradycardia initially thought to be acute coronary syndrome until the Lyme disease serology yielded positive results.

Case Presentation

- 62-year-old male with no pertinent past medical history presented to the ED with witnessed seizure-like activity at work. The patient worked on a dairy farm year-round and endorsed multiple tick bites in the past. No pertinent physical examination findings noted, patient did not recall any skin lesions or rashes in the prior months.
- Pertinent labs include leukocytosis of 19.5, elevated AST of 46, and elevated troponin of 2033. Blood cultures were negative. EKG showed sinus bradycardia with elevated T waves in Leads V3, V4, V5, V6 with poor R wave progression. Echo showed normal ejection fraction with mild left ventricular dilatation without vegetation of thrombus. Brain MRI showed severe intracranial atherosclerotic disease and multiple subacute infarcts bilaterally.
- The patient underwent permanent pacemaker implantation as well as left heart catheterization which showed no evidence of coronary artery disease. Troponins trended back to normal, and the patient was discharged on aspirin, high intensity statin, and anti-seizure medications with outpatient follow up with primary care physician, cardiology, and neurology.
- Lyme disease serology (IFA & Western Blot) resulted after discharge, and the patient was started on 3-week course of oral Doxycycline. Patient is still completing doxycycline therapy at this time and scheduled to follow up with cardiology within the next 90 days.



Index	Interpretation
<0.90	Negative
0.90-1.09	Equivocal
>1.09	Positive

Lyme Disease Ab(IgG),Blot	Positive !
Negative	
18 kD (IgG) Band	Reactive !
23 kD (IgG) Band	Reactive !
28 kD (IgG) Band	Reactive !
30 kD (IgG) Band	Reactive !
39 kD (IgG) Band	Reactive !
41 kD (IgG) Band	Reactive !
45 kD (IgG) Band	Reactive !
58 kD (IgG) Band	Reactive !
66 kD (IgG) Band	Reactive !
93 kD (IgG) Band	Reactive !
Lyme Disease Ab (IgM), Blot	Negative
Negative	
23 kD (IgM) Band	Reactive !
39 kD (IgM) Band	Nonreactive
41 kD (IgM) Band	Nonreactive

- This patient was treated with a 21-day course of Doxycycline therapy consistent with the treatment recommendation by the CDC.
- Temporary pacing is preferred as conduction abnormalities usually resolve once antibiotic therapy is complete, but on occasion they do not, and PPM placement is indicated (4). This patient had PPM implanted as Lyme serology was delayed. He is scheduled for interrogation within the next 6 months.

Lyme Carditis Treatment Regimens

Centers for Disease Control and Prevention (CDC)

Doxycycline 100 mg orally twice daily for 10-21 days or Cefuroxime Axetil 500 mg orally twice daily for 14-21 days or Amoxicillin 500 mg orally three times daily for 14-21 days

International Lyme and Associated Diseases Society (ILADS)

Amoxicillin 1500-2000 mg orally daily in divided doses for 4-6 weeks or Cefuroxime 500 mg orally twice daily for 4-6 weeks or Doxycycline 100 mg orally twice daily for 4-6 weeks or Azithromycin 250-500 mg orally daily for 21 days

Infectious Disease Society of America (IDSA)

Preferred Treatment Ceftriaxone 2 grams once per day via IV for 14 days with a range of 10-28 days

Alternative Treatments Cefotaxime 2 grams IV every 8 hours or Penicillin G 18-24 million units per day in patients with normal renal function divided into doses given every 4 hours or Doxycycline 200-400 mg per day in 2 divided doses orally for 10-28 days for patients intolerant of B-lactam antibiotics

Discussion

- Lyme Carditis is a manifestation of early disseminated *Borrelia burgdorferi* infection that can typically present within several days to three weeks after initial infection, most often in summer and fall (1). Only 40% of patients with Lyme Carditis can recall the characteristic erythema migrans skin lesion (1). Diagnosis is non-specific, usually is combination of (+) two-tier Lyme Serology and AV conduction abnormality.
- The most common manifestations of Lyme Carditis on Electrocardiogram include conduction disturbances such as first, second, or third degree atrio-ventricular blocks. Some less common cardiac presentations include right or left bundle branch blocks, QT prolongation, sinus bradycardia, and even paroxysmal atrial fibrillation (2), hence diagnosis can be difficult. The mechanism of these cardiac manifestations is not entirely understood. Current theories suggest infection inducing an autoimmune inflammatory response within the heart tissue (3).
- A two-tier test is required to confirm a diagnosis of Lyme disease. This includes an elevated Lyme antibody level and Western blot showing reactivity to at least five IgG proteins OR at least two IgM proteins as seen above(4).
- The Infectious Disease Society of America (IDSA), International Lyme and Associated Diseases Society (ILADS), and Centers for Disease Control and Prevention (CDC) have conflicting data regarding duration and choice of antibiotic therapy for disseminated Lyme disease (4).

Conclusions

- Tickborne exposure should always be considered when patients present with cardiac conduction abnormalities, most notably heart block.
- Temporary pacing is preferred as most patients will have complete resolution of conduction abnormalities after initiation of antibiotic therapy.
- Consider empiric Doxycycline therapy if pre-test probability for Lyme Carditis is high.

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