

Lyme carditis presenting with accelerated junctional rhythm in an adult patient



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Introduction

Lyme carditis occurs in 1.5%–10% of untreated patients infected with *Borrelia burgdorferi* in the United States and usually manifests as varying degrees of atrioventricular (AV) block; however, cases of myopericarditis, degenerative valve disease, and congestive heart failure have also been reported. In some cases, AV node inflammation caused by spirochetes may rarely result in an accelerated junctional rhythm as a result of increased automaticity of the AV node. Several cases of junctional tachycardia have been reported in children with Lyme disease, but there has only been 1 case reported in the adult population. Herein, we report a case of accelerated junctional rhythm in a 42-year-old woman with Lyme disease and discuss implications for understanding of the various possible presentations of Lyme carditis.

Background

Lyme disease is the most commonly reported vector-borne disease in the United States. Lyme disease is a multisystem disease caused by a spirochete, *Borrelia burgdorferi*, which is transmitted by *Ixodes* tick bites. In the early stages of the disease, the patient may experience arthralgias, headaches, malaise, fever, and erythema migrans, a target-shaped rash on the body. After weeks or months, an abnormal immune response can induce neurological, joint, and cardiac injury.¹

Lyme carditis is a cardiac complication of Lyme disease that occurs in less than 10% of untreated patients.² Although Lyme carditis commonly manifests as AV conduction delay or block, other conduction abnormalities associated with this disease may delay diagnosis and treatment if the association is not recognized.

We report a case of accelerated junctional rhythm in a 42-year-old woman with Lyme carditis. The case illustrates the importance of a high index of suspicion of cardiac involve-

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KEY TEACHING POINTS

- Lyme disease is a common spirochetal infection that may cause carditis. Atrioventricular (AV) block is a common manifestation. Antibiotic treatment usually results in reversal of all cardiac manifestations.
- Accelerated junctional rhythm (AJR) has been rarely reported in children with Lyme carditis but not in adults. We report a case of AJR in a 42-year-old woman clearly associated with Lyme carditis and reversed with antibiotic treatment.
- AJR with Lyme carditis likely results from inflammation of the AV node. Lyme disease should be considered in patients with unexplained AJR.

ment in a patient with risk factors for Lyme disease, particularly if atypical arrhythmias are present.

Case report

A 42-year-old woman with no significant past medical history presented with complaints of palpitations and lightheadedness. One month prior to the presentation, she had a tick bite on her left anterior upper thigh while working in her yard and chopping wood. The tick was removed after about 3 hours. At the time of tick bite the patient had no fevers, arthralgias, or rashes; she did have flu-like symptoms and nausea that lasted 1 day. One month later she developed symptoms of palpitations and lightheadedness while at work.

A 12-lead electrocardiogram (ECG) was performed showing accelerated junctional rhythm with AV and ventriculoatrial dissociation and was otherwise normal (Figure 1A). The next day, her primary care physician conducted Lyme serology owing to high suspicion of Lyme disease resulting from tick bite. Lyme serology came back positive for both IgG and IgM. Her Suspicious Index in

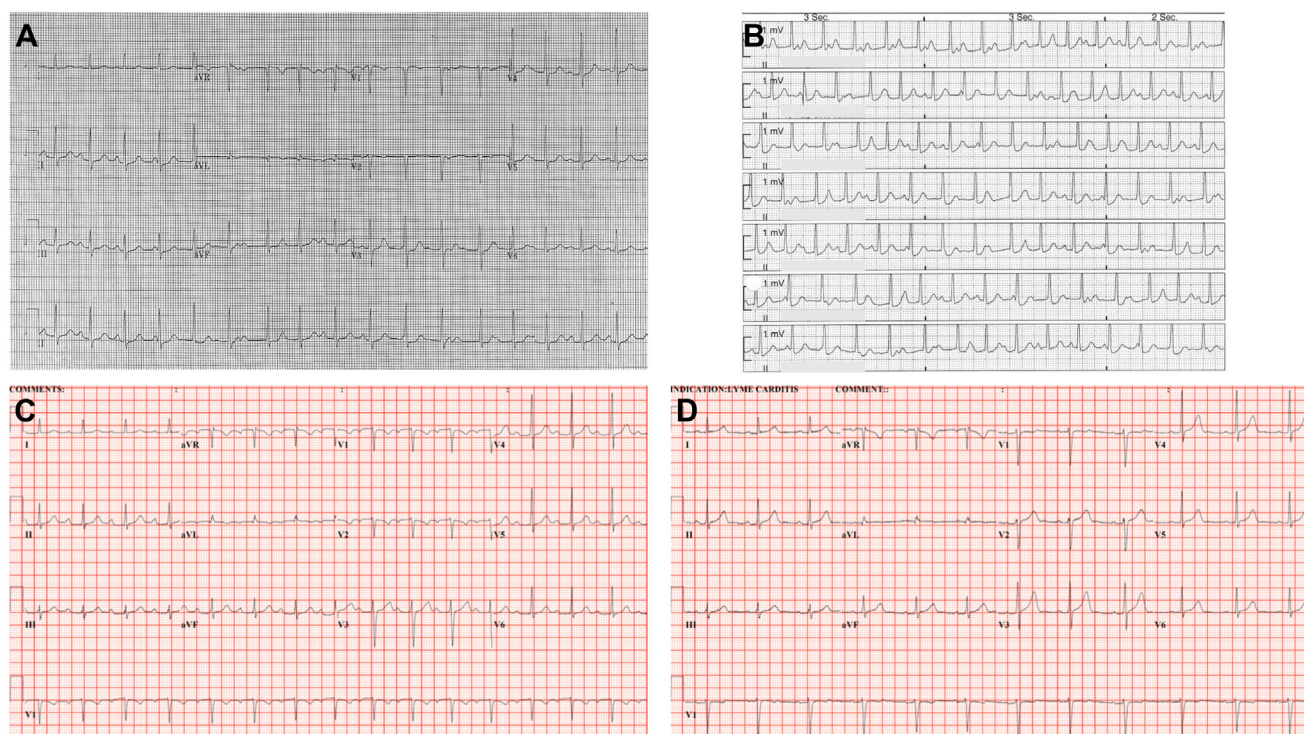


Figure 1 A: Electrocardiogram (ECG) at initial presentation showing accelerated junctional rhythm. B: Cardiac telemetry strips during hospital stay showing accelerated junctional rhythm. C: ECG on hospital admission showing PR interval prolonged to 252 ms. D: ECG 2 weeks after treatment showing normalization of the PR interval and absence of accelerated junctional rhythm.

Lyme Carditis score was 7 (3 points for tick bite, 2 points for constitutional symptoms, 1 point each for age <50 years and outdoor activity in an endemic area).³ A diagnosis of Lyme carditis was established by an electrophysiologist and she was admitted to the hospital for management of her symptoms and initiation of antibiotic therapy.

Repeat ECG showed sinus rhythm with PR prolongation (PR interval of 252 ms) along with episodes of accelerated junctional rhythm and junctional tachycardia (Figure 1B and 1C). She was started on intravenous ceftriaxone with continuous cardiac monitoring. Echocardiogram showed no abnormalities. A peripherally inserted central catheter line was placed for a 4-week course of ceftriaxone. Her PR interval normalized within 2 weeks of treatment with no junctional rhythm or AV block on serial ECGs and Holter monitors (Figure 1D). Pacing was never required. Although exercise ECG was not performed, she was evaluated in clinic a month after discharge and ECG and Holter monitor showed normal PR interval of 160 ms and no AV block. Additional follow-up over the next year showed no recurrence of symptoms or arrhythmias and no other cardiac sequelae.

Discussion

Lyme disease is a common systemic manifestation of spirochete *Borrelia burgdorferi* and transmitted to humans by Ixodes ticks. Despite its highly concentrated geographic

distribution favoring the northeastern United States, it is the most commonly reported vector-borne disease in the United States. Untreated Lyme disease can result in cardiac involvement in 1.5%–10% of adult Lyme patients. The most frequent presentation of Lyme carditis is varying degree of AV block.

Although about half of adult Lyme disease patients present with transient AV block, the range of cardiac manifestations in Lyme disease is wide and may include myocarditis, pericarditis, and degenerative valve diseases, as well as tachycardia and bradycardia.⁴ Several case reports have described Lyme carditis presenting as junctional tachycardia in the pediatric population,^{5–7} but to our knowledge this arrhythmia has not previously been reported in an adult with Lyme carditis. There is 1 case report of a 54-year-old patient with Lyme carditis and sinus node dysfunction with a junctional escape rhythm.⁸

Here, we report a case of Lyme carditis presenting as accelerated junctional rhythm in a 42-year-old woman.

Junctional ectopic tachycardia is an uncommon arrhythmia caused by either abnormal automaticity or triggered activity in the AV node or His bundle.⁹ In Lyme disease, direct spirochete invasion results in myocardial inflammation, which interferes with the AV conduction system, leading to conduction disorders.⁴ Hence, lack of prompt antibiotic treatment can lead to complete AV block and further complications. In the present case, inflammation of

the AV node may have led to abnormal automaticity in addition to slowed conduction.

In the present case, the patient was promptly started on intravenous antibiotics owing to the high suspicion of cardiac involvement in Lyme disease. The patient recovered quickly and, within 2 weeks of antibiotic treatment, accelerated junctional rhythm and PR prolongation resolved. Pacing was never required. Timely intervention with appropriate antibiotic treatment resulted in decreased duration of disease and complete recovery of a normal cardiac conduction pattern and prevented further complications.

Conclusion

Lyme carditis has a wide spectrum of presentation including AV block, myopericarditis, valvular degeneration, and heart failure. This case provides further evidence that Lyme carditis may present with accelerated junctional rhythm in adults and that Lyme disease should be considered in the differential diagnosis of patients with this uncommon arrhythmia in order to avoid delayed diagnosis and potential injury to the cardiac conduction system.

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