Lyme Carditis Presenting as Cardiac Arrest in an Older Adult: A Case Report

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Background

- Lyme carditis is an uncommon but clinically significant manifestation of early disseminated Lyme disease, caused by infection with *Borrelia burgdorferi* and transmitted by *Ixodes* ticks. The incidence of Lyme carditis among all Lyme disease cases is approximately 1.1%. The clinical spectrum of Lyme carditis is broad, but the most common and characteristic manifestation is atrioventricular (AV) conduction block, which can fluctuate rapidly and progress to high-grade or complete heart block.
- The age distribution of Lyme carditis is bimodal, with peak incidence in childhood and middle age. Epidemiologic data from the Centers for Disease Control and Prevention (CDC) show a median age of 43 years, with a strong male predominance (65%). Carditis is disproportionately more common among men aged 20–39 years, women aged 25–29 years, and persons aged 75 years or older, compared to those aged 55–59 years.
- Complete heart block is the most severe form of conduction disturbance in Lyme carditis and can be life-threatening if not promptly recognized and treated. Cardiac arrest as a presenting feature is exceedingly rare but has been documented in case reports and surveillance data.
- Clinically, Lyme carditis most commonly presents as rapidly fluctuating degrees of AV block, which can progress from first-degree to high-grade second- or third-degree heart block within hours to days. The degree of block may change rapidly, and the hallmark is the reversibility of conduction abnormalities with appropriate antibiotic therapy.
- Older adults may be at increased risk for severe presentation and persistent conduction defects due to age-related degenerative changes in the conduction system.

Case

- In August a 62-year-old man with a history only of immune thrombocytopenia was admitted after out-of-hospital cardiac arrest occurring at home with successful resuscitation. On arrival, he was found to have third-degree atrioventricular (AV) block requiring transvenous pacing for hemodynamic support.
- Temporary transvenous pacing was initiated while monitoring for neurologic recovery. Intermittent interruption of temporary pacing revealed fluctuating high degree AV block. Collateral history revealed a concern for recent Lyme infection with recent outdoor exposure and preceding malaise, although no erythema migrans. Lyme serology revealed positive IgM and negative IgG, consistent with acute Lyme disease.
- After 4 days of treatment with intravenous ceftriaxone patient had resolution of AV block with restoration of intrinsic pacing. However, he suffered an anoxic brain injury and demonstrated minimal neurologic improvement and was subsequently transitioned to comfort care by family.

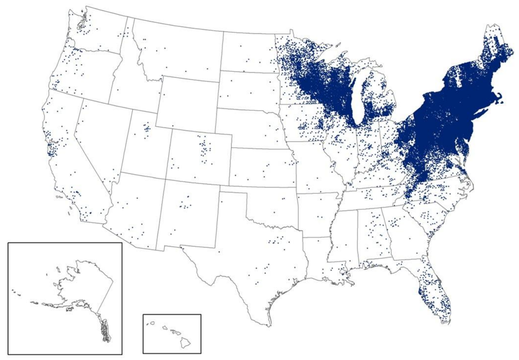

Figure 1. Map of the United States showing reported cases of Lyme disease in 2023. One dot placed in county of residence for each reported case.

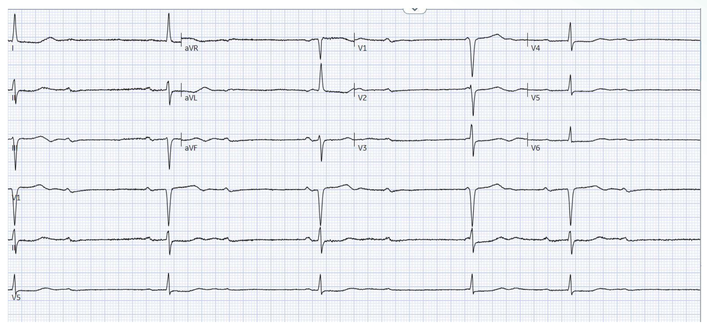

Figure 2. Patient's EKG demonstrating high degree AV block

Unique Aspects

- This patient's age is noteworthy, as most reported cases of Lyme carditis with third-degree heart block involve younger individuals. Older patients, however, face higher risks of adverse outcomes and pacing requirements.
- Cardiac arrest as an initial presentation is rare but recognized, often stemming from untreated high-degree AV block. The fatal outcome from hypoxic brain injury in this case underscores the need for rapid recognition and management of Lyme carditis to prevent irreversible complications.
- The absence of prior cardiac risk factors further distinguishes this case, as older patients with complete heart block are more likely to have underlying degenerative conduction system disease.

Recommendations

- The diagnosis of Lyme carditis is made based on presence of clinical and epidemiologic feature together with positive serologic testing. Scoring systems such as SILC (Suspicious Index in Lyme Carditis) have been proposed but not validated. Between 35-75% of patients have other symptoms with the most common being erythema migrans. However, in patients with moderate to high pretest probability of Lyme carditis serologic testing, ideally with both enzyme linked immunosorbent assay (ELISA) and Wester blot can establish the diagnosis.
- Continuous cardiac monitoring is recommended until there is improvement of conduction system to first degree AV block with a PR interval less than 300 milliseconds.
- Permanent pacemaker placement should be avoided as most cases of conduction delay resolve with appropriated antibiotic therapy. Intravenous ceftriaxone 2 g once daily is the preferred initial therapy, with a switch to oral doxycycline 100 mg twice daily once there is clear evidence of clinical improvement. The total duration of therapy should be 14–21 days.

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Correction: 2018 ACC/AHA/HRS Guideline on the Evaluation and Management of Patients With Bradycardia and Cardiac Conduction Delay (Journal of the American College of Cardiology (2019) 74(7) (e51–e156), (S073510971838985X), (10.1016/j.jacc.2018.10.044)). Journal of the American College of Cardiology. 2019;74(7). doi:10.1016/j.jacc.2019.06.048

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