What might sudden cardiac death due to Lyme disease look like?

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http://danielcameronmd.com/autopsy-study-reviews-cases-due-to-sudden-cardiac-death-from-lyme-disease/

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Fatal Lyme carditis is rarely identified. In reviewing five post mortem cases, Muehlenbach and colleagues found that Lyme disease was not suspected for one patient who complained of episodic shortness of breath, while the second patient tested negative for Lyme disease. Two other patients did not seek medical care. Details regarding the fifth patient were not released.

Ultimately, two case patients were diagnosed during unexplained-death investigations at the Centers for Disease Control and Prevention (CDC). Lyme disease was suspected in two of the other cases by cardiac pathology at a tissue bank transplant service. Muehlenbachs and colleagues reassure the readers that cardiac tissue was not transplanted. [1]

Autopsies reveal several findings

Spirochetes were present in the heart on all 5 cases. When using immunohistochemistry (IHC), spirochetes were found "within the myocardial interstitial infiltrates, in the subendocardium, and occasionally in pericardial tissue in association with lymphohistiocytic infiltrates." Muehlenbachs adds, "Rare spirochetes were seen in the leptomeninges of two cases by immunohistochemistry."

All 5 cases lived in Lyme-endemic areas. Patients resided in counties with a high or moderate incidence of Lyme disease including, New York, New Hampshire (with recent travel to Connecticut), Massachusetts and Indiana.

All 5 cases reportedly engaged in outdoor activities. "Two patients had known exposure to ticks, and one patient reported a recent bite."

None of the 5 cases met the CDC surveillance case definition for Lyme carditis. This definition includes: recurrent, brief attacks (weeks or months) of objective joint swelling in one or several joints; lymphocytic meningitis; cranial neuritis; radiculoneuropathy; encephalomyelitis; acute onset of high-grade (2nd-degree or 3rd-degree) atrioventricular conduction defects, and myocarditis.

Only 1 of the 5 cases underwent serologic screening for Lyme disease and the results were negative.

All 5 cases were symptomatic prior to their death. "A prodrome was reported for each of the patients that included the following: non-specific viral-like illness, malaise, shortness of breath, and anxiety," according to Muehlenbachs. "One of these patients also had joint and muscle pain, and the other two patients had joint pain for an unknown duration."

"No dermatologic lesion was documented or reported for any of the patients, although one patient was evaluated in an emergency department 1 month before death for an arm lesion diagnosed as a possible spider bite from which methicillin-resistant Staphylococcus aureus was isolated in culture."

"Providers should consider Lyme disease in patients who have cardiac symptoms and exposure in an endemic area." [1]

All 5 cases were seropositive post mortem according to the CDC's two-tier criteria. "One sample met both IgM and IgG Western Blot (WB) criteria, with two of the three IgM bands and 6 of the 10 IgG bands reactive. The four remaining samples were positive by IgM WB criteria only, although three were nearly IgG positive with 4 of the 10 bands reactive," states Muehlenbachs.

Underlying cardiac disease may have played a role in 3 of the 5 cases of sudden cardiac deaths associated with Lyme disease, Muehlenbachs points out, since there was significant underlying heart disease present in two patients, and an additional patient had moderate atherosclerosis, discovered at autopsy.

Physiological cardiac stress was considered a potential factor in 2 of the 5 cases. "In the other two patients, who were otherwise healthy, a degree of physiological cardiac stress likely was present: the woman had given birth 6 months previously and the man was a physically active outdoor enthusiast," according to Muehlenbachs.

These pathologic findings provide insight into the possible cause behind sudden cardiac deaths associated with Lyme disease. "The findings support the proposed disease mechanism of spirochete cardiac tropism during early disease dissemination, the infiltration of cardiac tissue by inflammatory cells, and involvement of the conduction system, which likely mediates sudden cardiac death." [1]

Is early diagnosis and prompt treatment possible?

"Early diagnosis and prompt treatment for Lyme carditis can be life-saving," according to Muehlenbachs. "Health care professionals should evaluate all patients with suspected Lyme disease for cardiac signs and symptoms, and obtain an electrocardiogram promptly if carditis is suspected." Furthermore, "diagnosis is based on clinical suspicion and serologic testing, with the caveat that serology testing may be falsely negative in a patient with recent illness onset." [1]

Fishe and colleagues describe how early diagnosis and treatment helped save the life of a 15-year-old African-American girl with Lyme carditis. [2] The patient was hospitalized after a 3-day history of intermittent retrosternal and epigastric pain. After treatment was initiated, she developed a heart block. Tests for Lyme disease were positive and she was diagnosed with Lyme disease-associated myocarditis.

The adolescent was empirically started on doxycycline and was concurrently treated with milrinone infusion for afterload reduction and intravenous furosemide for pulmonary edema. Her EKG changed to first-degree heart block by day 2 and resolved completely on hospital day 3.

She recovered and was discharged home on hospital day 7 on oral furosemide, enalapril, and doxycycline, according to Fishe and colleagues.

However, another adolescent was not so fortunate. He died suddenly from undiagnosed Lyme carditis, following complaints of flu-like symptoms. The case is discussed in another All Things Lyme blog, Relying on a Negative Lyme Disease Test Can Prove Deadly.

“In patients with Lyme disease who complain of cardiopulmonary symptoms, clinicians should have a low threshold for obtaining an EKG to evaluate for Lyme carditis,” Fishe points out. Furthermore, clinicians should take note that in “children and adolescents, respiratory and gastrointestinal complaints, *with or without chest pain*, are the most frequent presenting symptoms.”

References:

1. Muehlenbachs A, Bollweg BC, Schulz TJ *et al.* Cardiac Tropism of Borrelia burgdorferi: An Autopsy Study of Sudden Cardiac Death Associated with Lyme Carditis. *Am J Pathol*, (2016).
2. Fishe JN, Marchese RF, Callahan JM. Lyme Myocarditis Presenting as Chest Pain in an Adolescent Girl. *Pediatr Emerg Care*, (2016).

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