

## Infection-Mediated Heart Disease - Case of Lyme Carditis

**Alain L Fymat\***

*International Institute of Medicine and Science, California, USA*

**\*Corresponding Author:** Alain L Fymat, International Institute of Medicine and Science, California, USA.

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This study is concerned with Lyme carditis, an uncommon acute manifestation of early-disseminated Lyme disease. I will outline its signs and symptoms, confounding factors and conditions, and its cause and treatment. I will also set forth the three cardinal rules and key points for healthcare providers.

*Borrelia burgdorferi sensu lato* is the causal agent of Lyme, a progressive infectious disease that may involve several organs (skin, heart, joint, and central nervous system). In particular, in the heart, it can interfere with the innate regulating conduction electrical signals and result in a “heart block” that can be mild, moderate, or severe, progressing possibly rapidly. It can present itself in various other rarer forms such as endocarditis, myocarditis, myopericarditis, pericarditis, and valvular heart disease. Caught early, the disease is treatable with no deleterious damage. Otherwise, the associated tissue damage may cause lingering heart problems. It is important to note that not all heart patients having been exposed to, or infected with Lyme agents will develop Lyme carditis. Conversely, not all Lyme carditis patients necessarily had prior unsuspected cardiac problems.

Early signs of Lyme carditis may not be diagnosed and quickly dismissed as other symptoms of a preexisting heart condition (high blood pressure, angina, palpitations, etc.), especially if heart conditions are common among the individuals seen. However, vigilance is required on the part of the attending health care providers to investigate any new symptoms, particularly if the person may have travelled to known Lyme areas or be infected directly or indirectly by Lyme agents. In addition to the usual symptoms of heart disease, Lyme symptoms may include a variety of others, including chest pain, dizziness, dyspnea, faintness, heart palpitations, light-headedness, myalgia, shortness of breath, syncope, and throbbing in the neck. They may also include the Lyme’s signature “bull’s eye” or *erythema migrans* rash. These several symptoms may vary from person to person.

It is important to recognize the three “early” factors of Lyme carditis that are essential to reach an early diagnosis and achieve a favorable prognosis, namely, “early recognition” by an atrioventricular block occurring as early as three days after a tick bite, “early consideration” in patients with atrioventricular block, especially those living in an endemic area, and “early treatment” with appropriate antibiotics.

An electrocardiogram is the diagnostic test usually performed to assess the electrical signaling within the heart and the regulation of its rate. It may evidence dysfunctions in the cooperative functions of the atrioventricular chambers. Such dysfunctions may vary from person to person. In addition, lupus symptoms may further compound the task. Electrophysiologists are best educated and trained for this task.

Early treatment consists of a 2 - 4 week course of an antibiotic such as doxycycline or ceftriaxone. With this regimen, most symptoms are usually gone within 1 - 6 weeks. However, late treatment or more serious cases may require hospitalization with specialized interventions (intravenous antibiotics, placement of a temporary pacemaker at least until the infection would have been cleared and the heart function restored to its previous “normal” condition, etc.). Unfortunately, particularly for individuals with preexisting heart conditions, some fatal cases (small in number) do occur when Lyme carditis was not recognized and left untreated. However, with trained and skillful

medical personnel, it is possible to prevent such fatal conclusions. One cannot over-emphasize the importance of the three early factors (recognition, consideration, and treatment).

There are three key points for health care providers in their initial examinations of patients: identifying suspected Lyme carditis individuals who may present heart problems, identifying heart patients who may have been exposed to or infected by tick bites, and promptly treating them even before any confirming laboratory tests.

In summary, Lyme carditis, is an uncommon acute manifestation of early-disseminated Lyme disease. Its causal agent is *Borrelia burgdorferi sensu lato*. It is a progressive infectious disease that may involve several organs and result in a heart block. Health care providers should be vigilant and not quickly dismiss it as a manifestation of an existing heart condition. There are three early factors that deserve serious consideration and application (early recognition, early consideration, and early treatment). Electrophysiologists are better educated and trained in interpreting the prescribed electrocardiograms. Early treatment consists of a 2 - 4 week course of an antibiotic such as doxycycline or ceftriaxone during which or at the end of which most symptoms are usually gone. Key points for health care providers are to identify suspected Lyme carditis patients and treat them early even prior to laboratory confirmation and advise heart patients of the several circumstances under which they could be infected with Lyme.

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