

## A Classic Presentation of Lyme Complete Heart Block

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### Abstract

Lyme Borreliosis is a systemic disease caused by the spirochete *Borrelia Burgdorferi* and usually presents as early, localized and disseminated, as well as persistent or chronic disorder. If untreated with antibiotics, more than half the patients develop further complication. The least well developed complication is carditis. It has been estimated that 4-10% of untreated patients develop carditis complications.

Here we present a classic case of Lyme carditis, who had concomitant complete heart block and erythema chronicum migrans, as only 44% of patients with complete heart block were identified to have Erythema Migrans simultaneously.

### Case Report

A 28 year old man was brought to the Emergency room because of sudden loss of consciousness in August, 2015. Patient denied any symptoms of systemic illness, no chest pain, shortness of breath, palpitation, nausea, vomiting, diarrhea, abdominal pain. No history of headache/seizure disorder noted. He had past medical history of alcohol abuse, but he stopped using alcohol several years back. He denied any illicit drug use history.

Patient is single, not currently sexually active; he lives in New Jersey and three weeks back patient visited his parents in Connecticut.

His general and physical examination were unremarkable except fever and rash. On examination, we found he had a fever of 101°F. A targetoid erythematous skin rash (Highest diameter 15 cm) with central clearing was found on the upper back, which seemed fading by the time patient presented in ER.

Except for a leukocytosis (White blood cell count was 12), the hematologic values and electrolytes were normal. EKG showed dissociative AV rhythm – third degree heart block, no ST changes. A CXR was normal. A CT scan of head was also normal.

The patient was admitted to the Coronary Care Unit and a transvenous temporary pacemaker was inserted the same day. For Early Disseminated Lyme Disease, as a presumptive cause of complete heart block, Ceftriaxone 2 gram intravenously daily was started and a transvenous pacemaker was temporally placed. The diagnosis of early Lyme disease was subsequently confirmed by positive ELISA and Western blot. Heart rate picked up, rhythm first converted to Mobitz type 2 second degree heart block and then to first degree heart block. On day 6, when heart rhythm was first degree heart block, and the patient was symptom free, the transvenous pacemaker was turned off and removed. The patient was discharged home with a plan to administer Intravenous Ceftriaxone for a total duration of 2 to 3 weeks of IV Rocephin.

### Discussion

Cardiac complications of Lyme disease generally occur in the early phase (Stage II) [1] and include conduction system disturbances, myopericarditis and congestive heart failure. Valvular involvement is not a characteristic of Lyme disease. Lyme carditis (stage II) presents after typical organotropic *Borrelia burgdorferi* disseminates hematogenously and preferentially to specific organ systems, which is weeks after the most common presentation of Lyme disease, skin rash, Erythema Chronicum Migrans (Figure 1) [1].



**Figure 1:** Erythema Chronicum Migrans on lower arm as an early manifestation of Lyme disease – Erythematous ring expanding peripherally.

Thus we see only 44 % of patients with third degree heart block presents with ECM [2]. It is not impossible that the number of cases reported underestimates the true number of patients with third-degree heart block from Lyme disease.

Infectious or immune – mediated pathogenesis is suspected in many patients suffering from Lyme DCM. It is obvious that the presence of spirochetes in the myocardium is intrinsic to the pathophysiology of cardiac organ damage, by causing the inflammatory reaction induced by the spirochete infection, besides a direct destructive effect of the spirochetes.

Taking into account the guidelines of the European Federation of Neurological Societies on the diagnosis and management of Lyme neuroborreliosis, today Ceftriaxone (alternative: cefotaxime), administered over a period of two weeks, has become the standard antibiotic for the treatment of acute Lyme carditis [3]. Other recommendations include either oral or parenteral antibiotic therapy for 14 days (range, 14-21 days) (Table 1) [4].

Indication	Treatment	Duration, days (range)
Tick bite in the United States	Doxycycline, 200 mg in a single dose; (4 mg/kg in children ≥ 8 years of age) and/or observation	....
Erythema migrans	Oral regimen	14 (14-21)
Early neurologic disease		
Meningitis or radiculopathy	Parenteral regimen	14(10-28)
Cranial nerve palsy	Oral regimen	14 (14-21)
Cardiac disease	Oral regimen or parenteral regimen	14 (14-21)
Borrelial lymphocytoma	Oral regimen	14 (14-21)
Late disease		
Arthritis without neurologic disease	Oral regimen	28
Recurrent arthritis after oral regimen	Oral regimen	28
	Or parenteral regimen	14 (14-28)
Antibiotic-refractory arthritis	Symptomatic therapy	.....
Central or peripheral nervous system disease	Parenteral regimen	14 (14-28)
Acrodermatitis chronica atrophicans	Oral regimen	21 (14-28)

Post-Lyme syndrome	Consider and evaluate other potential causes of symptoms; if none is found, then administer symptomatic therapy	.....
<b>Note:</b> Regardless of the clinical manifestation of Lyme disease, complete response to treatment may be delayed beyond the treatment duration. Relapse may occur with any of these regimens; patients with objective signs of relapse may need a second course of treatment.		

**Table 1:** Recommended therapy for patients with Lyme disease [4].

Although studies showed equal effectiveness of oral doxycycline and intravenous ceftriaxone in the treatment of acute disseminated Lyme disease, which included Lyme heart block patients, it has not been widely practiced and proven in various clinical settings yet [5].

In contrast, antibiotic treatment of a long – standing dilated cardiomyopathy based on the assumption of a past Borrelia infection cannot be recommended because of the inconsistency of the presently available data [1].

Management of Lyme disease is still evolving. Duration of antibiotics and the route of administration in different clinical settings of Lyme carditis need to be determined. Only very few studies have been conducted to determine the appropriateness and effectiveness of antibiotics in Acute Dilated Cardioomyopathy and Conduction disorder. No conclusive studies or data on Chronic Dilated Cardioomyopathy cases are reported so far, nor has the need to use steroid in Cardiac Lyme disease been assessed adequately. Also actual Lyme carditis mortality and prevalences may be higher than assumed or documented [1].

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