



Lyme Carditis: From a Third Degree Heart Block to a Complete Remission

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ABSTRACT

Cardiac evidence of Lyme disease are relatively infrequent, occurring within weeks after the infectious tick bite (median of 21 days), and resulting at this stage from a direct borrelial infection of the myocardium, as indicated by reports of spirochete isolation from pericardium and myocardium. Lyme carditis typically presents with a fluctuating degree of atrioventricular block that spontaneously resolves in several days. The management of Lyme carditis does not differ from the treatment of Lyme disease without carditis.

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Introduction:

When not treated in its initial phase, up to 10% of patients with Lyme disease may suffer from heart disease. The severity of this attack and its clinical repercussions are variable, ranging from minor and asymptomatic conduction disorders to cases of potentially fatal arrhythmias or severe heart failure. An anamnesis of tick bite or a previous skin lesion (erythema migrans) may be lacking, which is why clinicians should keep a low suspicion when confronted with a patient potentially exposed to borreliosis with compatible cardiac disorders. We describe the case of a patient with

Lyme carditis showing a varying degree of atrioventricular block and we present a literature review on the subject.

Observation:

A 36-year-old woman, with no medical history, shows up at the emergency room of our hospital for palpitations accompanied by chest discomfort; without notion of loss of consciousness. The physical examination, mainly cardiovascular, has nothing in particular; the heart rate is normal and regular.

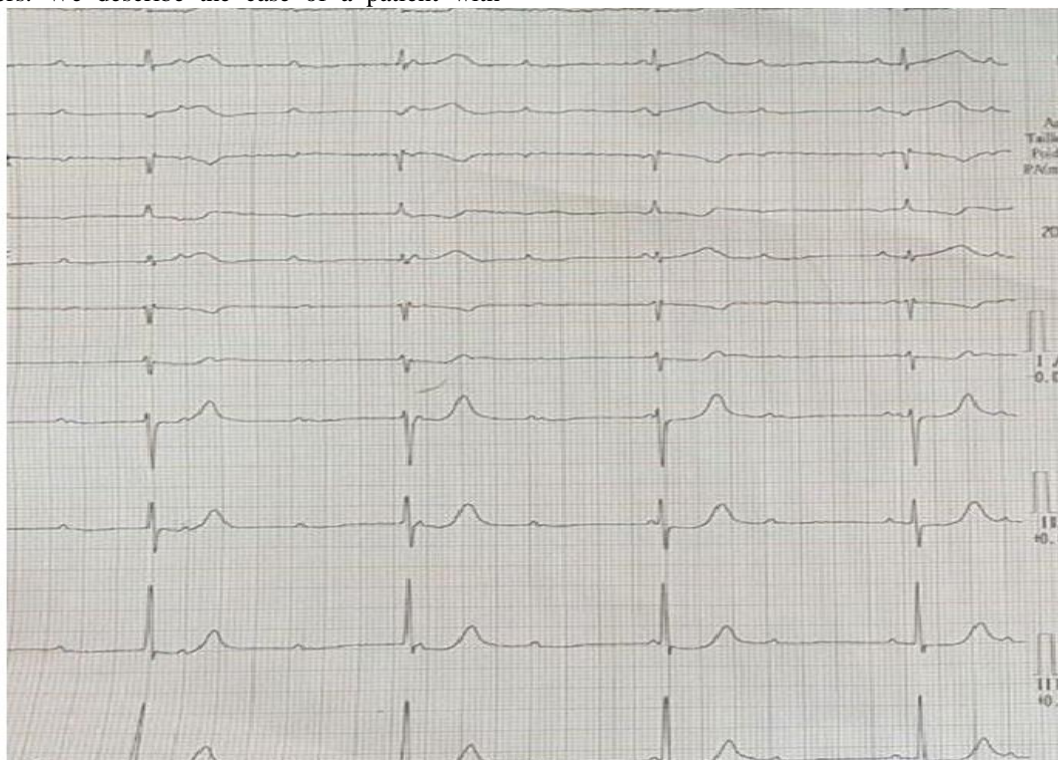


Fig 1. Complete atrioventricular block (AVB) Discussion.

Two ECGs recorded at 30-minute intervals show a complete atrioventricular block (AVB) (Figure 1) alternating with a second-degree type II B (Wenkebach); cardiac enzymes as well as the electrolyte balance including electrolytes are normal, as is echocardiography. A Holter then confirms conduction disturbances of varying degrees with a first-degree AVB alternating with a second-degree type II AVB.

After a careful anamnesis, the patient reported an insect bite six months previously, followed by a pustule at the site of the bite that disappeared in the following weeks, without associated joint problems.

The IgG antibodies for *Borrelia burgdorferi* then performed are positive, leading to the probable diagnosis of Lyme disease (ML) with cardiac disorder (Lyme carditis).

The intravenous administration of ceftriaxone 2 g d-1 intravenously allowed a dramatic evolution: conduction disturbances retroceded within 7 days with reoccurrence of normal atrioventricular conduction (Fig.2). The search for neurological disorder was negative (CSF serology and CSF culture), the 2-week serology test remained strongly positive (index = 5.39), whereas the control performed 2 months later showed a clear decrease in total Ig (index = 2.11). It is therefore a patient who developed an exceptional cause of infectious AVB Lyme disease successfully treated with ceftriaxone 2 g d-1 for 21 days.

Discussion:

Cardiac disorder of Lyme disease is exceptional (0.3 to 4% of patients in Europe) [1]; they occur several weeks to several months after inoculation of the bacterium and they are revealed mainly by fluctuating degrees of complete AVB in 50% of cases and they are requiring the establishment of a temporary pacemaker in more than a third of cases [2]; other heart attacks may develop but they are much rarer: myocarditis, pericarditis, acute pancarditis, congestive heart failure, cardiomyopathy, arrhythmias [2]. In this context, the differential diagnosis is essential in order to eliminate other possible etiologies, infectious or not [4].

Patho physiologically, when performed, myocardial biopsies show interstitial infiltrates of lymphocytes and macrophages possibly associated with myocyte necrosis; the presence of spirochaetes has also been demonstrated from these biopsies [1,2,4].

The biological diagnosis of *B. burgdorferi* sensu lato infections is essentially serological [5,6] and in this context, the Enzyme Linked Immunosorbent Assay (ELISA) tends to supplant the indirect immunofluorescence. The interpretation of these serologies is delicate and requires considering several facts:

- possibility of cross-reactions [5], particularly with other infectious agents such as *Treponema pallidum*;
- serologies may remain negative in case of early antibiotic therapy or the presence of circulating immune complexes;
- the kinetics of appearance of the antibodies is slow, the IgG are detectable after 3 months on average and only 50% of the patients develop IgM within 1 to 3 weeks, hence it is obligatory to perform a 2nd serology 3 to 4 weeks later in case of first negative serology;
- the antibody response varies according to the clinical form: low in erythema migrans (positive serology in only 50 to 70% of patients), intermediate in meningo-radiculitis and strong in arthritis (positive serology in more than 99% of cases);
- there is high seroprevalence in endemic areas;

- an acute infection is difficult to affirm biologically because IgG persist for years even after healing and IgM can take more than a year to disappear after treatment.
- Although there is generally a significant decrease in total Ig levels in 3 to 6 months after antibiotic therapy, the monitoring of antibody levels in the evaluation of the response to treatment is of little interest.

Since these quantitative techniques are sometimes difficult to interpret, Western-Blot is used as a confirmation method for positive or doubtful serologies; it then makes it possible to study the specificity of the antibodies found. The major problem of the Western-Blot resides in the determination of its criteria of positivity: nature, number and intensity of the bands retained; the biological diagnosis of Lyme disease requires a rigorous interpretation to correlate with the clinic and the monitoring of antibody kinetics is essential to determine the moment of infection.

Treatment:

The choice of antibiotic agent, its application and duration of treatment depend on the stage and severity of the disease.

Doxycycline, amoxicillin, cefuroxime (oral) and ceftriaxone (parenteral route) are the preferred agents, while macrolides are an alternative through oral application in case of contraindications to the aforementioned agents, the same thing for cefotaxime and penicillin G through parenteral application.

Although it has not been shown that antibiotic therapy influences the course and prognosis in cardiac disorder of ML, which is usually self-limited, antibiotic treatment is recommended, particularly to prevent the subsequent extra cardiac manifestations of ML.

In Lyme's carditis, an oral antibiotic treatment of 14 to 21 days is recommended in case of benign problem. For more severe cases requiring hospitalization, initial intravenous treatment is recommended, with the possibility of relaying it by oral treatment once the severity criteria have been corrected, for a total duration of 21 to 28 days.

Hospitalization and rhythmic monitoring should be considered according to the symptomatology of the patient, but especially according to the severity of the cardiac disorder observed. Such measures are recommended for patients with first-degree BAV when the PR interval is greater than 300 ms and for patients with a higher degree block. Usually, if adequate antibiotic therapy is initiated early, conduction disturbances disappear within 7 to 10 days [8, 9]; a temporary pacemaker is sometimes required to manage conditions of deep bradycardia [8,9]. Persistent atrioventricular blocks, despite appropriate treatment, are described but remain exceptional [4, 8, 9].

Conclusion:

The possibility of cardiac disorder in ML should be known by endemic clinicians for this disease. This diagnosis should be mentioned in the case of an evocative chart, especially against an atrioventricular conduction block in a young patient without underlying heart disease. Serology and ECG are the diagnostic methods chosen, and antibiotic therapy for two to three weeks is the recommended treatment.

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