
Lyme Carditis AVB III° Resolved Under Antibiotic Treatment

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Abstract

Introduction: Most patients with AV Block III° require a permanent pacemaker. Rarely, AVB III° is reversible.

Case Report: We report the case of a 67-years-old patient with AVB III° and positive borellia serology. He was treated with a third-generation cephalosporin. There was a resolution of AV Block III° to AV Block I°.

Conclusion: Lyme carditis is rare. However, it is a reversible cause of AV Block and should be considered in case of a specific patient history to avoid unnecessary pacemaker implantation.

Keywords: Lyme carditis; AV block III°; Reversible AV block

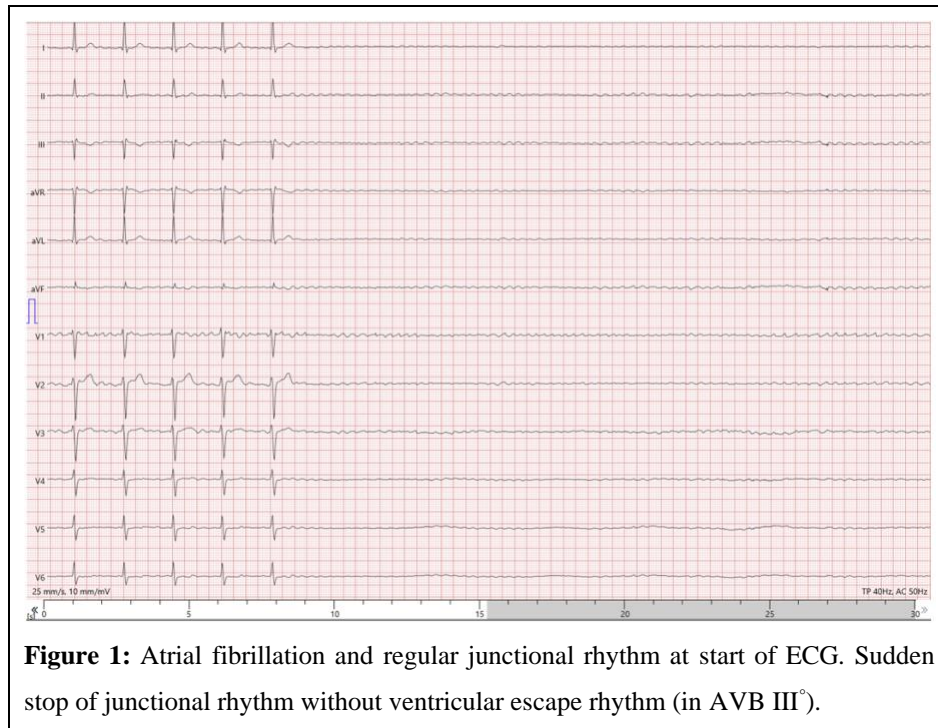
Introduction

Ticks are parasitic arachnids and transmit different kinds of infectious diseases, such as Lyme borreliosis caused by the gram-negative spirochete bacterium borellia burgdorferi. Lyme disease is a medical chameleon, causing different symptoms at different stages: The first stage is a localized infection and occurs days until weeks after tick bite, presenting with erythema migrans and sometimes unspecific flue like symptoms, i.e., head and muscle ache; the second stage is a disseminated infection occurring after weeks until months and can involve heart and the nervous system; the third stage occurs after months until years, eventually causing Lyme arthritis and actodermatitis chronica atrophicans [1]. Lyme carditis is a rare complication of Lyme disease and occurs in 4-10% of cases [2]. It often affects the cardiac electrical conduction system, causing atrioventricular block (AVB) or other arrhythmias, e.g., atrial fibrillation, and can lead to myocarditis and pericarditis, dilated cardiomyopathy and heart failure [3].

Case Presentation

A 67-years-old patient was admitted to a referring hospital with recurrent presynopes. Medical history revealed a severe aortic stenosis, which was asymptomatic so far. The ECG showed atrial fibrillation and intermittent complete AVB ≥ 10 seconds. External pacing was established, and the patient was transferred to our center by air ambulance.

The ECG on admission to the emergency room showed atrial fibrillation with junctional rhythm (regular QRS, 74bpm) and repetitive complete asystole due to complete AVB (Figure 1). Laboratory findings showed normal leukocyte count but slightly elevated C-reactive protein levels (62mg/l). Troponin was minimally elevated (19ng/l). Echocardiography showed the known severely stenotic bicuspid aortic valve.

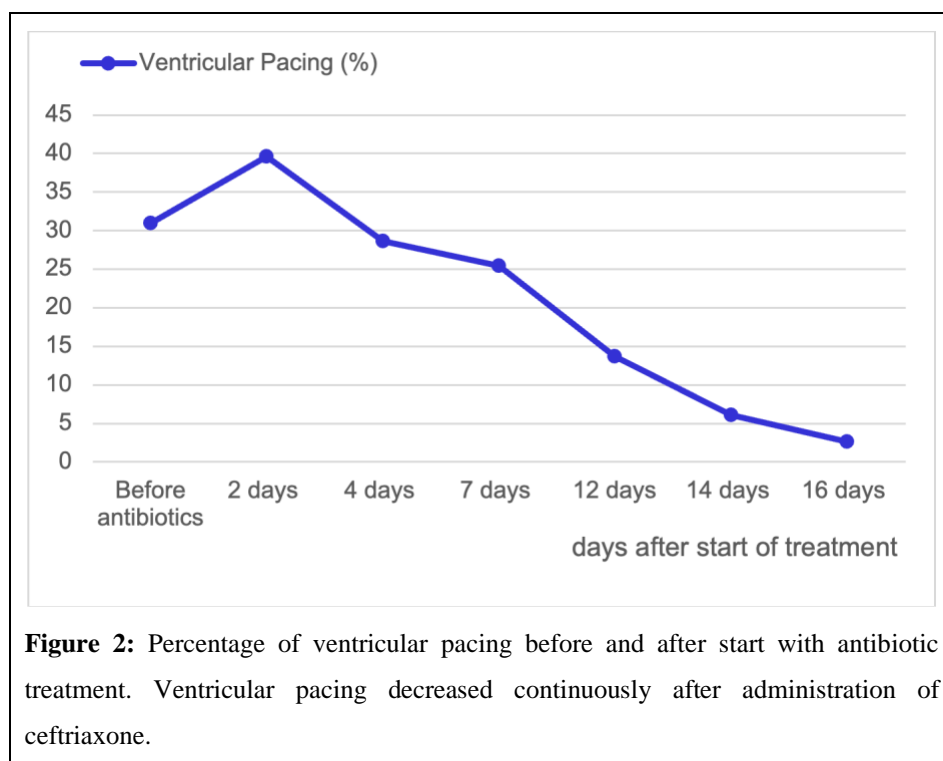


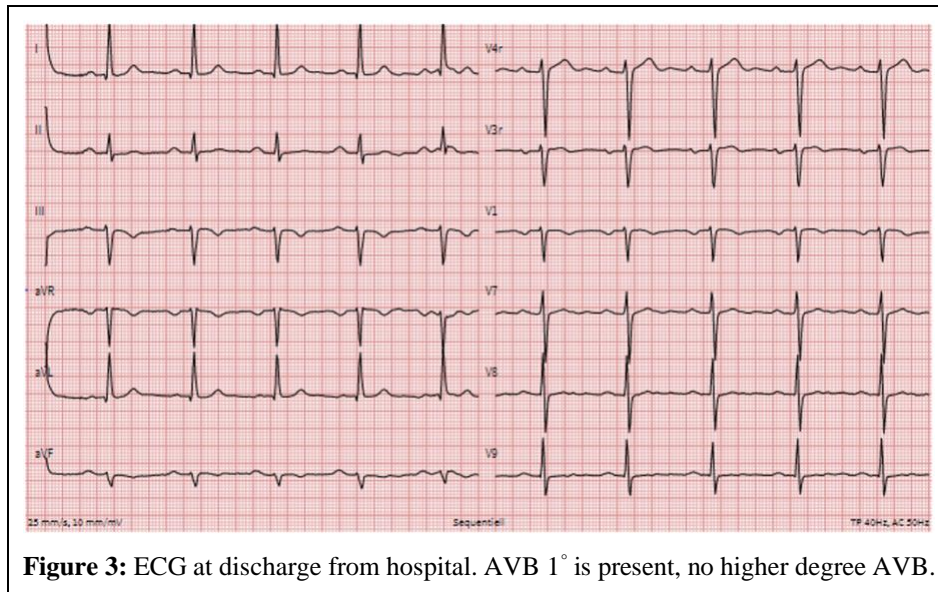
Because a temporary pacemaker inserted via femoral access failed to show a reliable function, a screwed-in temporary VVI-pacemaker was inserted the following day. We implanted a tendril lead (Tendril STS 2088TC 58cm, SJM, St. Paul, Minnesota, USA) via right internal jugular vein, whereby the aggregate was mounted outside the skin under sterile conditions [4]. Patient history revealed no recent history of erythema migrans. Because the patient reported to volunteer on the farm of his son and was a resident of an area endemic for ticks, we tested for *Borellia burgdorferi*. *Borellia burgdorferi* IgM and IgG were both positive. Therapy with ceftriaxone was started after detection of positive antibodies, i.e., three days after detection of AVB III°. In the following days, the rate of ventricular pacing constantly decreased (Table 1, Figure 2). Fifteen days after start with ceftriaxone, an electrical cardioversion was performed after transesophageal echocardiography to exclude intracardiac thrombi, and the atrial fibrillation was converted into sinus rhythm with AV Block I°. On the same day, an exercise stress test was performed, where the heart rate rose up to 169 bpm (110% of predicted value) with an atrioventricular conduction rate of 1:1. Despite a ventricular pacing rate of still 2.6% (probably due to postextrasystolic pauses and sinus bradycardia), the excellent AV conduction in ergometry allowed removing the external pacemaker. In the following days, no higher degree AV block was detected on telemetry. After discussion with the patient, an implantable loop recorder was implanted for early detection of higher degree AV conduction abnormalities and connected to home monitoring. ECG at discharge from the hospital showed sinus rhythm with AVB I° with a PQ time 240ms (Figure 3). Ceftriaxon was administered iv for 4 weeks, the last two weeks in an outpatient setting. 2 months after start with antibiotics no recurrence of a higher degree AV Block and no recurrence of atrial fibrillation were detected.

Table 1: Percentage of ventricular pacing before and after start with antibiotics, concurrent programming of temporary pacemaker and underlying rhythm.

	Ventricular Pacing (%)	Pacemaker Programming VVI x/min	Rhythm
Before treatment with Ceftriaxon	31	60	AF
2 days after start of treatment	39.6	50	AF
4 days after start of treatment	28.6	40	AF
7 days after start of treatment	25.4	40	AF
12 days after start of treatment	13.7	40	AF
14 days after start of treatment	6.1	40	AF
16 days after start of treatment	2.6	40	SR

AF: Atrial fibrillation, **SR:** Sinus rhythm.





Discussion

We report a case of a Lyme AV Block in a patient without a typical history of recent erythema migrans. It was successfully treated with third generation cephalosporine. The patient is without higher AV Block recurrence ever since.

Lyme AV block is a rare condition. In patients with clinical suspicion, ESC Guidelines recommend to take serology for borreliosis [5]. The Suspicious Index in Lyme carditis (SILC) scored our patient with 2 points (outdoor activity in endemic area and male sex) and classified him in the low-risk category and in the treatment, algorithm guided by SILC Score, standard treatment for high-degree AVB was suggested [6,7]. In the present case, patient history of physical activity in an area endemic for ticks lead us to take serology for borrelia burgdorferi. We only started antibiotic treatment after positive serology results, three days after diagnosis of AVB III°, because the clinical hints for Lyme AVB were not strong. This late start, together with the complete AVB III°, may have been the reason why the healing of the conduction system (until AVB 1°) lasted for 2 weeks. In a review of 45 patients with Lyme AVB III°, the resolution to AVB I° or normal conduction took a median time of only 6 days (range 1-42 days) [8].

We decided for a total iv antibiotic administration with ceftriaxone for 4 weeks, the last applications were given by the general practitioner in an ambulatory setting. In serious presentation with AVB III° iv ceftriaxone (2g daily) should be administered for 10-14 days (or up to 28 days) and afterwards oral doxycycline (100mg twice daily), amoxicillin (500mg 3 times daily) or cefuroxime axetil (500mg twice daily) for total antibiotic course of 14-21 days should be given [9]. Other literature recommend longer treatment [7]. Because the iv antibiotics were well tolerated, had an excellent effect and could be administered in ambulatory setting, we decided to administer ceftriaxone for the entire treatment course.

The ECG at admission showed atrial fibrillation with a junctional rhythm alternating with a AVB III°. Generally, if there is a sufficient junctional rhythm no pacemaker is required unless there is a chronotropic incompetence. In this case however, junctional rhythm was only intermittent. We assume that the inflammation of the tissue around the AV node must have created a similar situation as found during an ablation of AV-node-reentrant-tachycardia. In this condition, ablation close to the AV node/AV nodal zone usually causes enhanced automaticity resulting in junctional rhythm [10].

Severe aortic stenosis is another frequent reason for recurrent presyncope. However, after the resolution of the AVB III°, symptoms ceased, and the patient was asymptomatic.

Atrial fibrillation was not previously described. It might be a result of hypertrophic ventricle caused by severe aortic stenosis. On the other hand, it might be associated to Lyme carditis as well. The further observation by loop recorder monitoring will give more information. If sinus rhythm will be persistent, oral anticoagulation may be reevaluated.

Conclusions

Lyme AVB III° is a rare condition. AV conduction can resolve under antibiotic treatment.

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