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## Multiple cardiac arrests due to Lyme carditis — 4-year follow-up

### Dear Editor,

Four years ago, we reported the case of a patient who required the implantation of a permanent pacemaker following multiple episodes of cardiac arrest due to a complete atrioventricular (A-V) block secondary to Lyme disease [1]. The patient presented with a severe manifestation of the disease, and the conduction disturbances persisted despite a 10-day course of antibiotic therapy. Therefore, according to the guidelines, the decision to implant a pacemaker was made [2].

At the three-month follow-up post-implantation, we questioned the necessity of the pacemaker implantation as there was no evidence of ventricular pacing. At the one-year follow-up, however, ventricular pacing reappeared. The patient's follow-up now extends to four years (Tab. 1). Over this period, we have observed a progressive increase in the percentage of ventricular pacing, despite promoting intrinsic rhythm by prolongation of paced A-V delay to 250ms. Additionally, the patient became pace-dependent - failing to generate an intrinsic escape rhythm. An echocardiogram performed during follow-up visits, also at the four-year follow-up revealed asynchronous septal contraction and mild left ventricular hypertrophy, with normal LVEF and no other significant pathologies.

In the literature, there are single reports regarding the follow-up of patients up to a year, with a maximum period extended to 44 months in one patient [2, 3]. In these cases, if the A-V block resolved completely during hospitalization, there was no need for pacemaker implantation, and no conduction disturbances were observed during follow-up. While most cases of third-degree A-V block resolve, there are few reports of persistent conduction disturbances following the completion of antibiotic therapy [4–6]. Notably, the patients in these reports did not exhibit temporary improvements in A-V conduction as observed in our patient. The literature does not provide substantial evidence to suggest a direct correlation between Lyme carditis diagnosed four years prior and the patient's current condition.

Some authors propose the existence of a chronic Lyme disease entity characterized by persistent inflammation leading to fibrosis of the cardiac conducting system [5]. Most researchers, however, do not confirm this hypothesis [7].

Additionally, reinfection can occur among patients successfully treated for early stages of Lyme disease (e.g., erythema migrans), but it has not been well-documented in cases following late manifestations such as Lyme carditis [8].

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**Table 1.** Atrial (A) and ventricular (V) pacing percentage during pacemaker control

Time of the pacemaker control	Atrial (A) and ventricular (V) pacing percentage (%)
Discharge from hospital	A 7, V 100
One month follow-up	A 15, V 13
Three-month follow-up	A 16, V 0
One-year follow-up	A 20, V 4
Two-year follow-up	A27, V 23
Three-year follow-up	A 33, V 47
Four-year follow-up	A47, V 60

An alternative explanation for the patient's condition could involve the presence of previous non-symptomatic lower-grade disturbances in A-V conduction which evolve after Lyme carditis [6]. In this context, Lyme disease may have acted as a trigger for the development of the underlying condition or merely coincided with its manifestation.

Furthermore, the possibility of coincidence cannot be excluded as the patient may have developed conduction disturbances independently of Lyme carditis.

A biopsy and cardiac MRI (ang. magnetic resonance imaging) would likely be necessary to approach a definitive diagnosis. However, given that these tests would not alter the therapeutic management, they were not pursued in this patient.

## Article information

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