



Temporary-Permanent Pacing in Lyme Carditis

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Abstract

Most high degree atrioventricular block due to Lyme carditis will resolve with appropriate antibiotic therapy over the course of days to weeks. Lyme carditis patients with atrioventricular block require continuous cardiac monitoring. For patients with Lyme carditis with symptomatic heart block, temporary-permanent pacing is the preferred strategy for ventricular pacing support due to better lead stability allowing earlier patient mobilization.

Keywords

Lyme disease • Lyme carditis • Atrioventricular block • Heart block • Temporary-permanent pacing • Pacemaker

1 Introduction

Lyme carditis (LC) is a rare complication of the *Borrelia burgdorferi* infection affecting approximately 10% of reported cases [1]. Patients may often first present with other features of Lyme disease such as cutaneous, neurologic, and joint manifestations. It is important to consider LC in young patients who present with severe conduction abnormalities, especially if they live in a Lyme-endemic region [2, 3]. Though it can be difficult to diagnose high-degree atrioventricular block (AVB)

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associated with LC, the Suspiciousness Index in Lyme Carditis (SILC) score identifies key risk factors through patient history and physical exam [4]. Since most patients with LC present with high-degree AVB, it is important to recognize this reversible cause to prevent unnecessary permanent pacemaker implantation. Reversal of AVB can occur days to weeks after initiation of appropriate antibiotic therapy [5–7]. Some patients with symptomatic bradycardia may require temporary pacing for hemodynamic support. Traditional temporary transvenous pacemakers require patients to be bed bound, leading to potential deconditioning, and associated increased complications and costs. This chapter discusses the use of temporary-permanent pacemakers (TPPM) for symptomatic bradycardia in patients with LC.

2 Clinical Course of Atrioventricular Block Due to Lyme Carditis

Lyme carditis is usually an early manifestation of Lyme disease but can occur anywhere from < 1 to 28 weeks after initial infection [8]. The most common presentation of Lyme carditis is high-degree AV block, accounting for approximately 90% of cases. Up to one third of patients with AV block due to Lyme carditis may require temporary pacing [9–11]. Other manifestations can include sinus node disease, supraventricular tachycardia, bundle branch block, ventricular tachycardia, myocarditis, pericarditis, endocarditis, as well as valvular disease and cardiogenic shock [8]. The manifestations of early disseminated Lyme carditis are described in detail in Chap. 6.

Most patients with appropriately treated LC have complete recovery within the first few days of antibiotic initiation. High-degree AVB typically resolves within the first 7–10 days but can range from 3 to 42 days [8]. The current recommended approach for patients diagnosed with Lyme carditis and high-degree AVB is to initiate antibiotics as early as possible (sometimes based on a high SILC score while awaiting the results of Lyme serology). Once the patient recovers 1:1 AV node conduction with a PR interval of less than 300 ms, the temporary pacemaker can be removed, and a stress test is recommended to evaluate AV node conduction during exercise. Maintenance of 1:1 AV node conduction at a heart rate > 120 bpm is a positive prognostic sign, and the patient can be discharged home. All patients are recommended to follow-up within 4–6 weeks of discharge to ensure that AV conduction remains within normal limits [3]. On long-term follow-up of more than 12 months after initial diagnosis, most patients have complete resolution of symptoms and conduction abnormalities [11].

3 Temporary-Permanent Pacemakers

Reversible causes of AVB are generally treated with transvenous temporary pacemakers, requiring prolonged bed rest and monitoring in the cardiac care unit due to the risk of lead dislodgement. Immobilization has been associated with complications such as loss of muscle mass and deconditioning, increased risk for venous thrombosis, and prolonged length of stay in hospital [12].

Temporary-permanent pacemakers (TPPM) are “externalized” re-usable permanent pacemakers with an active-fixation lead, allowing for improved lead stability and early mobilization when compared to the standard temporary transvenous pacemaker (TPM). Several studies have found that use of TPPM is associated with decreased rates of lead dislocation and complications (severe bradycardia requiring resuscitation, infection, inappropriate pacing and venous thrombosis) when compared to traditional TPMs [13–15]. TPPMs are an increasingly popular method of pacing in cases where permanent pacemakers are contraindicated, such as in patients with suspected transient conduction abnormalities or active infection.

4 Temporary-Permanent Pacemakers in Lyme Carditis

Patients with LC are often younger and healthier with few comorbidities when compared to the typical population of patients presenting with high-degree AVB [4, 7]. Since the duration of AVB in Lyme carditis can vary and can last for several days after initiation of antibiotic therapy, TPPM offers a stable form of ventricular pacing support while promoting early patient mobilization. At our center in the Lyme endemic region of Southeastern Ontario, Canada, TPPM is the standard therapy for symptomatic bradycardia due to Lyme carditis [16]. Our experience showed that of the 21 patients diagnosed with LC at our center in the last 5 years, 4 patients received TPPM for management of symptomatic bradycardia. The average duration of TPPM implant was 10.5 days (standard deviation 1.9), and there were no procedure related complications.

5 Conclusion

TPPMs are increasingly used for pacing in the setting of patients with reversible conduction or systemic infection, affording better lead stability and allowing for early mobilization when compared to the conventional TPM. In patients with symptomatic heart block due to Lyme carditis, TPPMs are the therapy of choice for supportive management.

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