Texas Heart Institute Journal

Editorial Commentary

Highlighting Infranodal Block in Lyme Carditis

Rachel Wamboldt, MD[1]; Adrian Baranchuk, MD[1]

[1]Division of Cardiology, Kingston Health Science Center, Queen's University, Kingston, Ontario, Canada

To the Editor:

It was with much interest that we read the manuscript by Zaid et al[1] entitled, "Lyme carditis presenting with complete heart block and wide complex escape rhythm." Lyme disease (LD) is a vector-borne infection that is becoming increasingly common in many areas of Canada, the northern United States, and Europe.[2] It is estimated that 3% to 10% of LD affects the heart, called Lyme carditis (LC). Approximately 90% of LC cases present with some degree of atrioventricular block (AVB), which can progress quickly and be fatal if not recognized early and treated appropriately with antibiotics.[3]

This case report is an extremely important addition to the ever-expanding literature on the topic of LC, specifically because it presents a case in which the patient had infranodal complete heart block with a wide-complex escape with right bundle branch block morphology. This indicates that the origin of the escape was in the left ventricle. Infranodal blocks represent only 13% of cases of AVB associated with LC and have been less frequently reported in the literature than has the more commonly seen supra- or intranodal AVB with AV junctional escape rhythm (narrow complexes).[4] A similar case report was published by Maxwell et al[4] featuring an adolescent male patient with acute symptomatic high-grade AV block with an intermittent wide-complex escape. This represents the direct involvement of the His-Purkinje system by spirochete invasion or inflammation.

We were delighted to see that the authors used the Suspicious Index in Lyme Carditis (SILC) score, which is a risk-stratification tool used to evaluate the likelihood that a patient's high-degree AVB is caused by LC. In preliminary retrospective validation studies, the SILC score was found to have a sensitivity of 93.2%.[5] Prospective series have not been completed using the SILC score, and its specificity has not been assessed; however, it still holds considerable clinical utility.[5] Using the SILC score to determine those who are at intermediate or high risk for LC allows for quicker antibiotic administration, which can reduce the risk of complications and prevent the development of high-degree AVB and the need for temporary pacing. Also, using the SILC score to identify those with AVB that may be attributed to LD can prevent the inappropriate implantation of permanent pacing devices and improve overall patient outcomes.

As Zaid et al[1] discussed, an exercise stress test conducted before or within 10 days of discharge would have been useful to assess the stability of the AV node conduction. If a patient is able to exercise at a heart rate of more than 120 beats per minute while maintaining 1:1 AV conduction, they can be discharged safely on oral antibiotics (Fig. 1).[6] We highly recommend using the algorithm proposed by Yeung et al,[6] which is now available as an additional resource on the Centers for Disease Control and Prevention webpage for LC (https://www.cdc.gov/lyme/treatment/lymecarditis.html). Recently, our lab showed that patients treated using the above-mentioned algorithm had complete resolution of their conduction abnormalities on long-term follow-up (mean, 20.8 months) without the need for pacemaker implantation.[7] This indicates that if AV conduction is stable at discharge—measured using the stress testing protocol outlined in the algorithm—subsequent conduction abnormalities on long-term follow-up are unlikely to occur.

Citation: Wamboldt R, Baranchuk A. Highlighting infranodal block in Lyme carditis. *Tex Heart Inst J.* 2022;49(5):e217777. doi:10.14503/THIJ-21-7777

Keywords: Carditis, atrioventricular block, Lyme disease, heart block

Corresponding author: Adrian Baranchuk, MD, Professor of Medicine and Physiology, Cardiac Electrophysiology and Pacing, Kingston General Hospital, Queen's University, 76 Stuart Street, Kingston, Ontario K7L 2V7, Canada

E-mail: Adrian.Baranchuk@kingstonhsc.ca

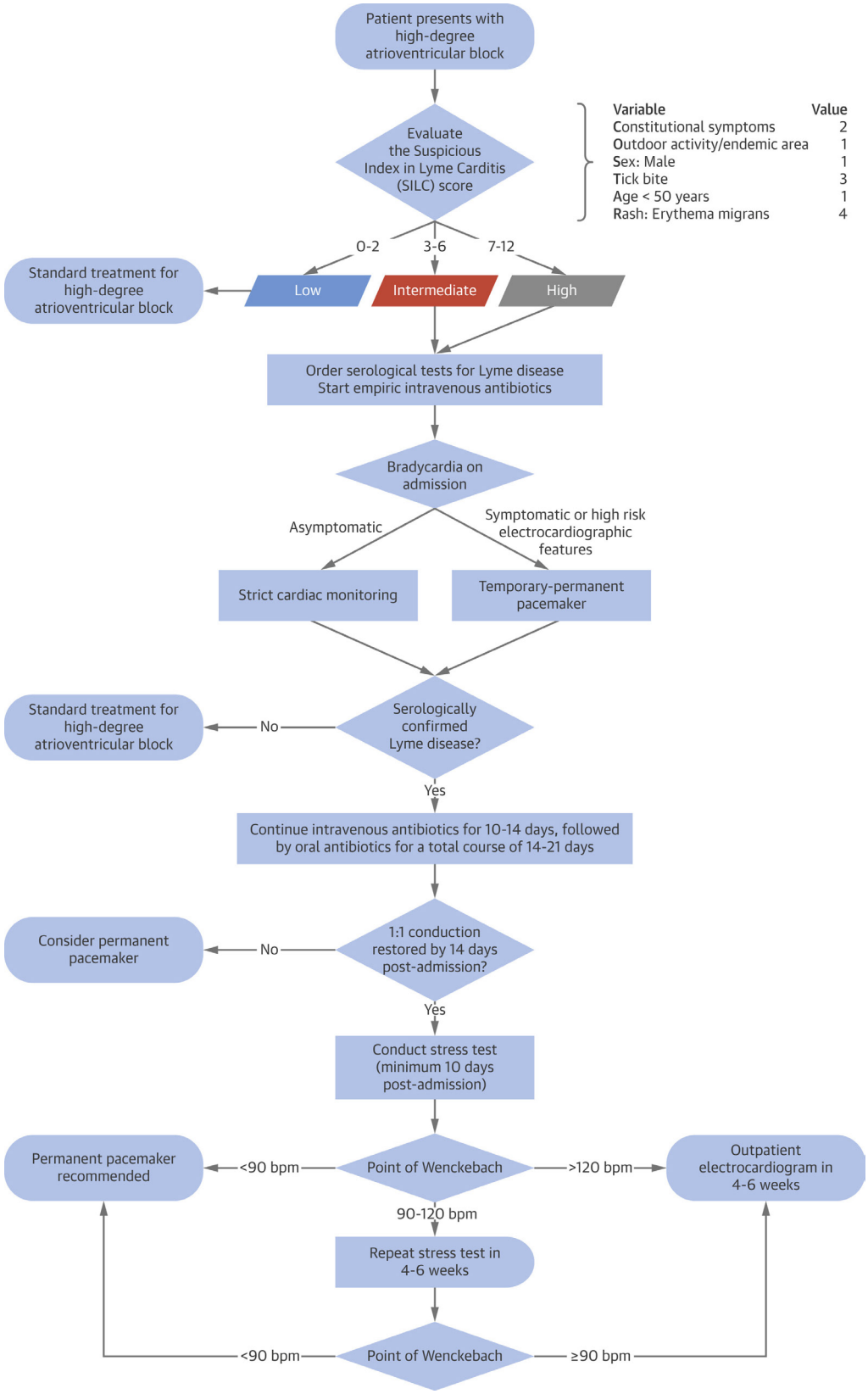

Fig. 1 *Systemic approach to the diagnosis and management of Lyme carditis and high-degree atrioventricular block.*

Reproduced from Yeung et al. Journal of the American College of Cardiology. *73(6), 717-726. Reprinted with permission from the* Journal of the American College of Cardiology *(Copyright ©2019). American College of Cardiology. All Rights Reserved.*[6]

We would like to congratulate Zaid et al[1] for underscoring the importance of physician vigilance in the consideration of LC as a potential cause of AV blocks in those with established risk factors for the disease, especially because conduction abnormalities seen in LC are transient and usually resolve with appropriate antibiotic therapy. More work needs to be done to educate clinicians and individuals who live in areas of endemicity about atypical presentations of LD and how to prevent transmission through appropriate habit modification (eg, wearing protective clothing, avoiding areas inhabited by ticks, using repellents, and inspecting clothes, skin, and pets following potential high-risk exposures).

Published: 31 October 2022

Conflict of Interest Disclosures: None

Funding/Support: None

References

1. Zaid JM, Lingel JM, Scheinthal E, Foster M, Ragupathi L, Russo AM. Lyme carditis presenting with complete heart block and wide complex escape rhythm. *Tex Heart Inst J.* 2022;49(5):e207515. doi:10.14503/THIJ-20-7515
2. Ripoche M, Gasmi S, Adam-Poupart A, et al. Passive tick surveillance provides an accurate early signal of emerging Lyme disease risk and human cases in southern Canada. *J Med Entomol.* 2018;55(4):1016-1026. doi:10.1093/jme/tjy030
3. Krause PJ, Bockenstedt LK. Cardiology patient pages. Lyme disease and heart. *Circulation.* 2013;127(7):e451-e454. doi:10.1161/CIRCULATIONAHA.112.101485
4. Maxwell N, Dryer MM, Baranchuk A, Vinocur JM. Phase 4 block of the right bundle branch suggesting His-Purkinje system involvement in Lyme carditis. *HeartRhythm Case Rep.* 2020;7(2):112-116. doi:10.1016/j.hrcr.2020.11.017
5. Besant G, Wan D, Yeung C, et al. Suspicious index in Lyme carditis: systematic review and proposed new risk score. *Clin Cardiol.* 2018;41(12):1611-1616. doi:10.1002/clc.23102
6. Yeung C, Baranchuk A. Diagnosis and treatment of Lyme carditis: JACC review topic of the week. *J Am Coll Cardiol.* 2019:73(6);717-726. doi:10.1016/j.jacc.2018.11.035
7. Wang CN, Yeung C, Enriquez A, et al. Long-term outcomes in treated Lyme carditis. *Curr Probl Cardiol.* 2021;47(10):100939. doi:10.1016/j.cpcardiol.2021.100939