

LETTERS TO THE EDITOR

To the Editor—Phase-4 RBBB in Lyme carditis?



Maxwell and colleagues¹ recently reported the case of an adolescent with Lyme carditis who exhibited high-degree atrioventricular (AV) block and “phase-4 right bundle branch block (RBBB).”

I disagree with their diagnosis of phase-4 RBBB.

Figure 2 shows sinus rhythm at rates (107–125 beats/min) associated with narrow QRS and first- and second-degree type 1 AV block (including atypical AV block). Wide QRS complexes with an RBBB pattern and a right axis deviation are also present. It is likely that these RBBB complexes are merely ventricular escape beats originating from the left ventricle. The intervals between P wave onset and the RBBB complexes markedly vary, ranging from 340 to 380 ms (Figure 2A), 160 to 200 ms (Figure 2B) and 140 to 160 ms (Figure 2C). All these values markedly contrast with that of the only PR interval in Figure 2, which undoubtedly is associated with normal AV nodal conduction (PR = 240 ms on the seventh QRS complex in Figure 2C). It is unlikely that a relatively short PR interval (140–160 ms) would be associated with RBBB (Figure 2C) while the PR associated with AV nodal conduction is much longer. Finally, the fusion beat between the normal QRS and the RBBB escape beat (third QRS in Figure 2C) is an additional proof of the ventricular origin of the escape beat.

The RBBB escape beats in Figure 2 are similar to those observed during complete AV block in Figure 1. Interestingly, despite the presumed AV nodal location of the AV block, the escape beat has a ventricular origin. Such findings have been previously reported^{2–4} and could have been interpreted as suggesting severe involvement of the His-Purkinje system. In fact, the lack of bundle branch disturbances after recovering of AV conduction militates against any involvement of the His-Purkinje system in this patient.

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Author's Reply—Phase-4 RBBB in Lyme carditis?



We are honored by Professor Belhassen's interest in our report¹ of Lyme carditis manifesting with high-grade atrioventricular block and intermittent late-coupled beats of right bundle branch-like morphology. We proposed that these beats were conducted with aberrancy owing to phase 4 block in the right bundle. In retrospect, perhaps we should have set out several alternatives, for as Professor Mauricio Rosenbaum used to say, “Every complex arrhythmia has at least 3 different explanations!”^{2,3}

Professor Belhassen hypothesizes instead that these beats are from a ventricular escape rhythm. We acknowledge the merits of this explanation, and appreciate particularly his astute observation of a very subtle fusion beat (third beat in Figure 2C). Additionally, we observe the wide beats lack typical right bundle branch block pattern as might be expected with a discrete proximal injury in an otherwise normal heart.

With regard to the observation that there is no other disturbance of His-Purkinje conduction, we note the right axis deviation seen on narrow-complex beats at presentation and throughout the acute period, but absent at outpatient follow-up (not shown). This may represent transient left posterior fascicular block⁴ (seen best in Figure 3B; precordial lead placement may have been imperfect in Figure 2 owing to external pacing pads).

We lack provocative maneuvers or intracardiac recordings to provide definitive resolution to this question. However, in either case, there is reason to question the integrity of the His-Purkinje system; as Professor Belhassen notes, an adolescent with atrioventricular nodal block should have a junctional escape.

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