Country cardiograms case 53: Answer

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These electrocardiograms (ECGs) address 2 related issues: intermittent left bundle branch block (LBBB) and evidence for ischemia.

Figure 1 (on page 63) shows normal sinus rhythm, at a rate of 63 beats/min. Figure 2 (on page 64) displays sinus bradycardia, at a rate of 52 beats/min.

In Figure 1, the QRS complexes are wide (0.16 s), with a tiny r wave in V1 and V2, and a deep, wide S wave. These are diagnostic features of LBBB. In Figure 2, the QRS complexes are substantially narrower (0.10 s).

Whereas BBB is often complete and permanent, in many cases it is intermittent and related to the refractory period of the affected bundle branch or to variations in blood supply. It may therefore be rate-dependent, emerging at higher rates and disappearing at lower rates. This is the likely explanation for the intermittent LBBB seen in these ECGs.

Fortuitously, this allows for an interesting analysis of the ST and T wave changes in these sequential ECGs, first with, and then without, LBBB.

In Figure 2, there is suggestion of an acute ischemic process: although there is no ST segment elevation or depression, T waves are deeply and symmetrically inverted in leads V1 through V5.

To correctly interpret the ST and T wave changes in Figure 1, it is first essential to consider the usual ST–T changes in leads V1 and V2 when LBBB is present. There should be ST segment elevation in these leads, sinuously sloping upward, along with a tall T wave. What is seen on an ECG tracing is the sum of electrical forces recorded. Hypothetically, if BBB causes an electrical force in one direction and ischemia causes an exactly equal force in the opposite direction, and there are no other forces at play, a flat, isoelectric line will result.

With this in mind, it is evident that the ST–T wave configuration seen in Figure 1 in leads V1 and V2, with biphasic T waves (seen also in V3 and V4), is highly abnormal. It represents the ischemic changes seen in Figure 2, superimposed on the typical LBBB pattern.

New LBBB in a clinical setting, consistent with acute myocardial infarction (MI), is one of the indications for thrombolytic therapy. This reflects the fact that interpretation of the changes in ST elevation of an ST elevation MI can be difficult in the presence of LBBB. However, the benefits of thrombolysis do not extend to non–ST elevation MI. Inevitably, some cases of non–ST elevation MI, or even other causes of chest pain, will receive thrombolysis, based on this "new LBBB" indication.

In this case, if a recent ECG from a previous presentation were available, if the LBBB could be shown to be new, and if only the ECG in Figure 1 were available from the current presentation, a decision to administer thrombolysis would be reasonable. However, Figure 2 demonstrates that the ischemic pattern in this patient does not involve ST segment elevation. Thrombolysis is therefore not indicated.

In the setting of MI, remembering that LBBB is sometimes intermittent and that it may disappear at slower heart rates has the potential to avoid unnecessary thrombolysis. If the rate slows and the QRS complex narrows, obtain a second ECG before proceeding with thrombolysis.

For the question, see page 63.

Competing interests: None declared.