

## BRIEF REPORT

# Left Bundle Branch Block (LBBB) Masks Changes Due to Hyperkalemia: A Myth

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Left bundle branch block masks ischemic changes but not those due to electrolyte imbalance. Peaking of T waves, prolongation of PR interval, diminution/absence of P wave, and widening of QRS complex can still be appreciated if one carefully compares the baseline ECG to the presenting ECG. *Journal of Hospital Medicine* 2010;5:226–227. © 2010 Society of Hospital Medicine.

**KEYWORDS:** diagnostic decision making, ECG, hyperkalemia, LBBB.

An 80-year-old man with end-stage renal disease requiring maintenance hemodialysis was admitted to the emergency department (ED) with complaints of fever, generalized fatigue, and lethargy. Presenting electrocardiogram (ECG) revealed normal sinus rhythm at 82 beats per minute (bpm), prolonged PR interval, complete left bundle branch block (LBBB) with wide QRS interval and tall T waves (Figure 1). A baseline ECG done 3 months ago also showed LBBB (Figure 2). In view of the underlying LBBB, changes in the presenting ECG were ignored.

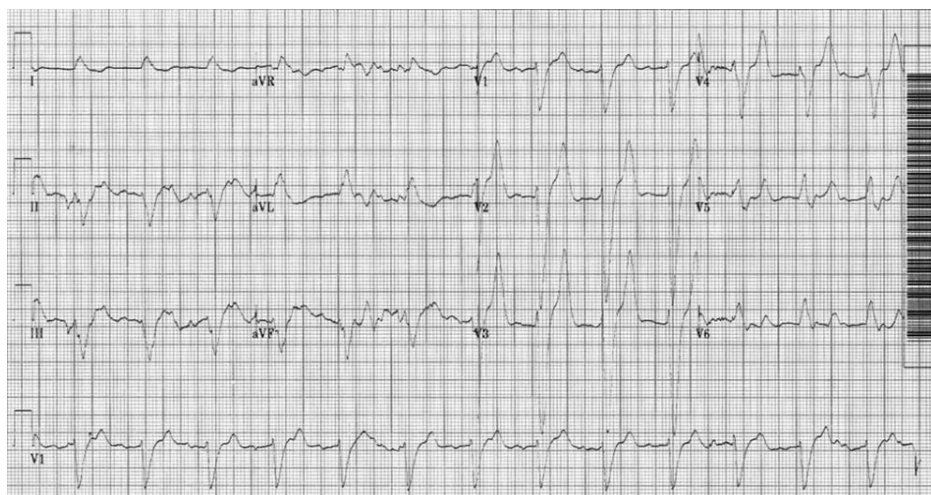
Hemodialysis was planned for the patient. A few hours later, repeat ECG revealed a sine wave pattern suggestive of severe hyperkalemia (Figure 3). Laboratory results were available then and his serum potassium was found to be 6.8

mmol/L. He was started on insulin, dextrose, and calcium gluconate, but he developed cardiorespiratory arrest and died.

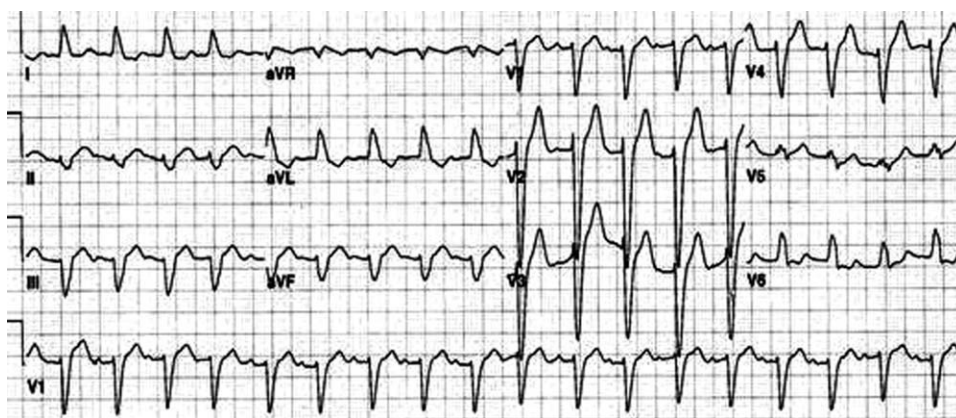
Retrospectively, looking at the presenting ECG (Figure 1), it was found that the PR interval was longer, the QRS was broader, and the T waves were taller and more peaked than the baseline ECG (Figure 2).

## Discussion

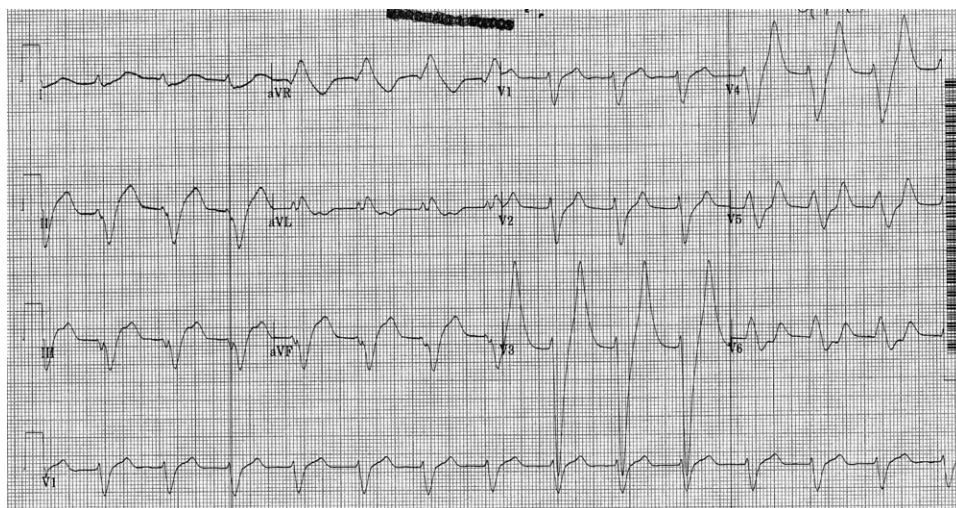
Hyperkalemia is a true medical emergency with potential lethal consequences that must be treated accordingly.<sup>1,2</sup> It can be difficult to diagnose due to the paucity of distinctive signs and symptoms. Any ECG change due to hyperkalemia



**FIGURE 1.** Presenting ECG showing LBBB with tall and peaked T waves, prolonged PR interval and wide QRS. **Abbreviations:** ECG, electrocardiogram; LBBB, left bundle branch block.



**FIGURE 2.** Baseline ECG taken 3 months ago. **Abbreviation:** ECG, electrocardiogram.



**FIGURE 3.** Prearrest ECG showing wide QRS rhythm without distinct atrial activity—the sinoventricular wave pattern due to hyperkalemia. **Abbreviation:** ECG, electrocardiogram.

becomes an indication for stabilizing the myocardium with calcium infusion.

Often, the sequence of repolarization due to myocardial infarction is altered on ECG in patients with baseline LBBB, making it difficult to diagnose accurately. Although it is thought that changes due to electrolyte imbalances will also be masked by the presence of LBBB, there is no evidence supporting this in the literature. Hence, it is wrongly believed that LBBB masks changes due to hyperkalemia. It is important that in patients with suspected electrolyte imbalance, baseline ECG showing LBBB is compared to the presenting ECG. In our patient, the presenting ECG (Figure 1) might not look too impressive, but in comparison to the baseline ECG (Figure 2), the PR interval is longer, QRS is wider, and T waves are more peaked and taller. If the admit-

ting physician had closely compared the presenting ECG (Figure 1) to the baseline ECG (Figure 2), the suspicion of hyperkalemia would have been high.

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