Is the left bundle branch really blocked when suggested by the electrocardiogram?

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This editorial refers to ‘Greater response to cardiac resynchronization therapy in patients with true complete left bundle branch block: a PREDICT substudy’ by M.J. Perrin et al., on page 690

Perrin et al.¹ suggest that a simple finding of the initial positivity in lead V1 on the electrocardiogram (ECG) during left bundle branch block (LBBB) identifies patients with residual LBB conduction who do less well during cardiac resynchronization therapy (CRT).

Obviously, the number of patients studied is small and, as will be discussed, better characterization of those patients is necessary.

How correct is the assumption that the initial positivity in lead V1 indicates not block but delay and residual conduction in the LBB? It is based on the observations by Padanilam et al.² who have concluded that the presence of an initial r wave of ≥1 mm in lead V1 indicates intact left-to-right ventricular septum activation suggesting persistent conduction over the LBB. However, in my opinion, there are circumstances where this ECG finding does not prove that LBB is still able to conduct and no complete LBBB is present.

The initial r in lead V1

As shown in Figures 1 and 2 in the case of a large septal scar, ventricular activation will occur without left-to-right septal activation resulting in initial positivity in lead V1 during LBBB because of unopposed endo-epicardial activation of the right ventricular wall. The initial r wave height and duration will depend on the right ventricular wall thickness. As shown in Figures 1 and 2 a q wave will usually be present in leads aVL and V6.

Absence of initial positivity in lead V1

Also, the absence of initial positivity does not exclude that LBB conduction is present. This can be demonstrated in alternating bundle branch block as shown in Figures 3 and 4. The left part of Figure 3 shows the absence of initial positivity in V1 during LBBB.

Figure 1 Electrocardiogram in a patient with extensive antero-septal myocardial infarction and left bundle branch block. Note the initial r wave in lead V1 and the initial q in leads aVL, V5, and V6.

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but, as becomes clear in the right part, the LBB is able to conduct. Figure 4 illustrates the possible (rate related) mechanism of alternating bundle branch block, with its characteristic difference in duration of the PR interval.

**What to conclude?**

The use of the criterion proposed by Perrin et al. requires some fine tuning. As shown in their Table 1 an ischaemic aetiology was found in most patients considered to have residual LBB conduction. However, an extensive septal scar resulting in the initial r in V1, as shown in Figures 1 and 2, has to be excluded. We know that those LBBB post-infarct patients do less well following CRT.

**References**


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