

# ECGs for Healthcare Professionals

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# 12 BUNDLE BRANCH BLOCK

Unlike atrioventricular block discussed earlier, bundle branch block occurs at the ventricular level, i.e. in the bundle of His and its branches or sub-branches or fascicles. It is classified according to where the delayed conduction occurs. There are combinations of different types of conduction delay, named as bifascicular or trifascicular blocks.

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## LEARNING POINTS

- 1 Conduction abnormalities at the ventricular level are called bundle branch block or fascicular block.
- 2 Both QRS duration and morphology are used to classify the types of bundle branch block.
- 3 Right bundle branch block is considered to be benign; left bundle branch block and bifascicular or trifascicular block may indicate underlying cardiac disease.



Figure 12-1 An ECG example of left bundle branch block

### Left bundle branch block

#### Case history

An 80-year-old man with a long history of hypertension developed dyspnoea recently. There are no typical signs of congestive cardiac failure on examination.

#### ECG findings

This shows sinus rhythm with a slow heart rate at 52 bpm. The PR interval is normal, but QRS duration (150 ms) and QT interval (480 ms) are greatly increased. The QRS axis is leftward. The QRS complexes are M shaped in the left-sided leads, I, aVL and to a lesser degree V5 and V6, where there is no septal q wave. There are global ST-T abnormalities (figure 12-1).

**ECG diagnosis:** sinus bradycardia, complete left bundle branch block (LBBB).

**ECG diagnostic criteria for LBBB:** prolonged QRS duration over 120 ms (three small squares).

Absence of septal q wave.

Dominant R wave or M shaped QRS complex in left-sided leads (V5, V6, I and aVL) and dominant S wave in right-sided leads.

Other ECG changes associated with LBBB include left axis deviation, increased QRS amplitude and ST-T abnormalities.

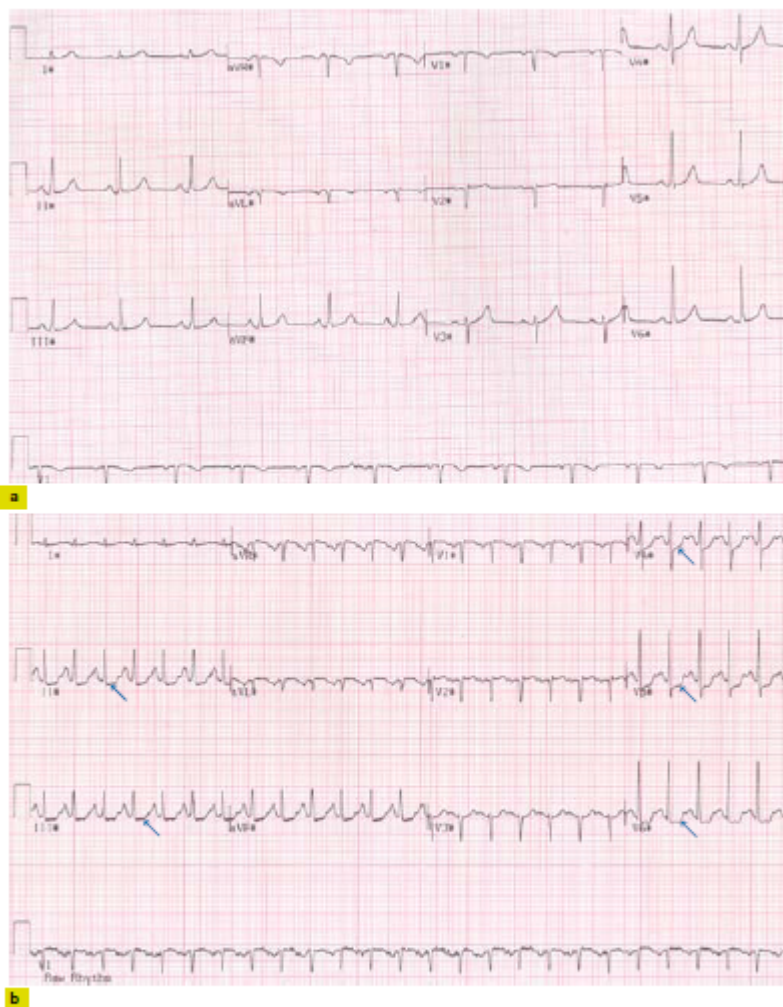
#### Comments

This ECG has all major features of LBBB, increased QRS duration, absence of septal q wave and M shaped QRS complexes in left-sided leads. It also shows left axis deviation and ST-T changes.

LBBB is mostly found in patients with heart disease secondary to various underlying aetiology including hypertension, coronary artery disease, aortic valve disease and cardiomyopathy. Occasionally, it can be found in a structurally normal heart based on the currently available imaging techniques.

#### What to do next

Apart from treating the underlying cause, further investigations are indicated particularly echocardiography which may provide information on left ventricular size and function, as well as valvular assessment. In cases with a high risk of coronary artery disease, a diagnostic angiogram should be performed.



**Figure 18-1** An exercise stress ECG test was performed in a 62-year-old woman with atypical chest pain. The resting ECG (a) shows nearly diminished R wave in V1 and V2 but no ST-T changes. After 7 minutes on the Bruce Protocol, she achieved 100% maximum predicted heart rate (158 bpm) and became significantly breathless. The ECG at peak stress (b) shows horizontal ST depression in inferior and lateral leads (arrows). This is a positive exercise ECG indicating inducible ischaemia