# A Pattern to Remember

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## Vignette

A 73-year-old woman briefly loses consciousness while attending church. She has no history of chest pain, and the description she and witnesses provide of the episode is typical of vasodepressor syncope. Her cardiovascular exam is normal. The electrocardiogram (ECG) shown in Figure 1 is recorded, and the patient is admitted to hospital for cardiac rhythm monitoring. Serial cardiac markers are normal. An ECG recorded the next day is shown in Figure 2.

## Questions

1. **How do you explain the differences between the two ECGs?**
2. **What is the clinical significance of these findings?**

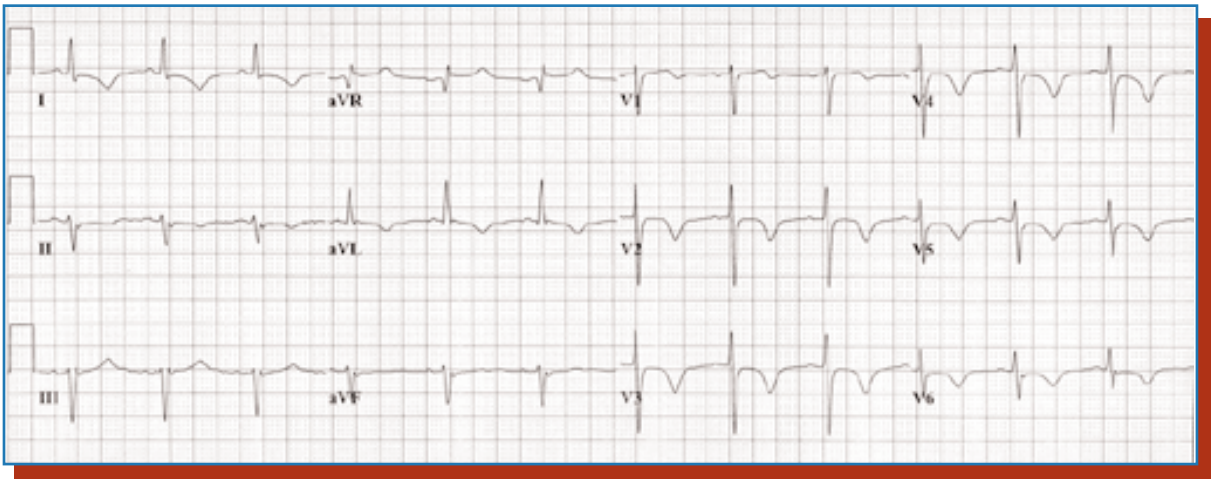


Figure 1. ECG upon initial presentation.

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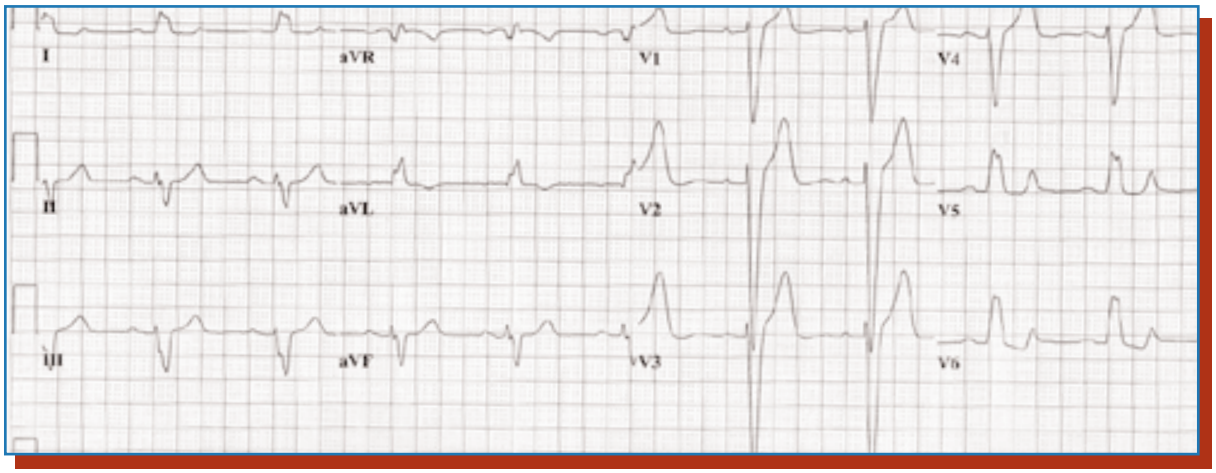


Figure 2. ECG recorded the next day.

## Answers

**1.** The initial ECG shows sinus rhythm at a rate of 74 beats per minute. The QRS duration is normal, and there is abnormal left axis deviation consistent with left anterior fascicular block. There is abnormal, deep T wave inversion, suggestive of anterolateral ischemia. The repeat ECG also shows sinus rhythm, but now a left bundle branch block (LBBB) pattern is present.

The patient has an intermittent LBBB. This is often a rate-dependent phenomenon, usually provoked by very slight increases in heart rate. Interestingly, the "critical" rate may vary from day to day, with normal conduction at a higher rate one day, and LBBB at a slower rate the next. The abnormal T wave changes during periods of normal conduction are well-described, and are thought to be due to "T wave memory". For reasons not fully understood, the cells "learn" the pattern of abnormal repolarization during periods of LBBB, and retain it even after conduction has returned to normal. The abnormal T wave inversion may persist for days, or even weeks. A similar phenomenon may be seen in patients with ventricular pacemakers following cessation of paced rhythms, and in patients with intermittent ventricular pre-excitation.

**2.** The clinical significance of intermittent or rate-dependent LBBB is uncertain. It is not related to underlying coronary artery disease. Some patients appear to have structurally normal hearts, while others may have some form of mild cardiomyopathy. Although the T wave changes may give cause for concern about an acute ischemic event, this is usually not the case.

None of the electrocardiographic findings in this patient were thought likely to provide an explanation for her syncopal episode. $D_x$