An Obvious Diagnosis

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Vignette

You are asked to consult in the case of a 77-year-old hypertensive woman who has been admitted to hospital after experiencing two brief episodes of syncope earlier in the day. She had a heart attack several years ago and was recently started on a new medication for control of occasional palpitations. Her electrocardiogram (ECG) is shown in Figure 1.

The attending physician wonders if the patient should be considered for pacemaker implantation.

Questions

1. What is your interpretation of her ECG?
2. What is the probable explanation for her symptoms and is pacemaker implantation appropriate?

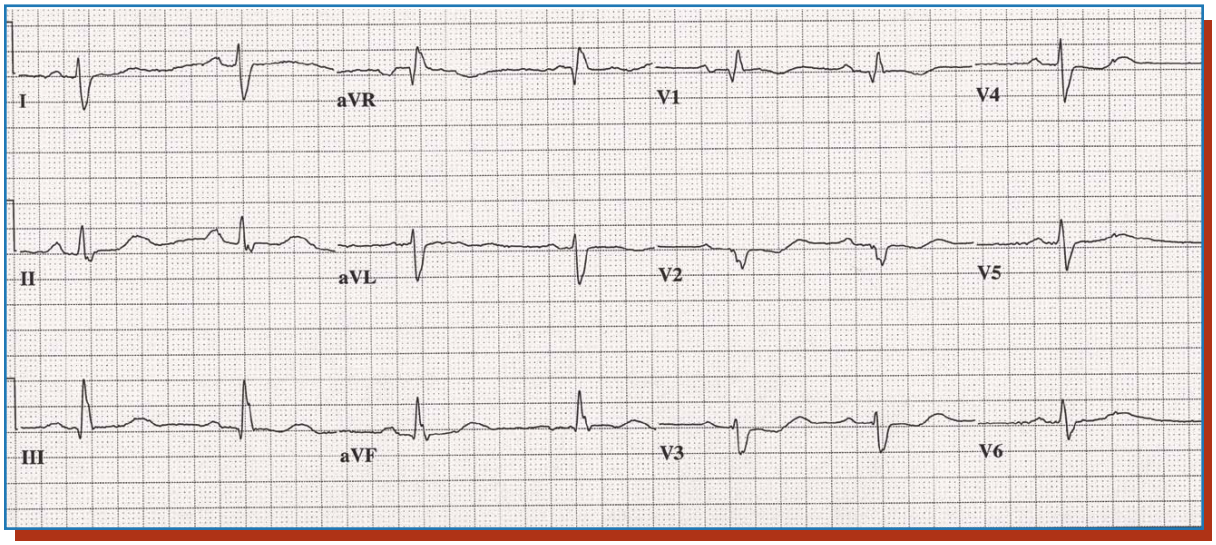

Figure 1. ECG.

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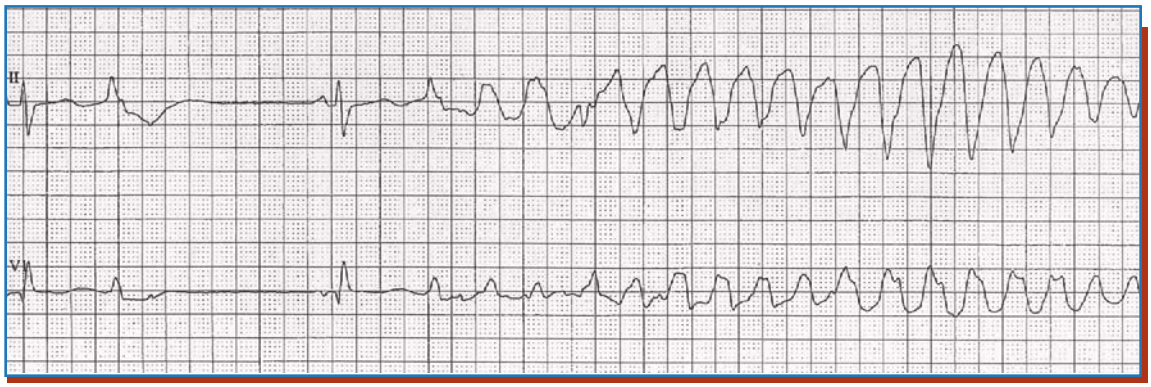

Figure 2. ECG showing arrhythmia.

Answers

1. The ECG shows sinus bradycardia at 46 beats per minute, with a borderline prolonged PR interval at 0.22 seconds. Q waves in V_1 to V_3 indicate a previous septal infarction. The combination of right bundle branch block and abnormal right axis deviation (in keeping with left posterior fascicular block) suggests that she has conduction system disease manifesting as bifascicular block. In addition, the slightly prolonged PR interval raises additional concern about the integrity of conduction through the remaining fascicle. This is sometimes referred to as incomplete trifascicular block, although, in most cases, the PR prolongation is due to a delay in atrioventricular nodal rather than infra-nodal conduction. The presence of these conduction abnormalities in a patient with recurrent, unexplained syncope would normally be considered strong presumptive evidence of Stokes-Adams attack due to intermittent complete heart block. However, a closer look at her QT interval may suggest an alternative diagnosis.

2. The QT interval is markedly prolonged in all leads, exceeding 600 ms. When corrected for the heart rate, it is 540 ms, which greatly exceeds the normal upper limit of 440. This should alert you to the possibility that she may be experiencing episodes of symptomatic, polymorphous ventricular tachycardia of the torsade de pointes variety.

Sure enough, her symptoms recur a few hours later in association with long, self-limiting runs of the arrhythmia shown in Figure 2.

She is found to be moderately hypokalemic as a result of maintenance diuretic therapy and the recently introduced medication is identified as sotalol, which causes both bradycardia and QT prolongation. With correction of her hypokalemia and withdrawal of sotalol, her QT interval returned to normal, her arrhythmia resolved, and her symptoms abated without the need for further intervention. Dx