Case 1: permanent pacemaker malfunction?

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CASE 1

A 65-year-old man presented to casualty with a short history of palpitation and breathlessness. Some years earlier a dual chamber permanent pacemaker had been implanted for symptomatic 2:1 atrioventricular block. What abnormalities were present on the electrocardiogram (ECG) (*Figure 1*)?

DISCUSSION

The ECG demonstrated a regular broad complex tachycardia at a rate of 120/min. No P waves were identifiable in any lead. A pacing spike preceded each QRS complex.

This case illustrates a relatively common pacing problem. Dual chamber pacing for atrioventricular block maintains the relationship between atrial and ventricular contraction. In DDD mode the ventricle is paced with a programmed delay following a sensed or paced atrial event — the P wave in sinus rhythm.

Clearly it would be inappropriate for the ventricle to be paced at the same rate as the atrium during an atrial tachyarrhythmia and therefore dual chamber pacemakers have a programmable 'upper rate' — the fastest rate at which the pacemaker will allow the ventricle to track atrial events. Interrogation of this patient's pacemaker revealed underlying atrial fibrillation with left bundle–branch block (*Figure 2*). The programmed upper rate in this case was 120/min.

The present generation of dual chamber pacemakers uses a variety of algorithms to detect atrial tachyarrhythmias. Upon so doing the pacemaker switches to a mode other than DDD in order that the ventricle does not track atrial activity. The mode switching function, although available, had not been enabled in this patient's pacemaker, hence the inappropriate ventricular pacing at the upper rate. HM

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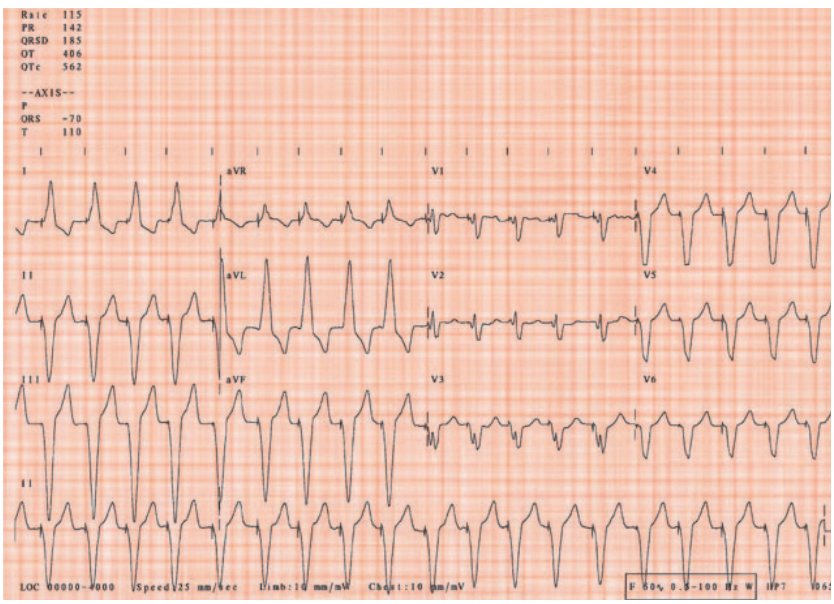

Figure 1. The 12-lead electrocardiogram at presentation.

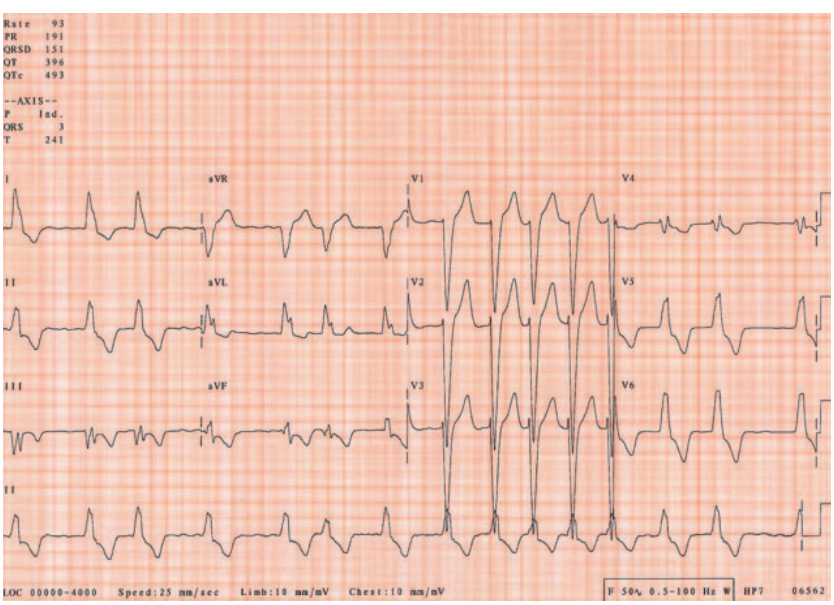

Figure 2. An electrocardiogram showing the patient's underlying rhythm.