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Electrocardiogram Quiz – Case 20

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A 73-year-old man presents with intermittent palpitations of a few days duration. The patient's 12-lead surface ECG is depicted in figure 1.

Questions

a. What can you deduce about the patient's cardiac history based on the ECG?
b. What is the clinical significance of your findings?

Comment

Ventricular demand pacing appears on the 12-lead surface ECG as a single pacemaker spike followed by a QRS complex that is wide, bizarre, and resembles a ventricular beat. The pacemaker

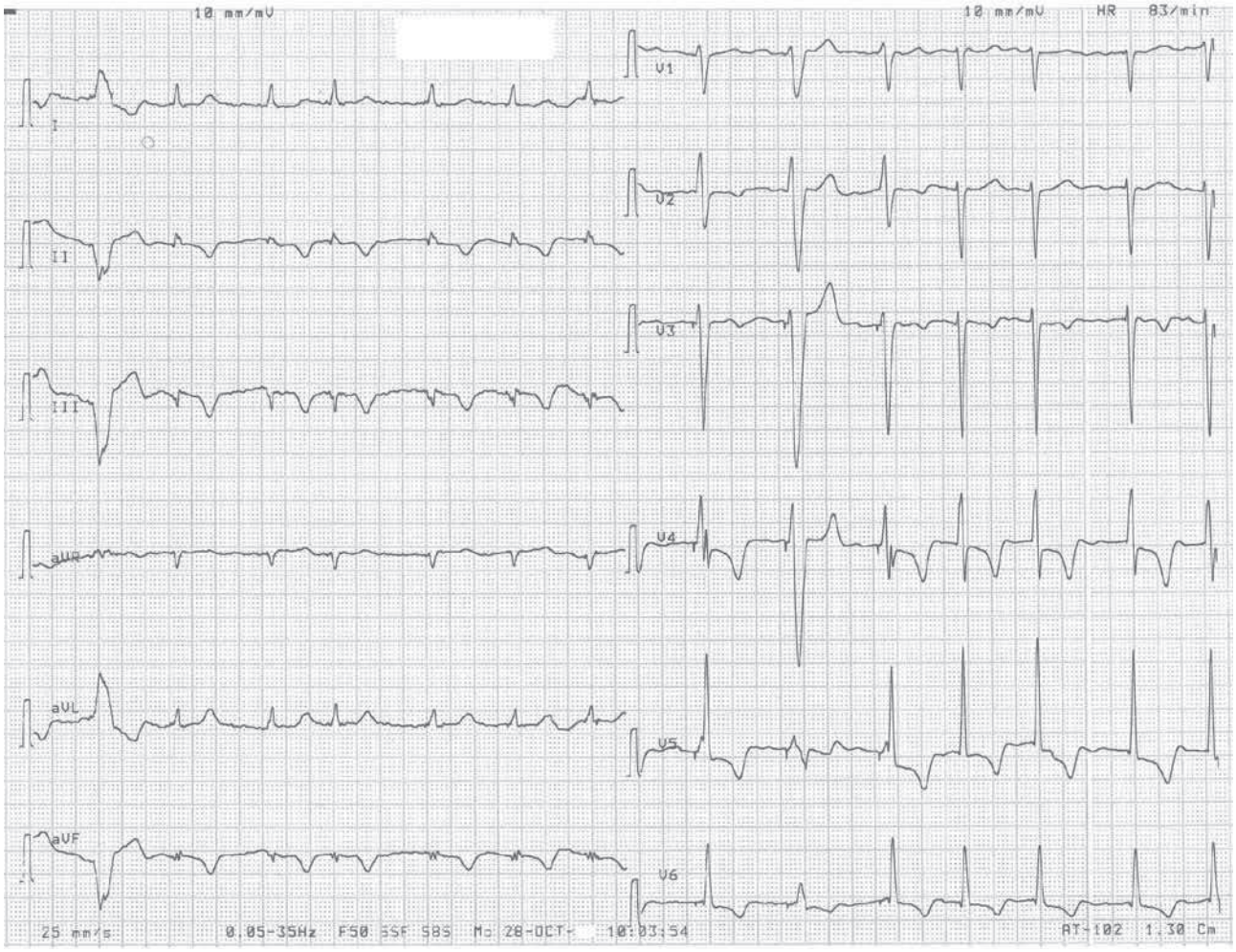

Figure 1

lead is usually in the right ventricular (RV) apex; thus, the paced QRS complex has a left bundle branch block (LBBB) configuration since RV activation occurs before activation of the left ventricle, and it is negative in the inferior leads. Sometimes, the lead may be placed higher up in the RV septum or outflow tract, and while there is still an LBBB pattern, the inferior leads may have variable axis. There may or may not be atrial activity noted, depending upon the nature of the patient's underlying rhythm, the atrial rate, and the occurrence of ventriculoatrial conduction via the atrioventricular node. If intrinsic or native atrial activity is present with a single chamber ventricular-only pacemaker, it occurs at a rate that differs from the ventricular rate since it is dissociated from the QRS complex. Frequently, ventricular demand pacing is seen in association with atrial fibrillation, as in the present case.

There may be episodic pacing in patients who have a ventricular demand pacemaker. The pacemaker is activated and delivers a stimulus only when the intrinsic ventricular rate falls below a predetermined lower limit; pacemaker activity is suppressed when the intrinsic heart rate is faster (ventricular inhibited). The escape interval (the time between the last intrinsic beat and the paced beat) is equivalent to the rate at which the pacemaker is set to activate. Similar to atrial pacing, if the pacemaker is set at 60 beats per minute, the pacemaker will only pace the ventricle if the rate falls below 60 beats per minute or there is a pause of one second (60 beats/min ÷ 60 sec/min). If the native rate is slow, there will be 100 percent ventricular pacing. The ECG may have evidence of fusion or pseudofusion beats if the pacemaker rate and intrinsic heart rate are nearly identical, and the native and paced QRS complex occur simultaneously.

References

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