

**Answer to the rhythm puzzle on page 328**

To establish a diagnosis, carotid sinus massage (CSM) was performed as a first step to solve the problem. CSM had no effect on the tachycardia. Adenosine 6 mg, 12 mg and 18 mg was administered intravenously (iv) without success. Subsequently electrical cardioversion was performed with 10, 50 and 100 Joules without termination of the tachycardia. The bladder surgery was postponed and amiodarone was administered 600 mg iv in six hours.

The administration of iv amiodarone was ineffective as well. Finally, a temporary transvenous pacing lead was placed in the high right atrium and the atria were paced at 70 beats/min, 100 beats/min, 200 beats/min and 300 beats/min without any effect on the tachycardia. Pacing was discontinued and the pacing lead was then re-positioned in the right ventricle. Due to manipulation of the catheter some premature ventricular beats were induced and the tachycardia subsequently terminated (figure 2). From top to bottom leads I, II, V1, aVF (figure 2).

Figure 2 shows that this patient had two concomitant arrhythmias: atrial fibrillation and ventricular tachycardia. Because of the presence of atrial fibrillation, atrial pacing could not capture the atrium and had no effect on the ventricular tachycardia.

The ventricular arrhythmia had a rate of 144 beats/min and a QRS width of 138 ms, which is a relatively slow ventricular tachycardia and a relatively narrow QRS complex. The left axis deviation in the standard leads, the rsR complex in V1 and the QS complex in V6 are all suggestive of a tachycardia originating from the posterior fascicle of the left bundle.<sup>1</sup>

In the literature, fascicular ventricular tachycardias related to digoxin intoxication were described by Wellens.<sup>2</sup> Several reports appeared in the literature on the administration of iv verapamil to terminate fascicular ventricular tachycardia<sup>3</sup> but systematic investigations on the usage of verapamil in fascicular ventricular tachycardias are lacking. In the recent literature, ablation of the tachycardia is explored and differentiation between fascicular tachycardia and papillary muscle tachycardia is mandatory. Although QRS duration during papillary muscle tachycardias is usually longer (150-170 ms) than during fascicular tachycardias (13-150 ms), only electrophysiology study with detailed mapping can provide the ultimate diagnosis. In case of papillary muscle tachycardia, there is a risk of damaging the papillary muscle of the mitral valve apparatus.

The message of this rhythm puzzle is to consider fascicular ventricular tachycardia as a diagnosis in relatively narrow QRS complex tachycardia with right bundle branch like morphology and left or right axis deviation. Verapamil can also be administered either orally or intravenously as first step to try to terminate the tachycardia. ■

**References**

- 1 Endhouse J, Morris F. Broad complex tachycardia- Part II. *BMJ*. 2002;30:776-9.
- 2 Wellens HJJ, Conover MC. *The ECG in emergency decision making*. Philadelphia: WB Saunders Company; 1992. p. 150-3.
- 3 Francis J, Venugopal K, Khadar SA, Sudhayakumar N, Gupta AK. Idiopathic fascicular ventricular tachycardia. *Indian Pacing Electrophysiol J*. 2004;4:98-103.
- 4 Good E, Desjardins B, Jongnarangsin K, Oral H, Chugh A, Ebinger M, et al. Ventricular arrhythmias originating from a papillary muscle in patients without prior infarction: A comparison with fascicular arrhythmias. *Heart Rhythm*. 2008;5:1530-7.

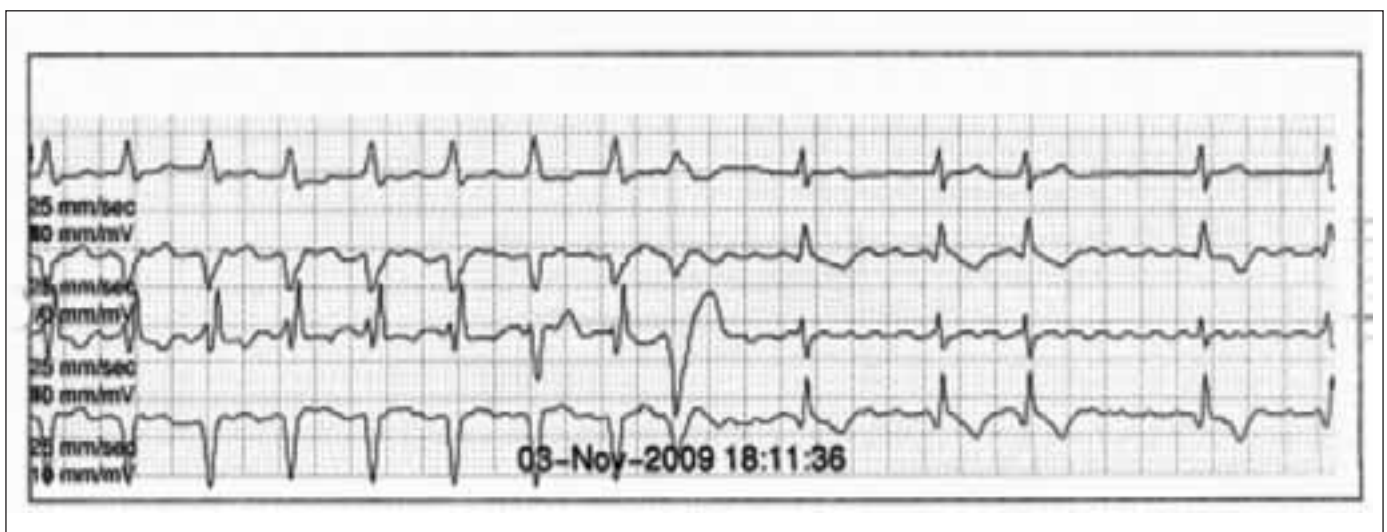


Figure 2. ECG recording during catheter manipulation.