

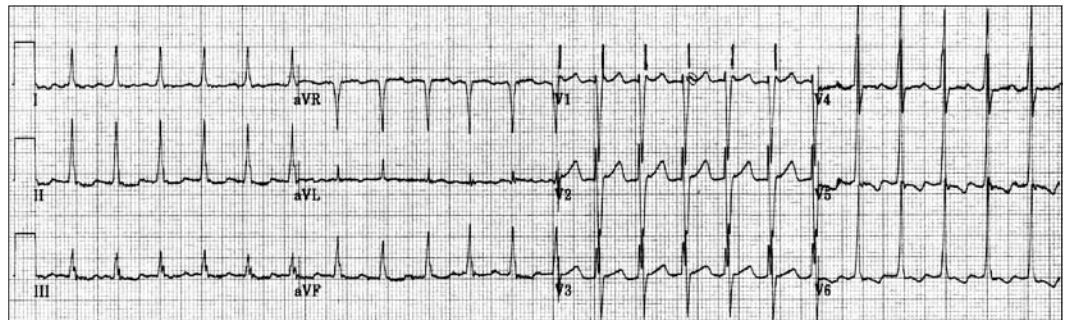
## Regular narrow QRS and regular wide QRS tachycardias in a woman with mitral regurgitation of uncertain etiology

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A 64-year-old woman had been experiencing short episodes of rapid regular heart beating for nearly a year. The bouts became frequent and lengthy, resulting in a hospital admission a month earlier when intravenously administered adenosine terminated an episode. She was discharged on diltiazem, but the bouts of tachycardia continued and were accompanied by light-headedness and sometimes nausea. When she returned to the hospital with one of these episodes, a narrow QRS complex tachycardia again was documented and again was terminated by adenosine (Figures 1 and 2).

In the hospital, episodes of tachycardia continued, but adenosine frequently was ineffective; the episodes would end spontaneously after varying periods. In addition, many of the episodes were now wide QRS complex tachycardias (Figure 3), and the patient became dyspneic for the first time. Amiodarone was given, first intravenously and then by mouth, and in time all episodes of tachycardia ceased and dyspnea disappeared.

Regular wide QRS complex tachycardias often are difficult to diagnose. Brugada et al (1) and Verecke et al (2) each have used stepwise approaches, incorporating four somewhat different criteria, with high rates of accuracy as judged by electrophysiological studies. Both groups found A-V dissociation to be 100% specific for ventricular tachycardia. However, A-V dissociation could be



**Figure 1.** Electrocardiogram recorded in the emergency department on the patient's second admission shows a regular tachycardia at a rate of 143 beats/minute. The QRS complexes are narrow (0.08 seconds) but in some leads appear wider because of retrograde P waves occurring at the end of the QRS complexes. These P waves are best seen as upright deflections in lead V<sub>1</sub> and are indicated by vertical lines above the lead. The rhythm could be either A-V nodal reentrant tachycardia or A-V reciprocating tachycardia utilizing a bypass tract; the short R-P interval (<0.07 seconds) favors the former. Large QRS voltage ( $SV_1 + RV_5 > 35$  mm) and downsloping ST segments with inverted T waves in leads V<sub>5</sub> and V<sub>6</sub> indicate left ventricular enlargement.

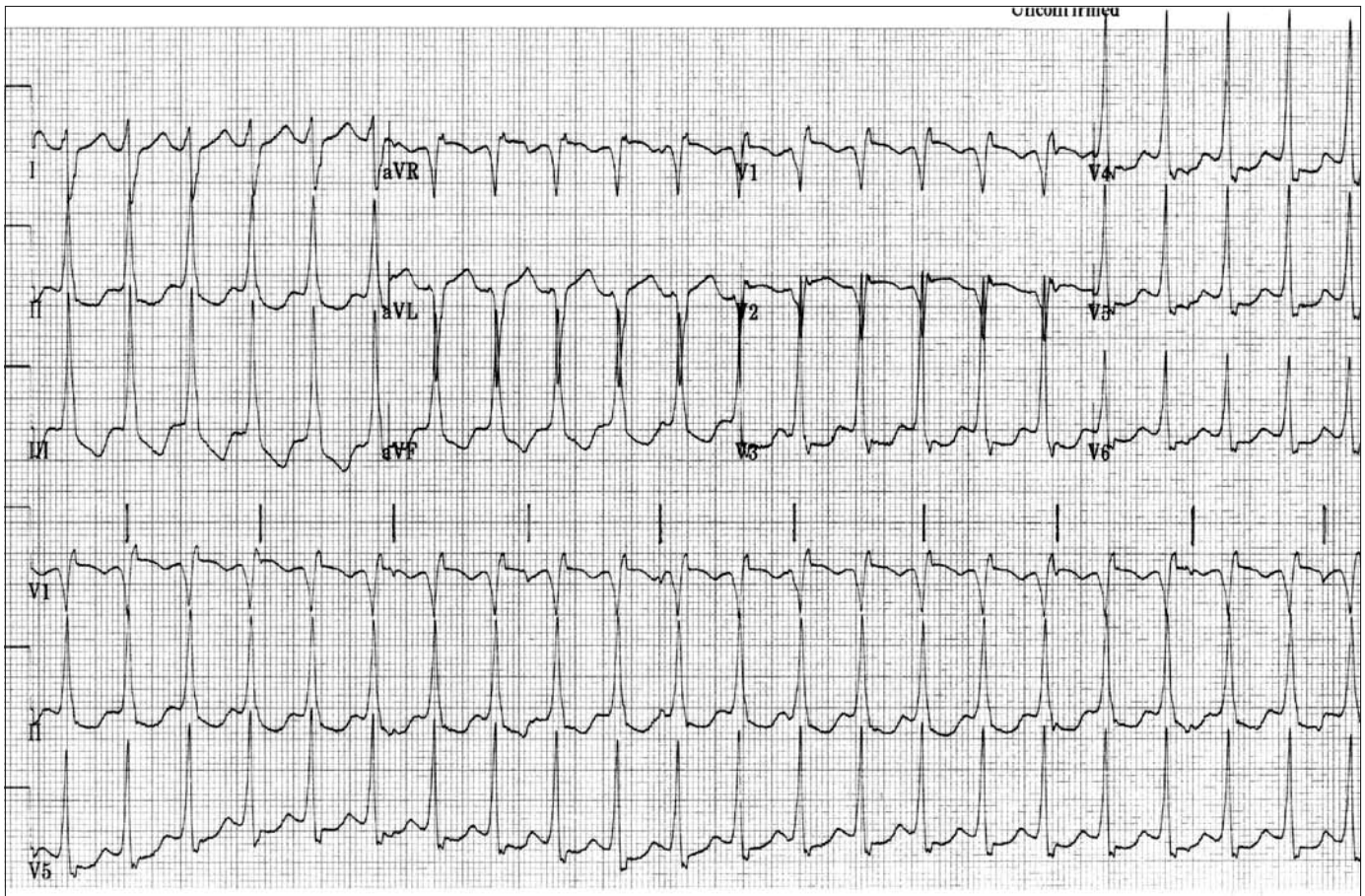


**Figure 2.** Electrocardiogram recorded after intravenously administered adenosine terminated the tachycardia seen in Figure 1. There is now sinus rhythm at a rate of 88 beats/minute with frequent multiform premature complexes, including one couplet. The retrograde upright P waves previously seen at the end of the QRS complexes in lead V<sub>1</sub> (Figure 1) have disappeared. The findings of left ventricular enlargement persist.

identified in fewer than 25% of patients with ventricular tachycardia, and most diagnoses were made from various morphologic characteristics of the QRS complexes (1, 2).

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**Figure 3.** Electrocardiogram recorded 2 days after those shown in Figures 1 and 2. A regular wide QRS complex (0.13 seconds) tachycardia has a rate of 138 beats/minute. The wide QRS complexes are not characteristic of either right bundle branch block or left bundle branch block. The interval from the beginning of the R wave to the nadir of the S wave in lead V<sub>3</sub> exceeds 100 msec. There is A-V dissociation with biphasic sinus P waves occurring independently at a rate of 64 beats/minute. (These are indicated by the vertical lines above the lead V<sub>1</sub> rhythm strip.) Each of these three findings is typical of ventricular tachycardia (1).

Both A-V nodal reentrant tachycardia and A-V reciprocating tachycardia usually occur in patients with so-called structurally normal hearts, but ventricular tachycardia rarely does so. Our patient has had systemic arterial hypertension since she was a young woman and has known of a heart murmur for many years. She never had symptoms, however, until the tachycardias began. Echo-Doppler studies obtained during her recent admissions have shown left ventricular hypertrophy and dilatation with a reduced ejection fraction of 40% and a restrictive filling pattern, biatrial dilatation, severe mitral regurgitation with

morphologically normal leaflets and annular dilatation, and an elevated pulmonary arterial systolic pressure of 40 mm Hg. She has been scheduled for mitral valvular repair.

1. Brugada P, Brugada J, Mont L, Smeets J, Andries EW. A new approach to the differential diagnosis of a regular tachycardia with a wide QRS complex. *Circulation* 1991;83(5):1649–1659.
2. Vereckei A, Duray G, Szenasi G, Altemose GT, Miller JM. Application of a new algorithm in the differential diagnosis of a wide QRS complex tachycardia. *Eur Heart J* 2007;28(5):589–600.