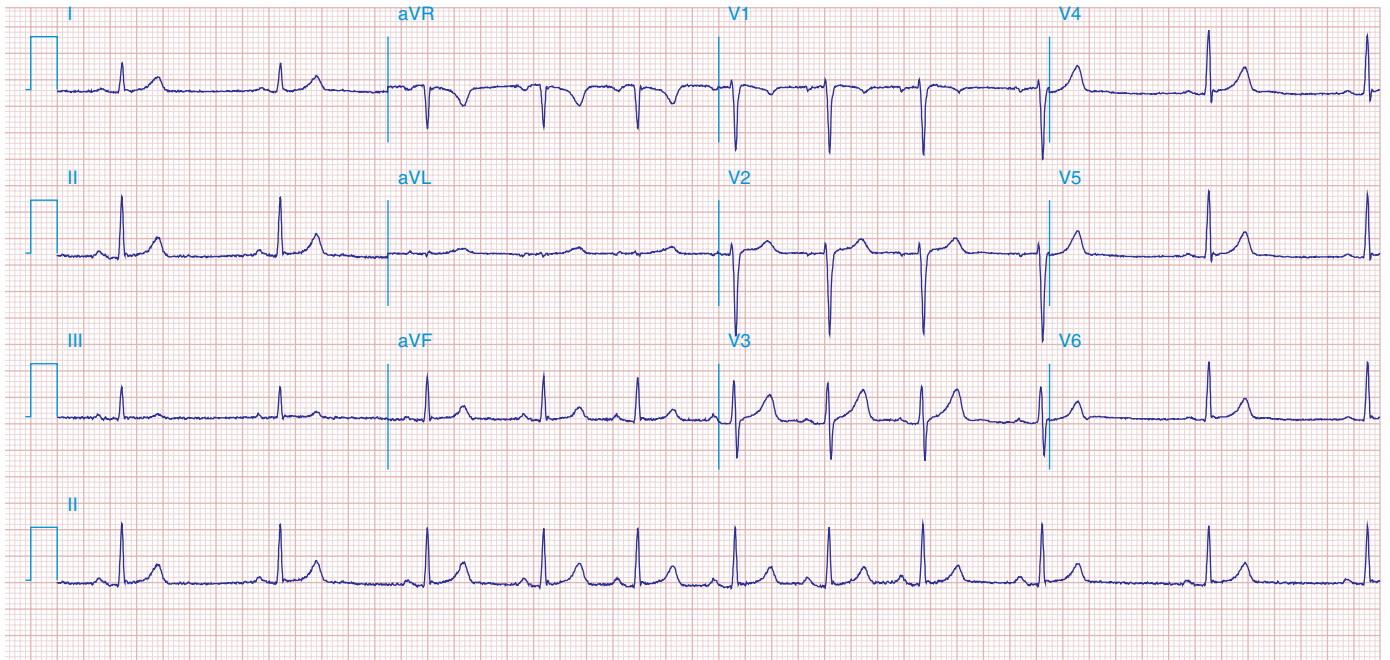


The electrocardiograms in this Atlas supplement those illustrated in Chaps. 225 and 226. The interpretations emphasize findings of specific teaching value.

All of the figures are from ECG Wave-Maven, Copyright 2003, Beth Israel Deaconess Medical Center, <http://ecg.bidmc.harvard.edu>.

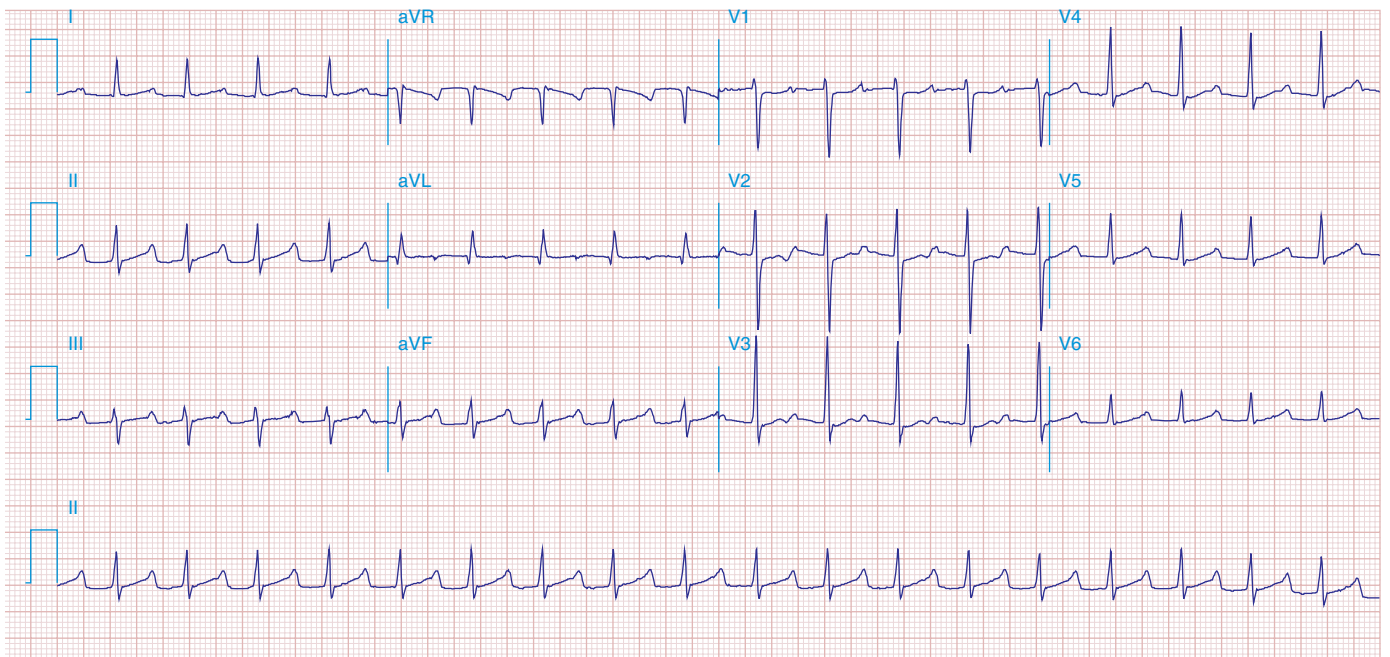
The abbreviations used in this chapter are as follows:

- AF—atrial fibrillation
- AV—atrioventricular
- AVRT—atrioventricular reentrant tachycardia
- LBBB—left bundle branch block
- LV—left ventricular
- LVH—left ventricular hypertrophy
- MI—myocardial infarction
- NSR—normal sinus rhythm
- RBBB—right bundle branch block
- VT—ventricular tachycardia
- WPW—Wolff-Parkinson-White

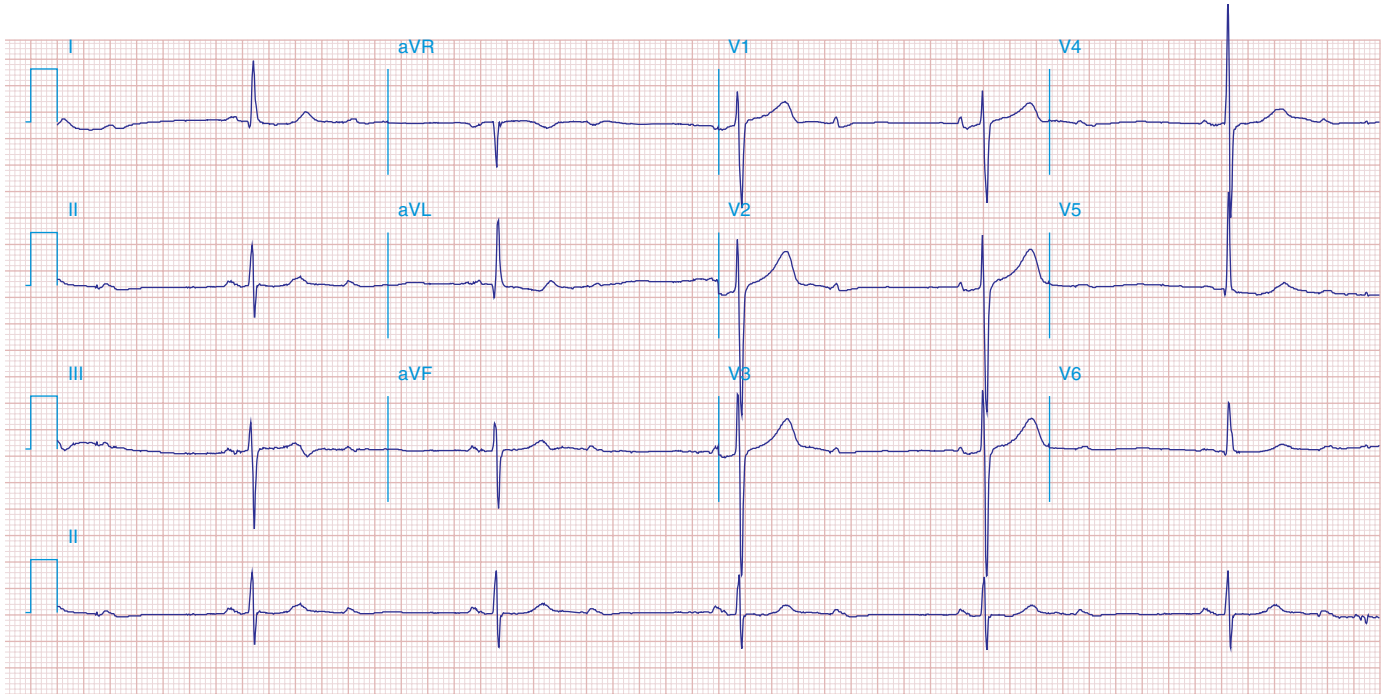


**FIGURE e21-1 Respiratory sinus arrhythmias**, a physiologic finding in a healthy young woman. The rate of the sinus pacemaker is slow at

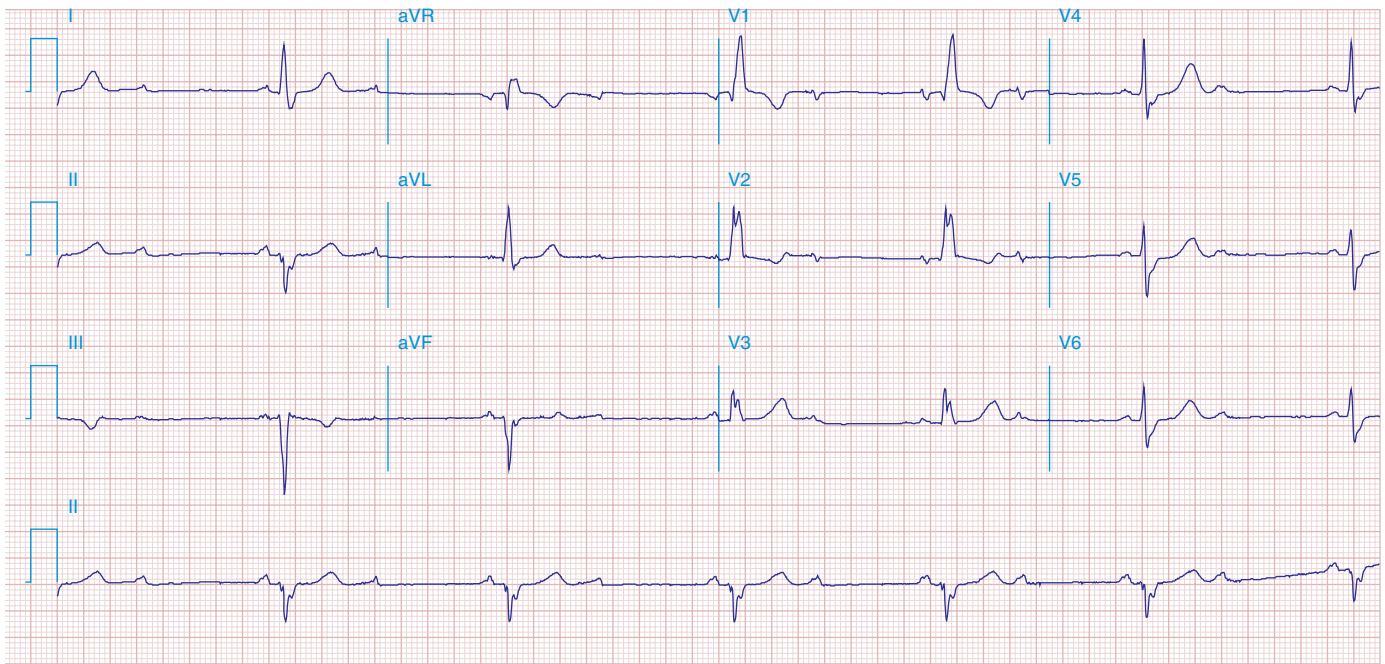
the beginning of the strip during expiration, then accelerates during inspiration and slows again with expiration.



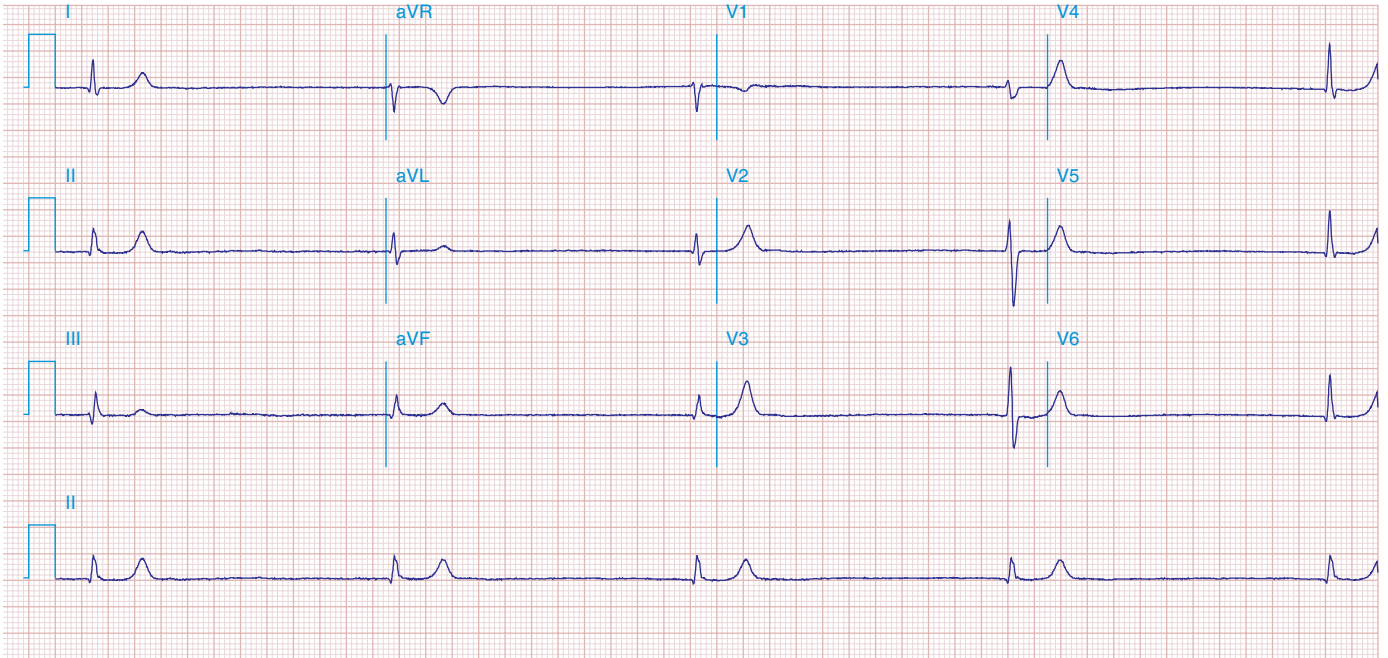
**FIGURE e21-2 Sinus tachycardia** (110/min) with first-degree AV block (PR interval = 0.28 s). The P wave is visible after the ST-T wave in V<sub>1</sub>-V<sub>3</sub>. Atrial tachycardia may produce a similar pattern.



**FIGURE e21-3** Sinus rhythm (pulse rate about 62/min) with 2:1 AV block causing marked bradycardia.

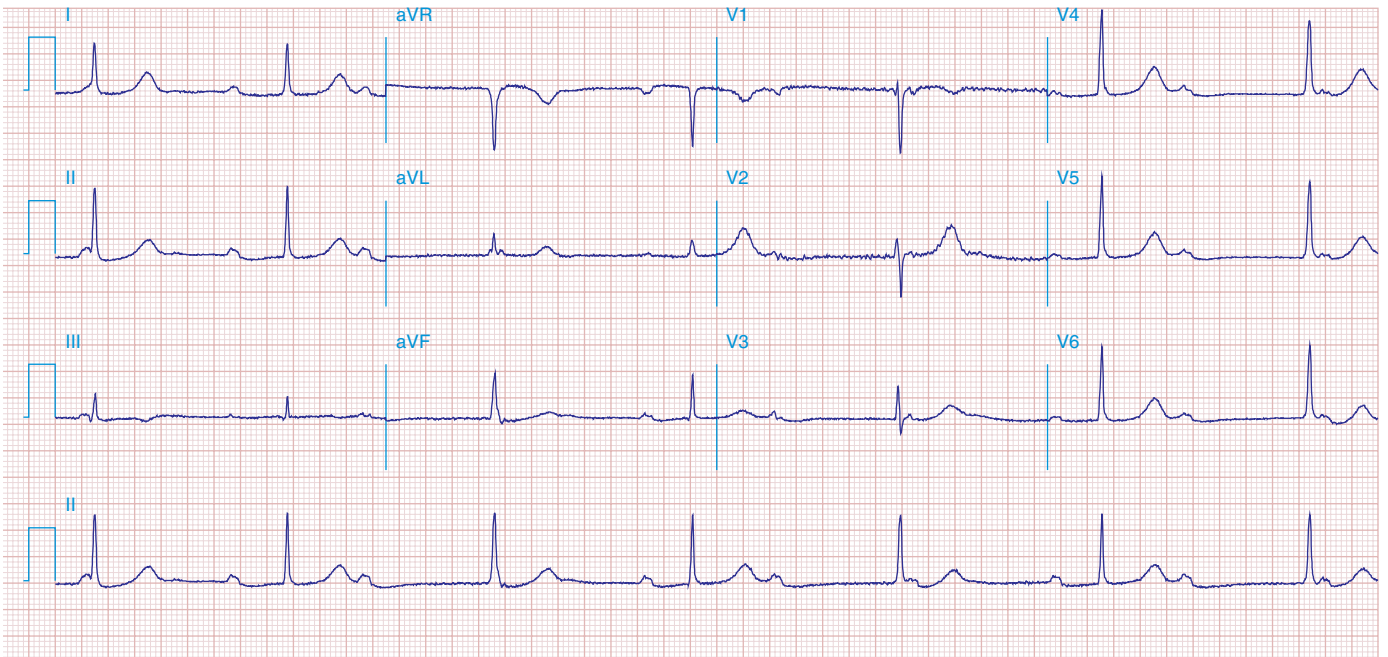


**FIGURE e21-4** NSR with 2:1 AV block. Left atrial abnormality. RBBB with left anterior fascicular block. Possible inferior myocardial infarction.

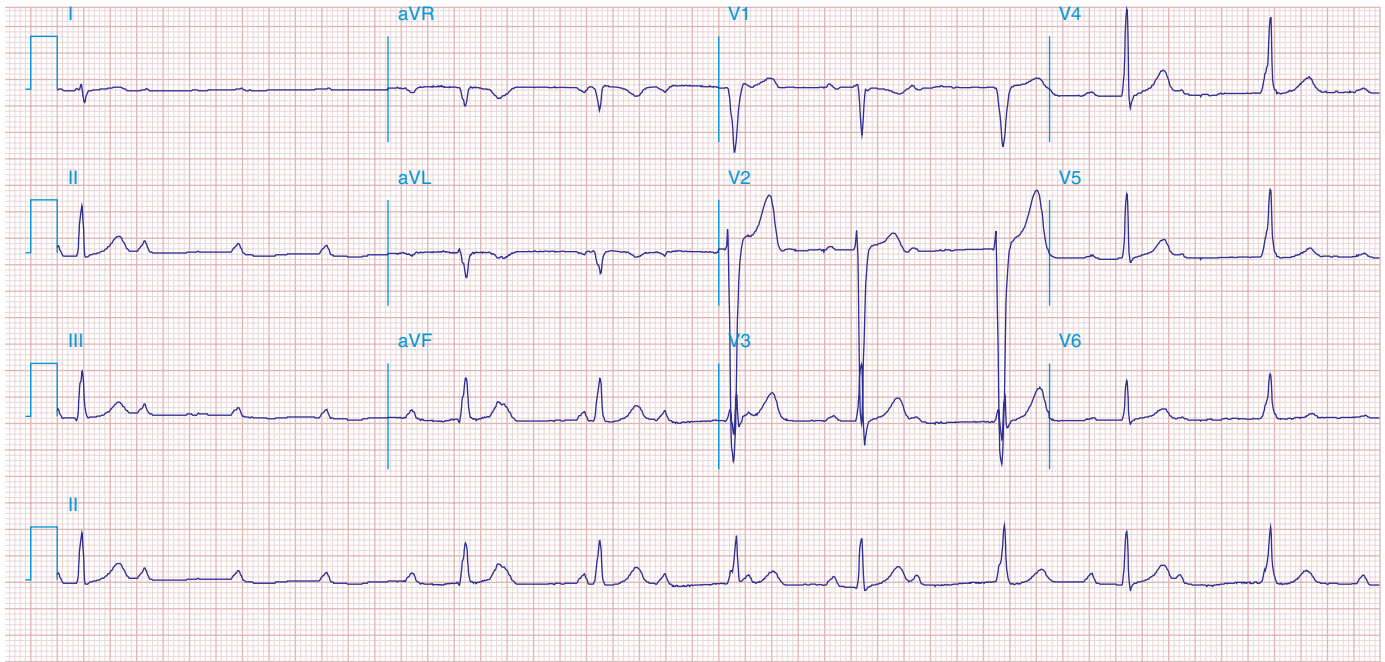


**FIGURE e21-5** Marked junctional bradycardia (25 beats/min). Rate is regular, flat baseline between narrow QRS complexes without P

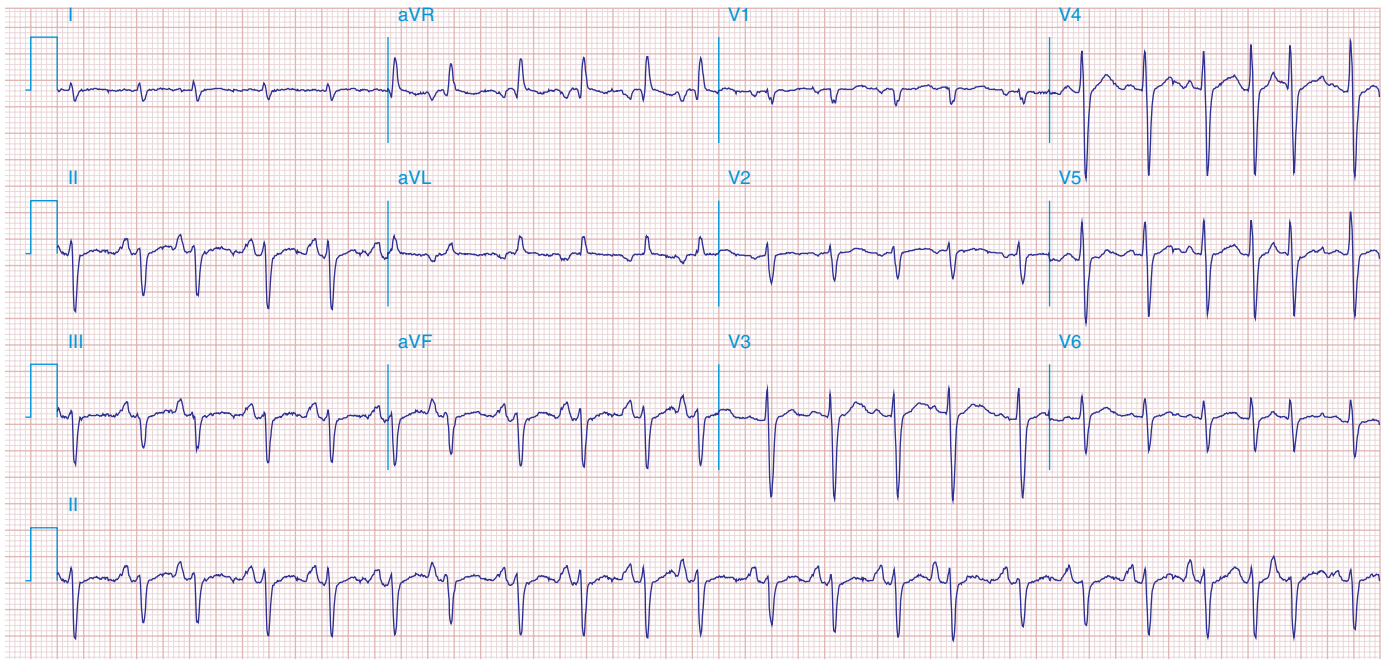
waves. Patient was on atenolol, with possible underlying sick sinus syndrome.



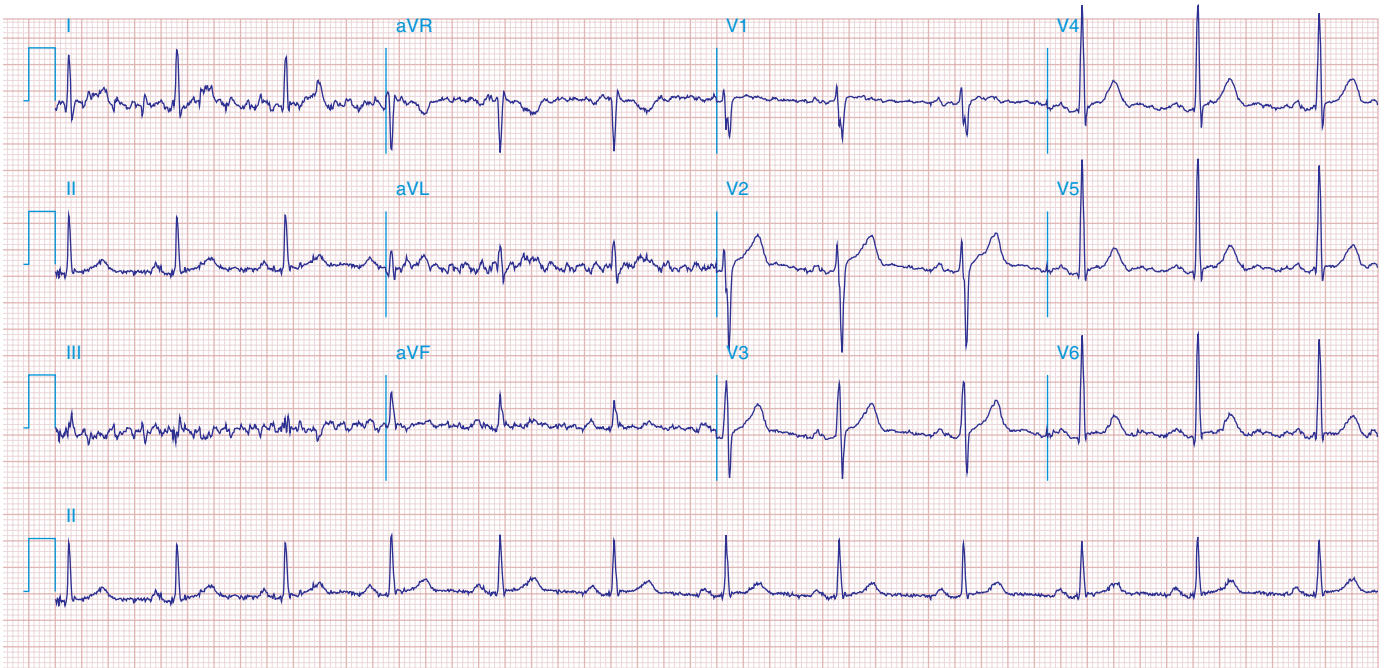
**FIGURE e21-6** Sinus rhythm at a rate of 64/min with third degree (complete) AV block at a rate of 40/min. The narrow QRS complex indicates an A-V junctional pacemaker. Left atrial abnormality.



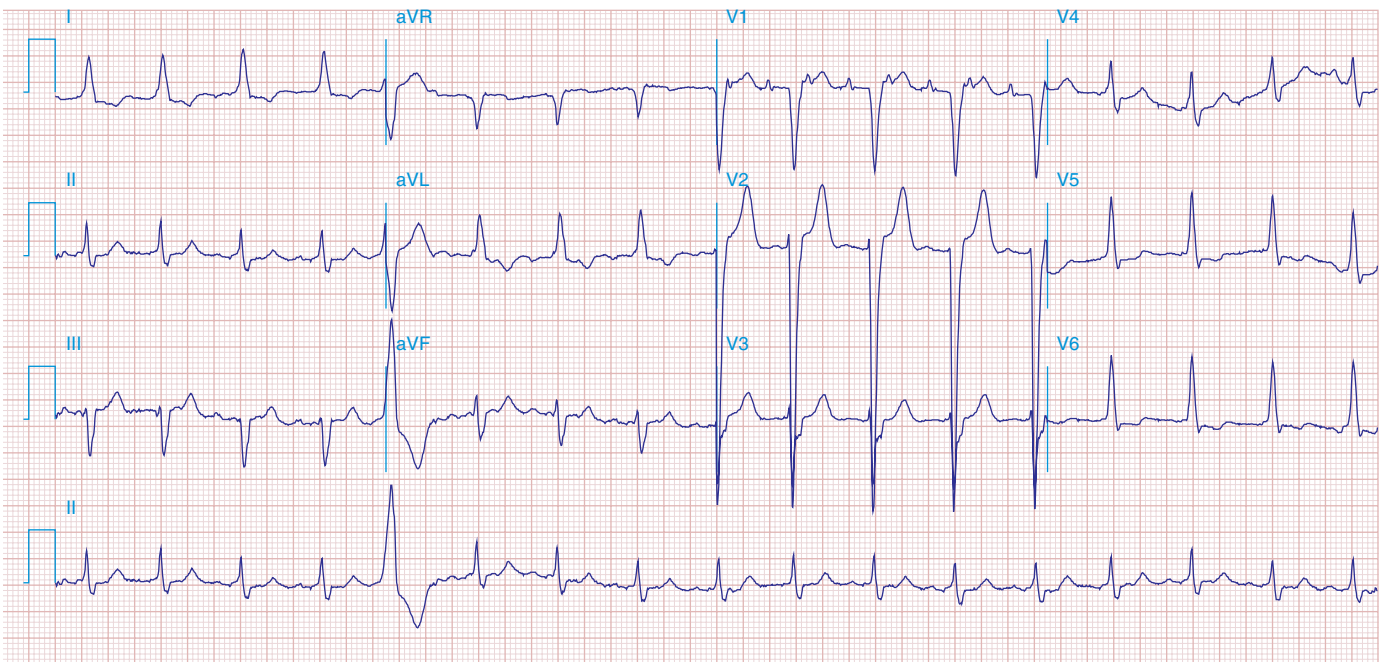
**FIGURE e21-7** Sinus rhythm at a rate of 90/min with **third degree (complete) AV block** and an A-V junctional pacemaker at a rate of 60/min, with an occasional dropped beat, in a patient with **Lyme carditis**.



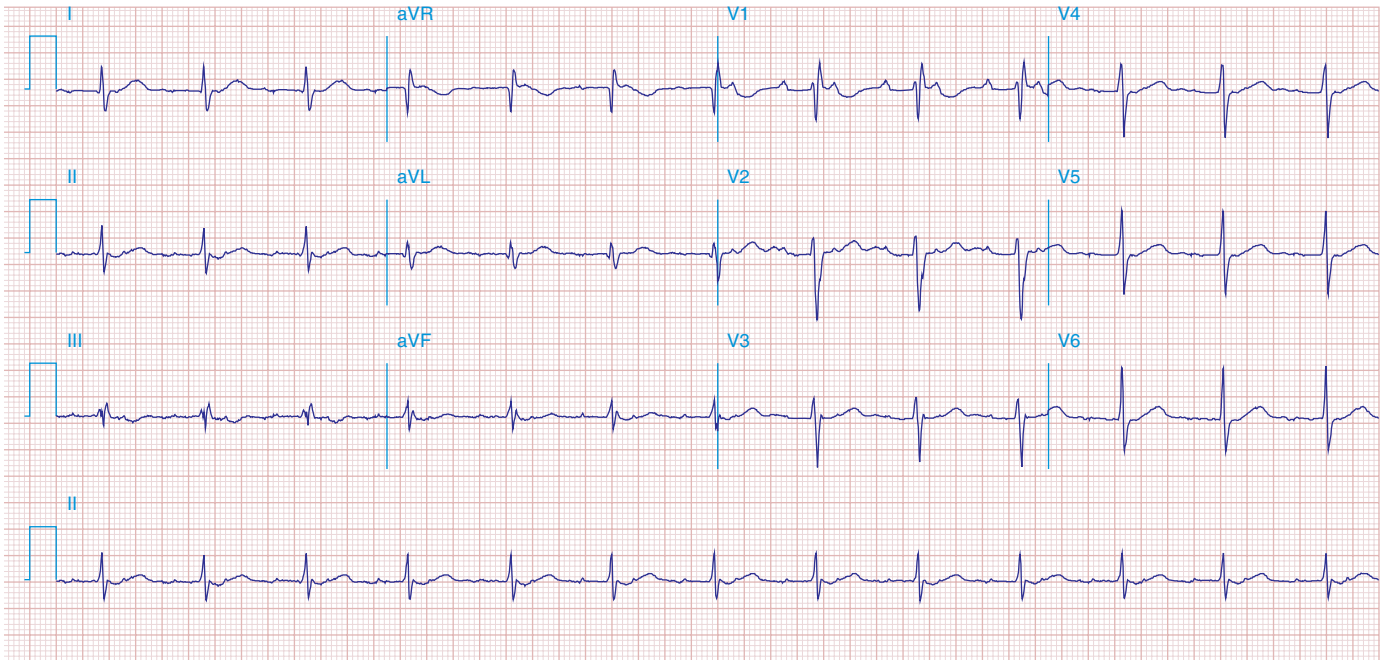
**FIGURE e21-8** **Multifocal atrial tachycardia** with varying P-wave morphologies and P-P intervals; right atrial overload with peaked P waves in II, III, and aVF; superior axis; poor R-wave progression with delayed transition in precordial leads in patient with **severe obstructive lung disease**.



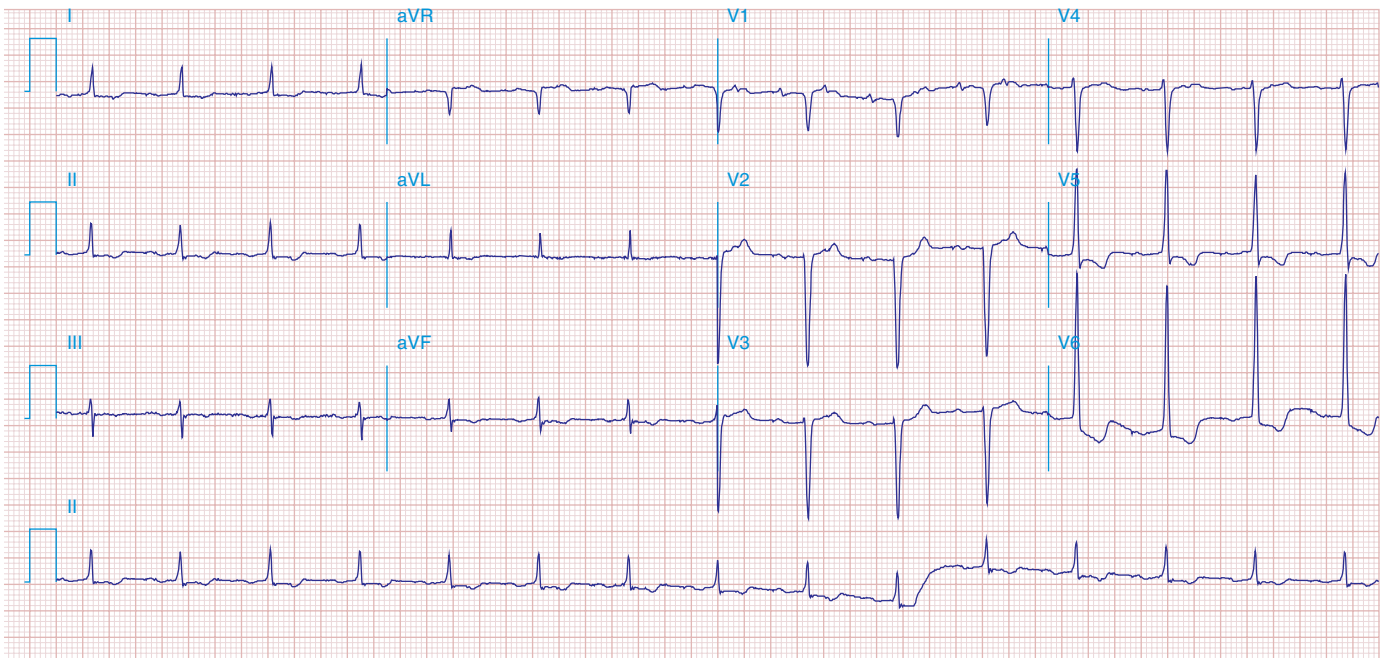
**FIGURE e21-9** NSR in a patient with **Parkinson's disease**. Tremor artifact, best seen in limb leads. This **tremor artifact** may sometimes be confused with atrial flutter/fibrillation.



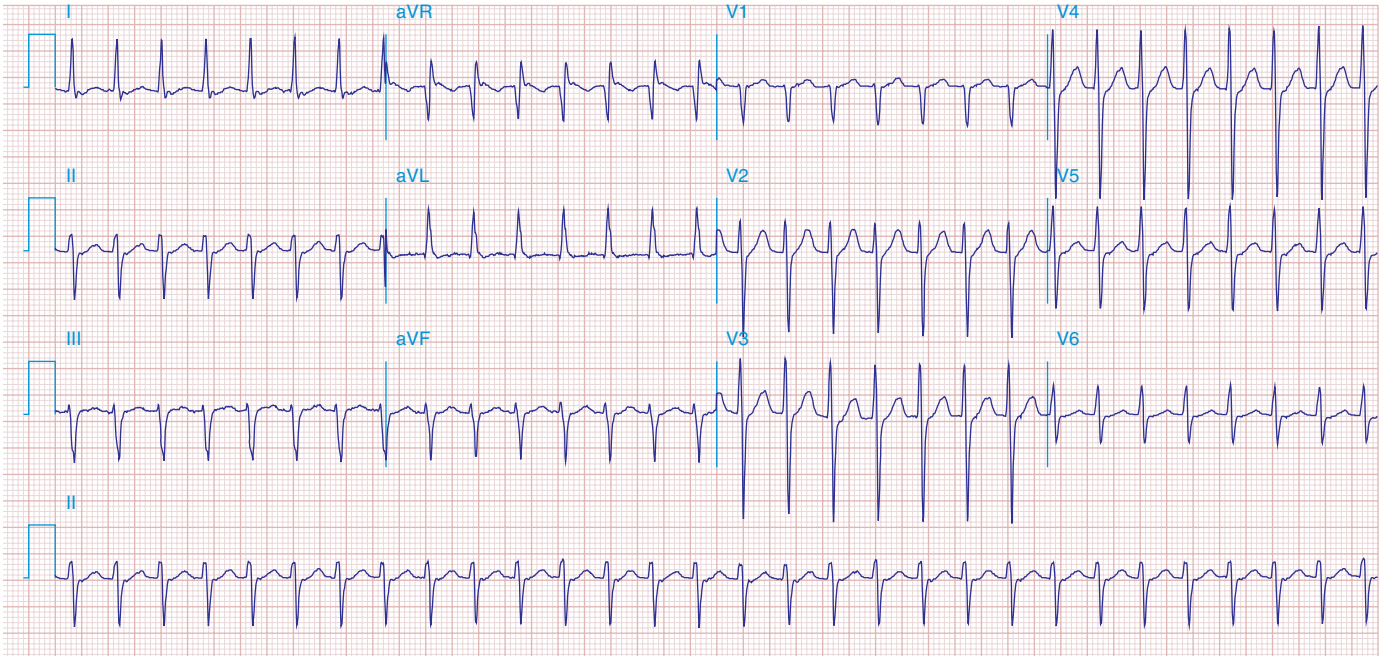
**FIGURE e21-10** Atrial tachycardia with atrial rate 200/min (note lead  $V_1$ ), **2:1 AV block**, and one premature ventricular complex. Also present: LVH with intraventricular conduction defect and slow precordial R-wave progression (cannot rule out old MI).



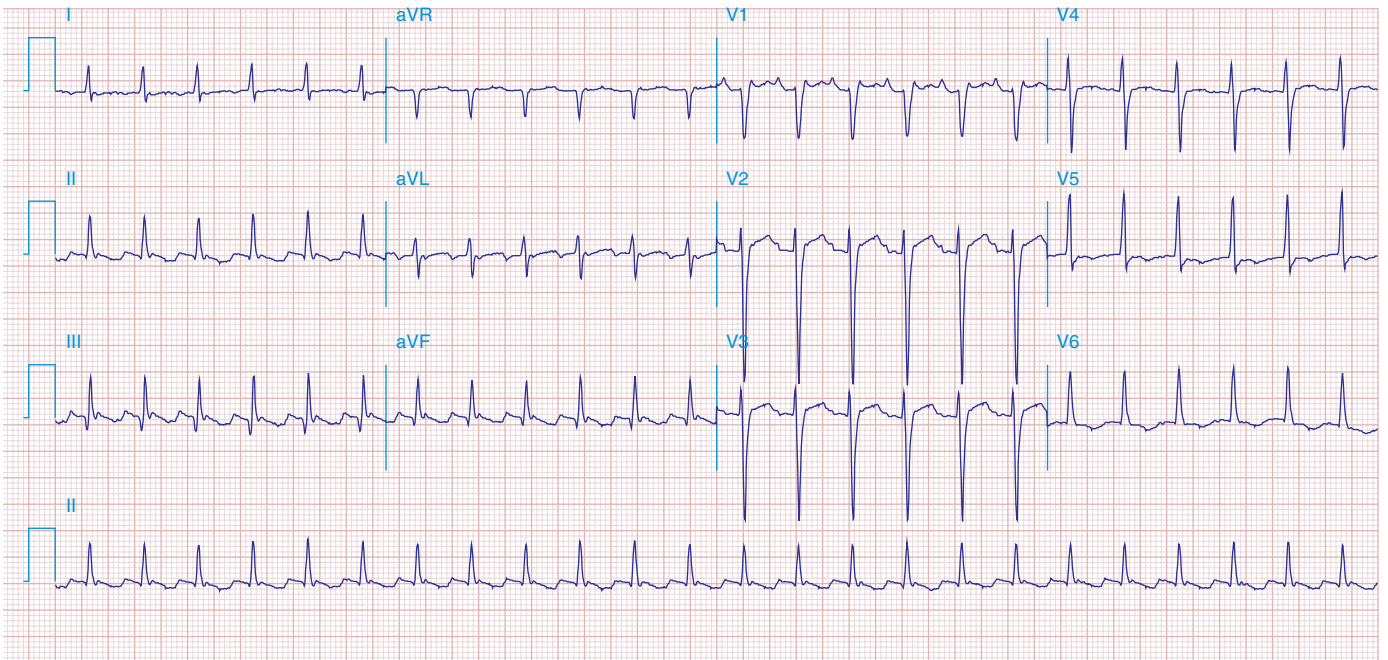
**FIGURE e21-11 Atrial tachycardia with 2:1 block.** The non-conducted (“extra”) P waves just after the QRS complex are best seen in lead V<sub>1</sub>. Also, there is incomplete RBBB and borderline QT prolongation.



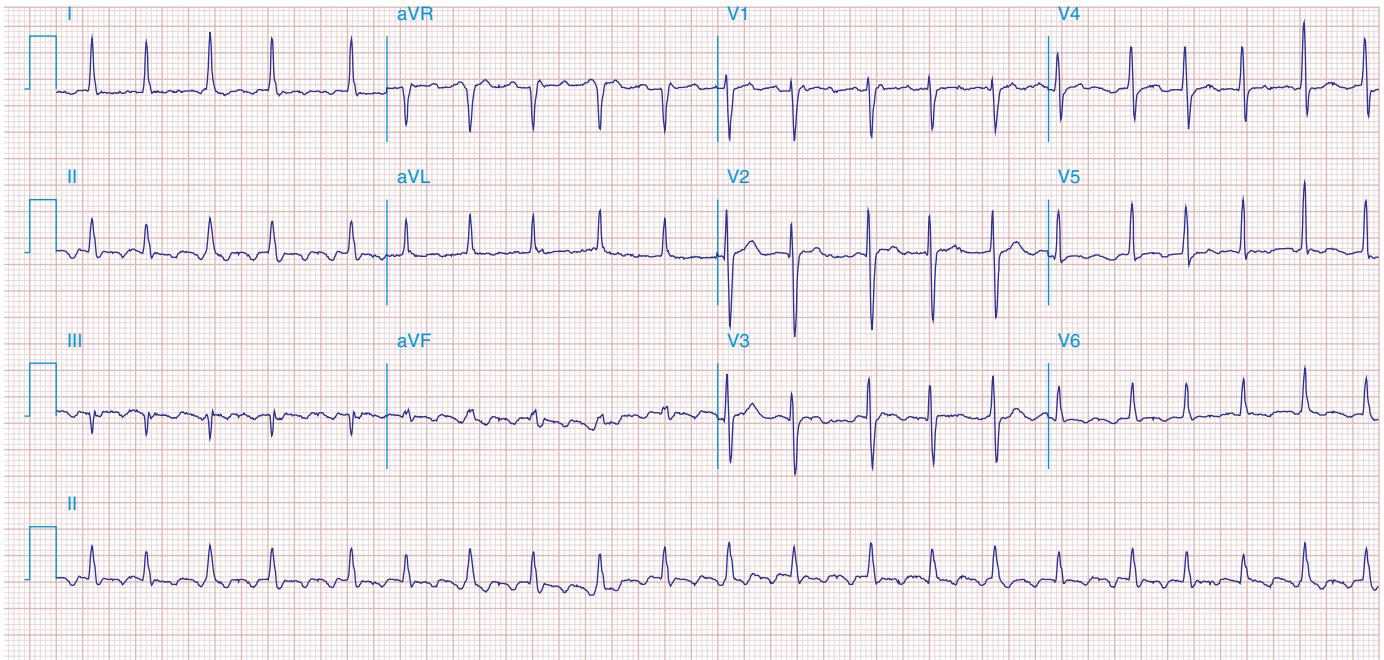
**FIGURE e21-12 Atrial tachycardia [180/min with 2:1 AV block (see lead V<sub>1</sub>)].** LVH by left precordial voltage. Slow R-wave progression (V<sub>1</sub>–V<sub>4</sub>) compatible with old anteroseptal MI.



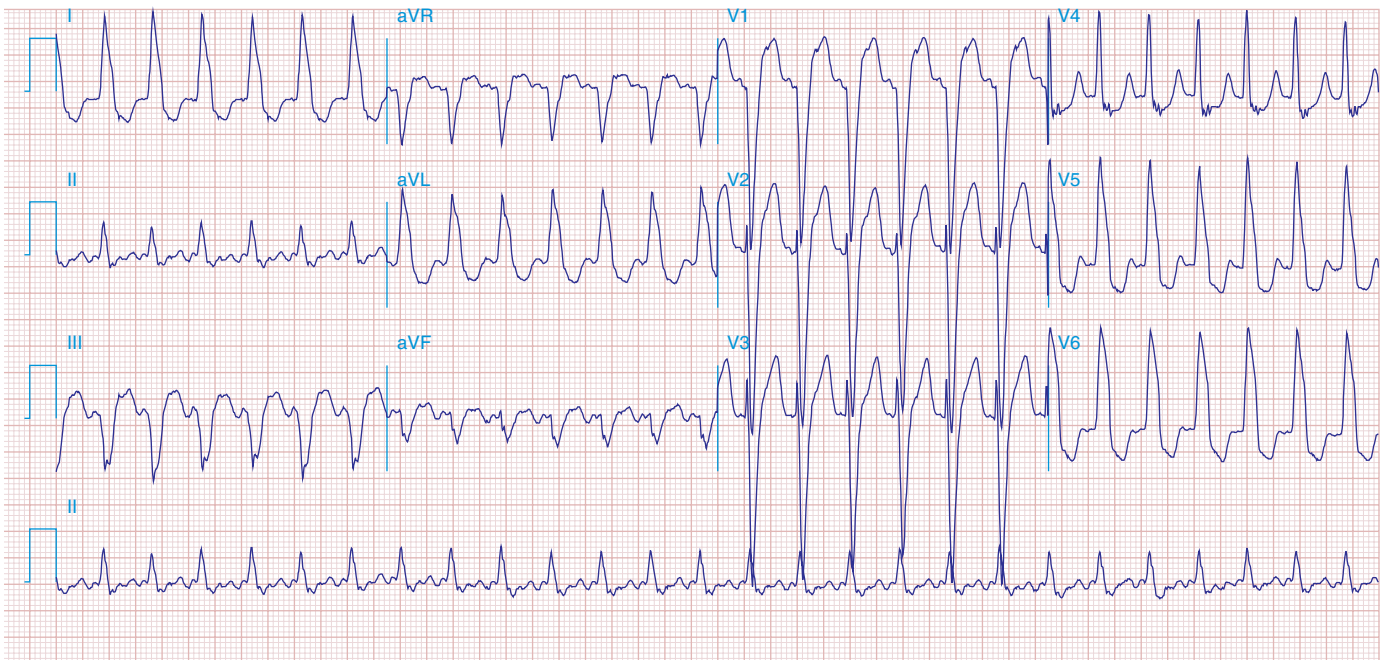
**FIGURE e21-13** AV nodal reentrant tachycardia (AVNRT) at a rate of 150/min.



**FIGURE e21-14** Atrial flutter with 2:1 conduction. Extra atrial waves in the early ST segment, seen, for example, in leads II and V<sub>1</sub>.

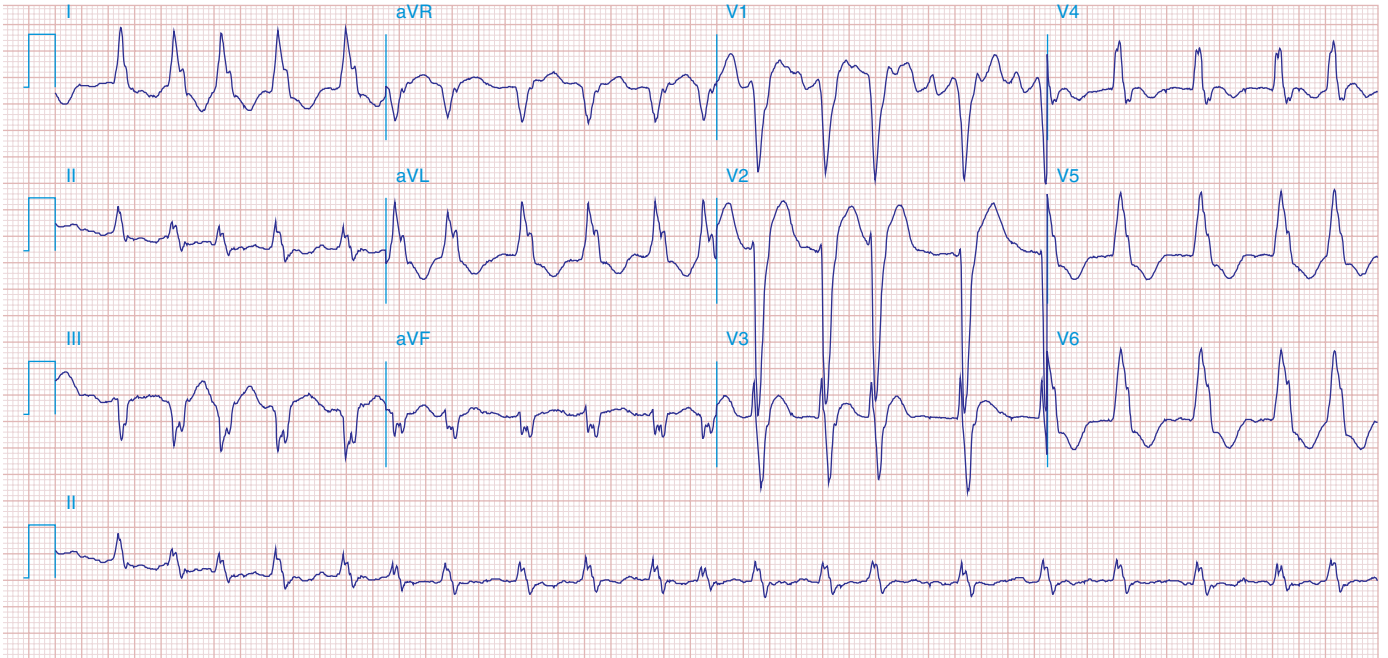


**FIGURE e21-15** Atrial flutter with atrial rate 300/min and 2:1 or 3:1 conduction. Flutter waves best seen in lead II.

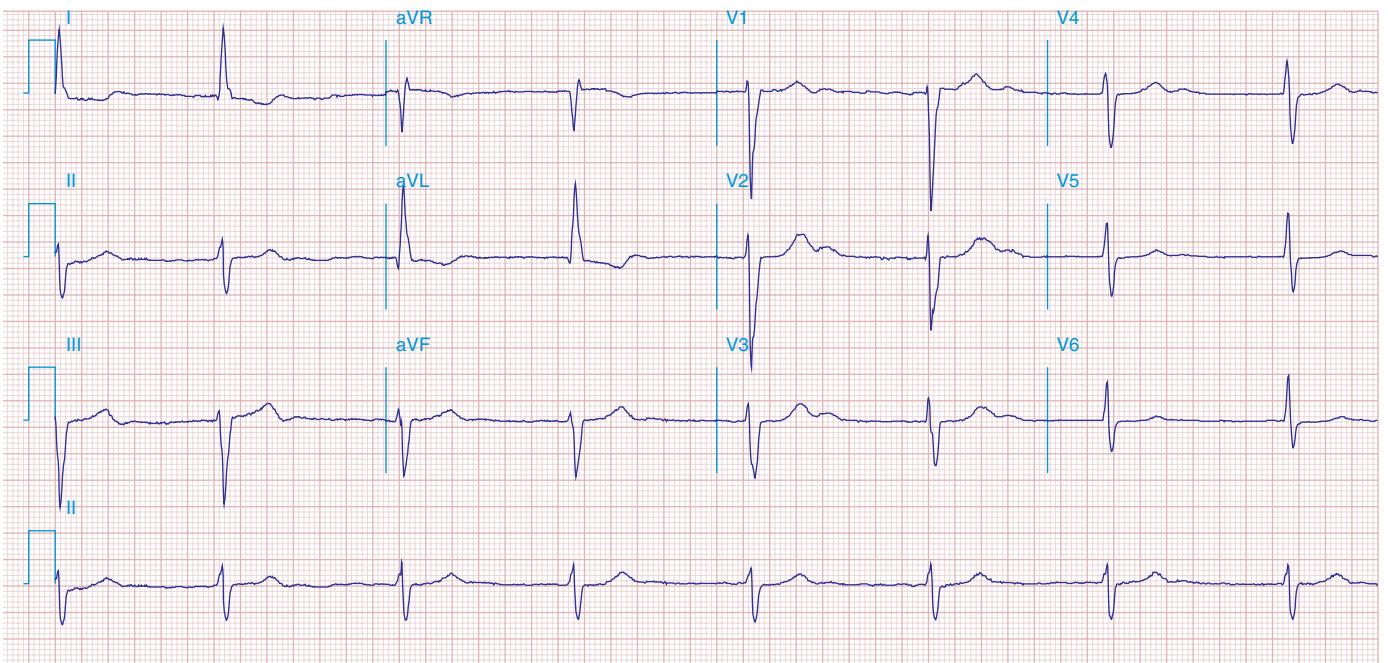


**FIGURE e21-16** Wide complex tachycardia. Atrial flutter with 2:1 conduction and LBBB, not to be mistaken for VT. Atrial activity is present in lead II at rate of 320/min.

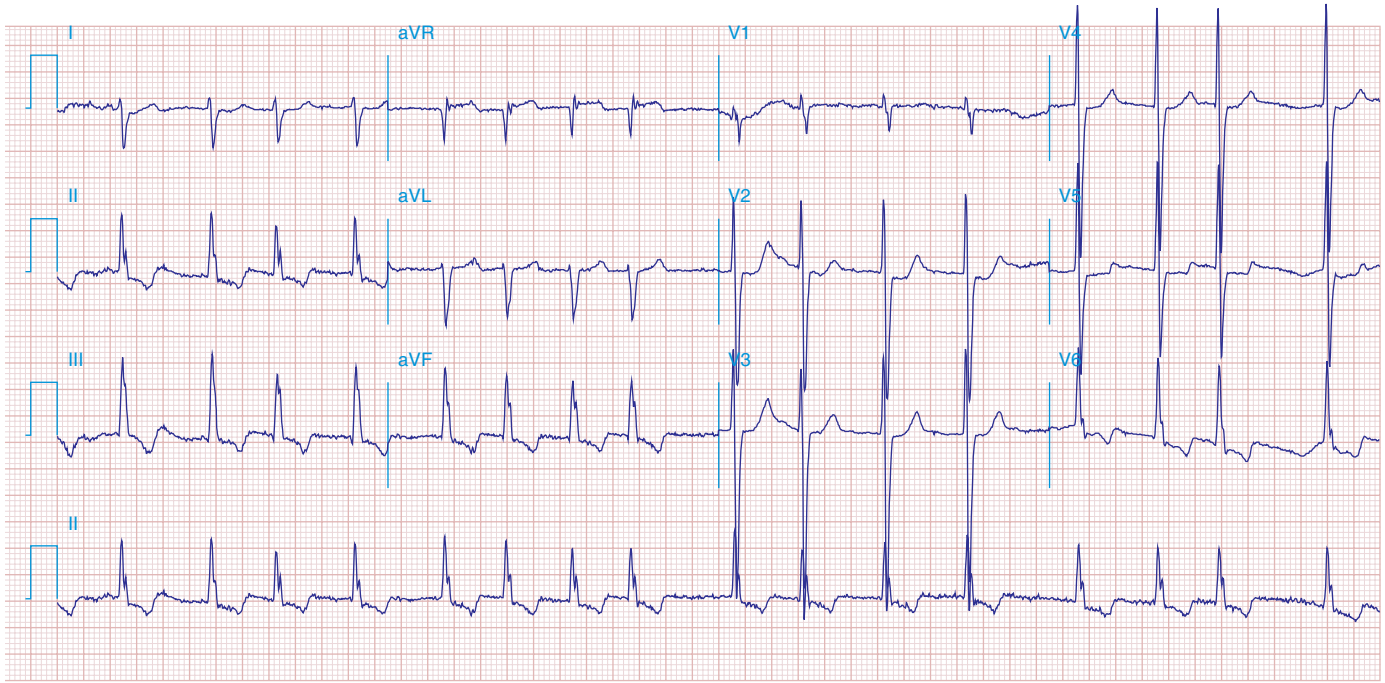




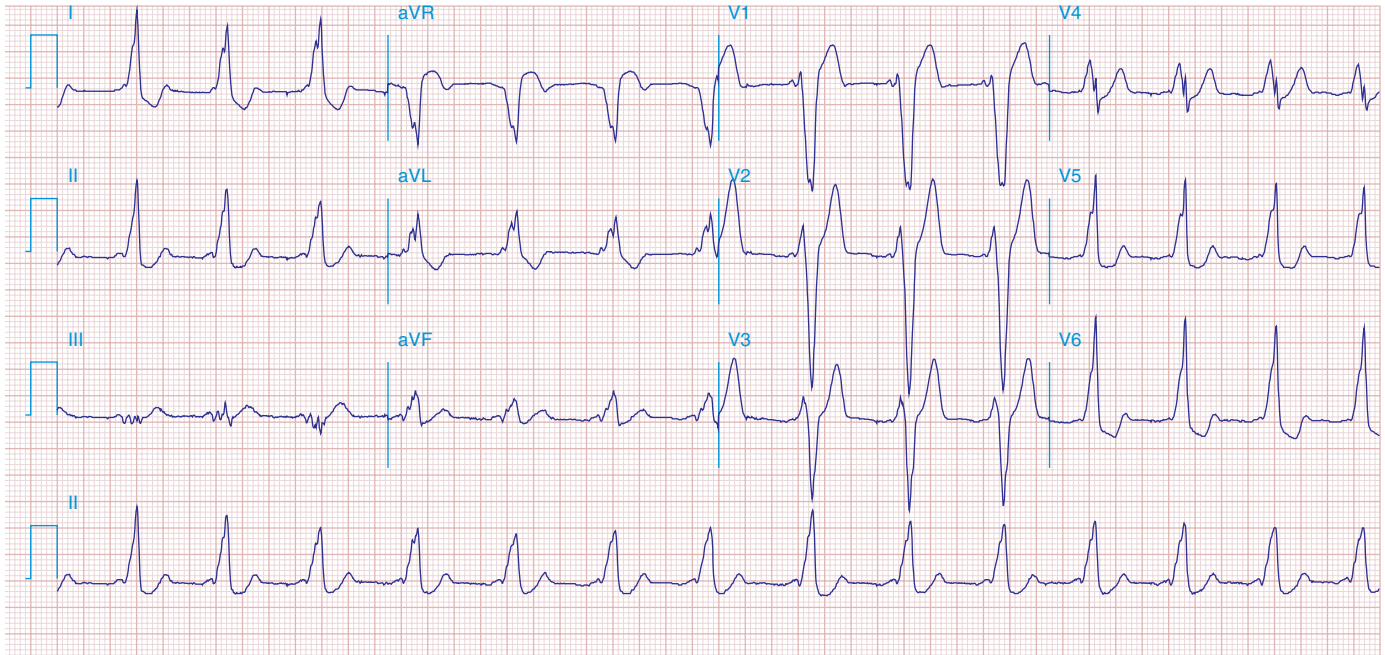
**FIGURE e21-17 AF with LBBB.** The ventricular rhythm is irregularly irregular.



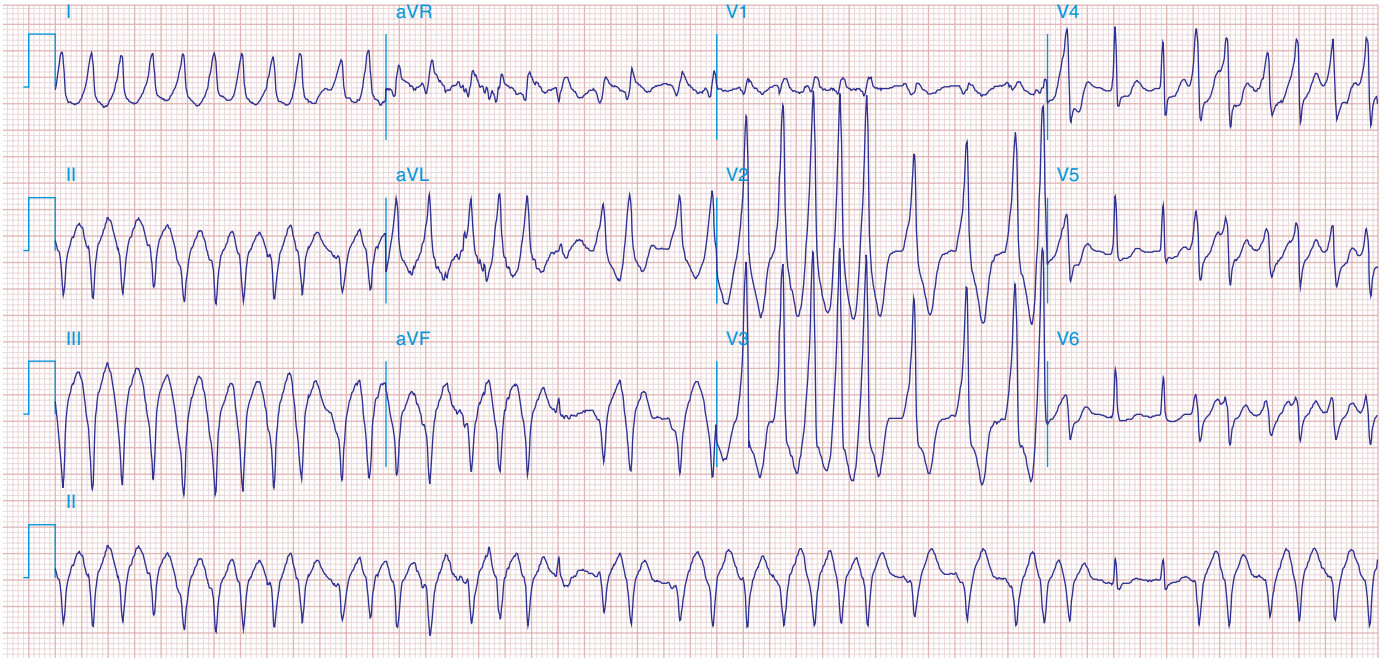
**FIGURE e21-18 AF with complete heart block and a junctional escape mechanism** causing a slow regular ventricular response (45/min). The QRS complexes show intraventricular conduction defect with left-axis deviation and LVH. Q-T (U) prolongation.



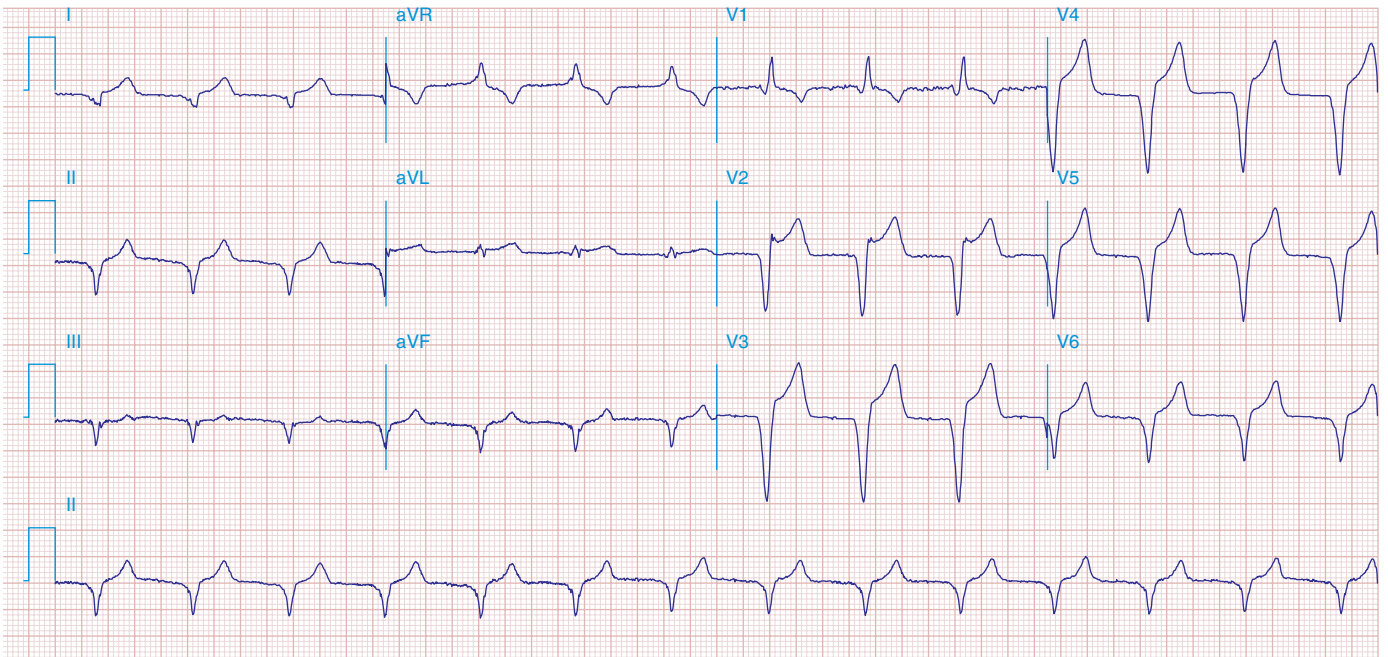
**FIGURE e21-19 AF with right-axis deviation and LVH.** Tracing suggests biventricular hypertrophy in a patient with **mitral stenosis and aortic valve disease.**



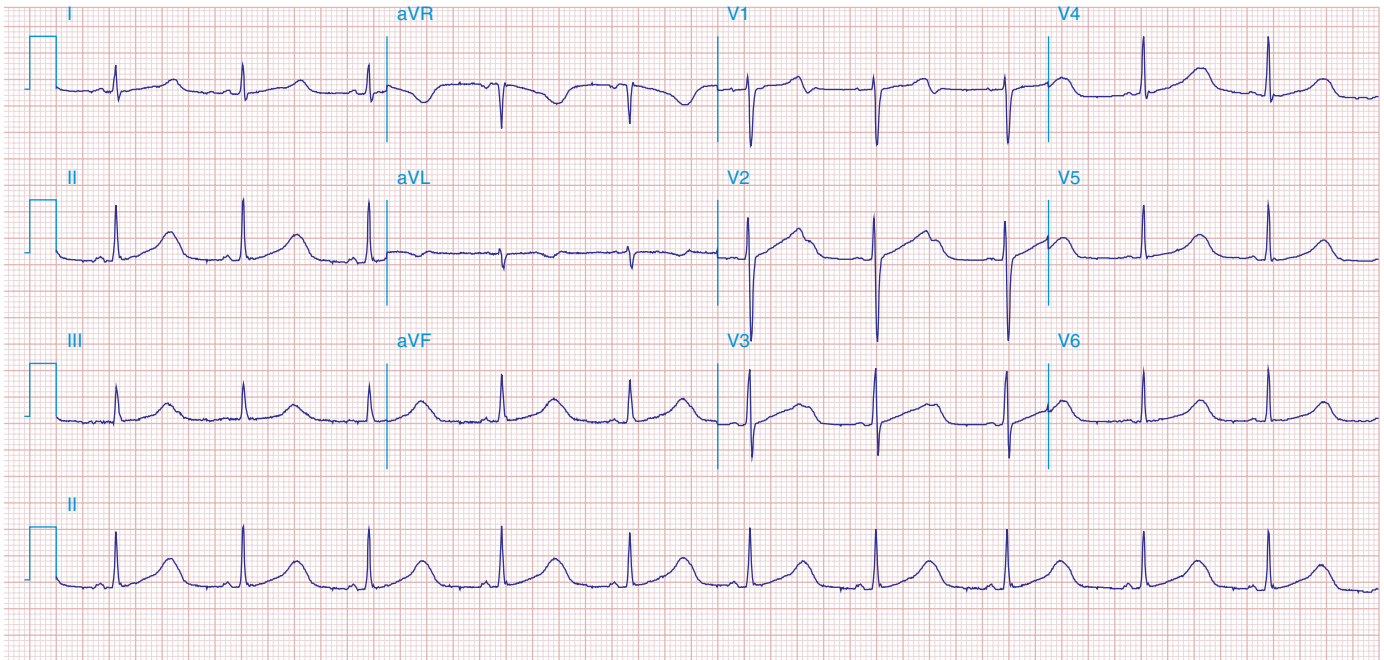
**FIGURE e21-20 WPW pre-excitation pattern,** with triad of short PR, wide QRS, and delta waves. Polarity of the delta waves (most positive in lead II and lateral chest leads) consistent with a right-sided bypass tract.



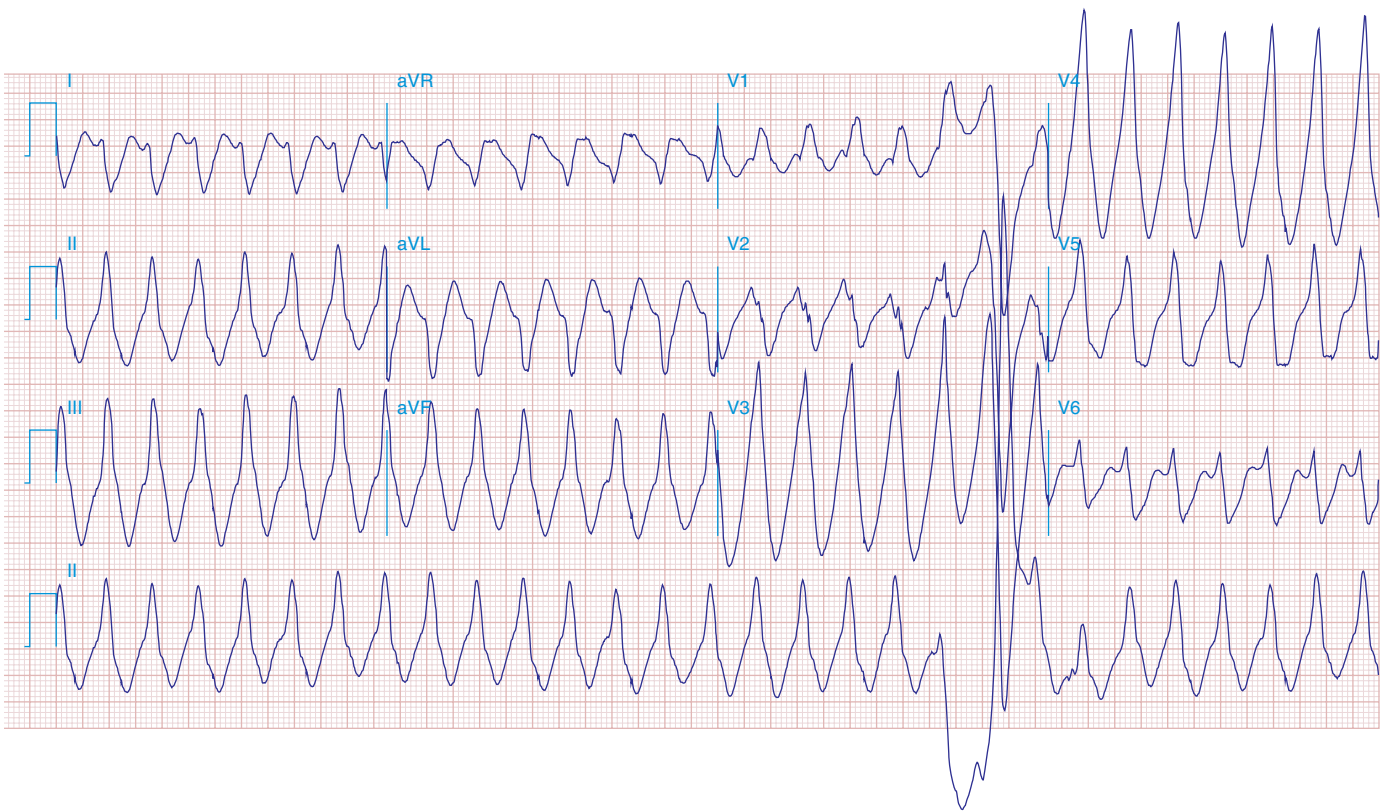
**FIGURE e21-21 AF in patient with the WPW syndrome, and antegrade conduction down the bypass tract leading to a wide complex tachycardia.** Rhythm is “irregularly irregular” and rate is extremely rapid (about 230/min). Not all beats are pre-excited.



**FIGURE e21-22 Accelerated idioventricular rhythm (AIVR) originating from the LV and accounting for RBBB morphology.** ST elevations in the precordial leads from **underlying acute MI.**



**FIGURE e21-23** Prolonged (0.60 s) QT interval in a patient with **hereditary long-QT syndrome**.



**FIGURE e21-24** **Monomorphic VT at rate of 170/min.** The RBBB morphology in  $V_1$  and the R:S ratio  $< 1$  in  $V_6$  are both suggestive of VT. The morphology of the VT is suggestive of origin from the left side of the

heart, near the base (RBBB with inferior/rightward axis). Baseline artifact is present also in leads  $V_1$ – $V_3$ .