

irregular, wide QRS rhythm with various degrees of QRS widening or preexcitation from beat to beat (see Fig. 9-5F). During AF in the setting of underlying WPW, activation of the ventricle over the AV node produces concealed retrograde activation of the accessory pathway, prolonging the refractory period of the pathway and moderating the rate of antegrade accessory pathway conduction.

Treating patients with AV nodal–blocking therapy decreases concealed retrograde activation of the pathway, facilitating antegrade accessory pathway conduction and potentiating hemodynamic instability. Appropriate acute therapy includes drugs that prolong the accessory pathway refractory period, such as intravenous procainamide, ibutilide, or amiodarone. In the event of hemodynamic instability, electrical cardioversion is preferred.

### Role of Catheter Ablation in Wolff-Parkinson-White Syndrome

Catheter ablation is highly effective for treating WPW, with success rates of approximately 95% and recurrence rates of only 5%. Procedural complications are uncommon, with major complications occurring in 2% to 4% of cases and deaths related to ablation occurring in 0.1%.

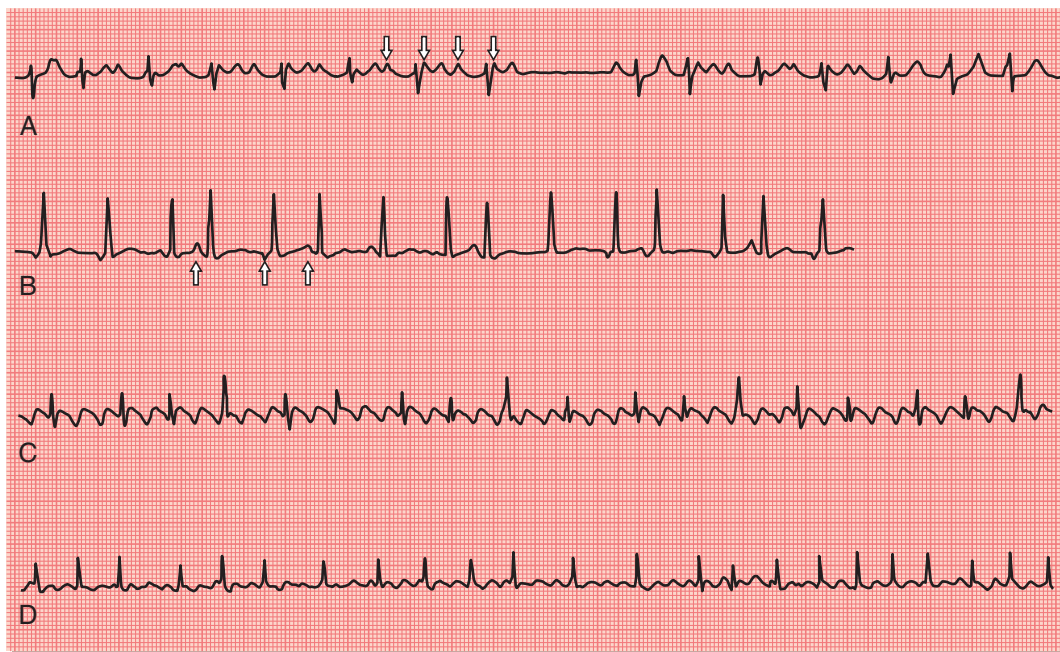
Although antiarrhythmic drug therapy may control symptoms, the expense and risks of pharmacologic therapy along with the safety and efficacy of ablation have made radiofrequency ablation the first-line therapy for symptomatic WPW. Because most patients with asymptomatic WPW patterns have a favorable prognosis, they should not be subjected to ablation.

## Atrial Arrhythmias

### Overview and Classification

Atrial arrhythmias depend entirely on the atria but are mechanically independent of AV conduction. As a consequence, intra-atrial arrhythmias persist despite the development of spontaneous or pharmacologically induced AV block. Tachycardias originating in the atria may be organized and repetitive, resulting from automaticity or intra-atrial reentry, or may be chaotic and disorganized, as is the case in AF. Therapy is directed at moderating the ventricular response during episodes of tachycardia or suppressing the underlying atrial arrhythmia.

Focal arrhythmias originate from a point source in one of the atria, and circumferential spread encompasses the remainder of the atrium. These arrhythmias display distinct P waves separated by a clear isoelectric segment. Focal arrhythmias commonly have an automatic mechanism, but in some cases, they may result from micro-reentry involving a geographically small portion of the atrium (e.g., around a single pulmonary vein), followed by radial spread to the rest of the atrium. Although most commonly a single abnormal focus may be active, in the setting of severe physiologic stress, multiple foci may be active simultaneously, leading to a chaotic electrocardiographic appearance with multiple distinct P waves, referred to as *multifocal atrial tachycardia* (MAT) (Fig. 9-6B). Automatic arrhythmias tend to be episodic and nonsustained, sometimes recurring incessantly. Cycle length often varies within a run, between runs, and with changes in autonomic tone.



**FIGURE 9-6** Atrial arrhythmias. **A**, Runs of focal atrial tachycardia with variable atrioventricular (AV) block. The tachycardia occurs in salvos with interspersed periods of sinus rhythm. The P waves (arrows) during tachycardia appear uniform although their cycle length varies, resulting in variable patterns of AV conduction and an irregular ventricular rate. **B**, Multifocal atrial tachycardia. Notice the incessant atrial premature beats (arrows) with at least three distinct morphologies. Because of the irregularly irregular response, this arrhythmia can be easily misdiagnosed as atrial fibrillation (which lacks discrete P waves) if the tracing is not carefully reviewed. **C**, Atrial flutter with rapid, variable conduction. Notice the continuous sawtooth atrial activity. Although commonly manifesting with stable 2:1 block and a regular response, the block varies in this patient, progressing through periods of 2:1 and 3:1 ratios and resulting in an irregular ventricular response. **D**, Atrial fibrillation with a rapid ventricular response. Notice the wavering baseline without distinct P waves and an irregularly irregular response.