Cardiac Case History—

Tachyarrhythmia and the Wolff-Parkinson-White Syndrome

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A 22-year-old white male presented to the Emergency Room following the abrupt onset of palpitation. During the preceding three years, he had experienced two or three episodes which subsided spontaneously. There was no history of heart disease, murmurs, or significant cardio-respiratory symptoms. He had had no previous hospitalizations or operations. His parents and two siblings, ages 24 and 13, were alive and well, with no record of heart disease or palpitations.

Review of systems was noncontributory.

He did admit to using drugs (intravenous heroin and barbiturates) a few months prior to admission.

On physical examination, he appeared to be a well-developed, well-nourished, thin white male in no distress. Blood pressure 110/80, pulse 215 per minute, temperature 100°, respirations 20 per minute. The only pertinent finding involved the heart, which had a regular apical rate of 215 per minute. There were no murmurs, gallops, or rubs, and the lungs were clear.

An electrocardiogram revealed a regular, supraventricular tachycardia with a ventricular rate of 215 per minute. Intravenous metaraminol raised the blood pressure to 210/100 but failed to convert the rhythm. Deslanoside (0.8 mg.) was then given intravenously, and within 30 minutes he converted to normal sinus rhythm.

A 12-lead electrocardiogram was being taken at the time of conversion, and normal sinus rhythm was recorded in leads V3-V6 (Fig.1). The postconversion 12-lead electrocardiogram revealed a short P-R interval (0.11 sec. -0.12 sec.) and an inconspicuous but definite delta wave (Fig. 2). In addition, a change in the direction of the initial QRS vector was noted with the rhythm change. These findings supported the diagnosis of a pre-excitation phenomenon.

Conversion to normal sinus rhythm was short-lived, and within 30 minutes he reverted to another tachyarrhythmia, which had strikingly different electrocardiographic features (Fig. 3). The ventricular rate was 240 to 300 per minute and irregular, and wide bizarre QRS complexes were observed. Blood pressure at this time was 95/60, and he was diaphoretic. Although the rhythm resembled a ventricular tachycardia, the awareness of the existence of a Wolff-Parkinson-White syndrome led to the diagnosis of atrial fibrillation with aberrant conduction.

Intravenous propranolol (3 mg.) and edrophonium (10 mg.) were tried unsuccessfully, and he was finally cardioverted with a DC electric shock of 60 watts-seconds. The post-conversion 12-lead electrocardiogram was identical to the one taken after the initial conversion to sinus rhythm (Fig. 2).

The increased frequency of tachyarrhythmia in the WPW syndrome is well known and is related to the presence of anomalous atrioventricular connections. Paroxysmal atrial tachycardia is the arrhythmia most often observed. Less frequently, atrial fibrillation takes place.

The occurrence of both tachyarrhythmias in the same patient illustrates the function of the anomalous pathway in this syndrome. During the atrial tachycardia, activation of the ventricle occurs exclusively via the normal A-V conduction system and in a retrograde direction via the anomalous pathway to complete a re-entrant circuit. During atrial fibrillation, the ventricles are activated exclusively via the anomalous pathway resulting in a very rapid ventricular rate with wide QRS complexes that simulate ventricular tachycardia.

The likelihood of misdiagnosis should be em-