Electrocardiographic Interpretation of Cardiac Arrhythmias

Diagnosis of cardiac arrhythmias depended exclusively on electrocardiographic (ECG) interpretation until late 1960’s, when Scherlag et al. succeeded in recording the electrical activity of the bundle of His using electrode catheters. This invention of His bundle electrocardiography heralded the era of clinical cardiac electrophysiologic studies (EPS) and catheter ablation techniques for the cure of arrhythmias. Today, it is quite remarkable that the mode and site of initiation of rhythm disturbances are precisely mapped and the mechanism of their maintenance elucidated.

However, it is my impression that such wonderful progress in medical technology in the last forty years has ironically undermined the classical art of ECG interpretation for various rhythm disturbances. I will cite my experience that led me to hold this impression. Several years ago, a middle-aged female patient was referred to my arrhythmia clinic. The referral stated that an EPS was carried out to identify the genesis of ventricular tachycardia (VT), but application of a series of premature stimuli failed to induce VT episodes. Examination of the original Holter records revealed that the arrhythmia read as VT by computer was not paroxysmal VT. It was what I call nonparoxysmal VT (or accelerated idioventricular rhythm), showing a succession of several wide QRS complexes at a rate of approximately 65/min. Since this arrhythmia results from an enhanced automaticity in the intraventricular conducting system and not from reentry, premature stimulation would not induce repetitive firing. Thus, the patient had been subjected to an unnecessary invasive study due to an erroneous interpretation of clinical ECG.

Another anecdote was related to an elderly patient who presented with a mild chest discomfort. A cardiologist specializing in percutaneous coronary intervention interpreted the recorded arrhythmia as atrial fibrillation (Af). The ECG, however, showed the presence of sinus rhythm with second degree atrioventricular (AV) block, several atrial premature systoles and AV junctional escape beats without any episode of Af. The logic of that physician was that observed irregular R-R intervals seemed to represent “arrhythmia absoluta,” and hence, Af. Thus, the prerequisite of diagnosing Af, or the absence of P waves with replacement of isoelectric line by fine undulations, was entirely forgotten.

Finally, I would like to point out one other fact. Today, probably 99 out of 100 physicians tell their patients, “You have an arrhythmia,” without specifying the type of rhythm disturbance. Such a statement is totally insufficient, since some arrhythmias are benign and do not require immediate therapy, while others could lead to sudden cardiac death. Thus, it is my hope that every cardiologist recognizes the importance of a correct ECG diagnosis and gives an explicit explanation of the type of arrhythmia to the patient.

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