243 Principles of Clinical Cardiac Electrophysiology

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HISTORICAL PERSPECTIVE

Clinical cardiac electrophysiology is the subspecialty of cardiology that focuses on the study and management of heart rhythm disorders. The development of the modern surface electrocardiogram (ECG) by Willem Einthoven more than 100 years ago enabled understanding of the relationship between cardiac electrical potentials, mechanical cardiac function, and pathophysiology of cardiac arrhythmias. In the mid-twentieth century, the recording of cellular membrane currents enabled the understanding that the surface ECG represents the sum of cellular cardiac electrical activity. An understanding of cellular electrophysiology also ushered in the development of antiarrhythmic drugs utilized by cardiac electrophysiologists.

The modern era of clinical cardiac electrophysiology began with the first recordings of human intracardiac electrograms in the 1960s. Initially, invasive electrophysiology studies were limited as diagnostic tools. This included serial electrophysiologic testing to evaluate arrhythmia mechanisms and evaluate arrhythmia suppression by antiarrhythmic drugs, and programmed stimulation of the heart for risk stratification of sudden cardiac death. In the 1960s and 1970s, cardiac surgery was the only available invasive treatment for cardiac arrhythmias. The subsequent development of radiofrequency catheter ablation in the 1980s ushered in the era of interventional cardiac electrophysiology. In addition, with the development of implanted cardiac rhythm management devices including pacemakers and defibrillators, clinical cardiac electrophysiology became a distinct medical subspecialty.