History of Atrial Fibrillation

Arthur J. Moss, M.D.

From the Cardiology Unit, Department of Medicine, School of Medicine and Dentistry, University of Rochester, Rochester, NY, USA

This issue of *Annals* includes an editorial on current rate and rhythm control therapy for atrial fibrillation. It seemed appropriate to include in this issue of *Annals* a perspective on the history of this arrhythmia since this year is the centennial anniversary of Einthoven's publication of the "elektrokardiogramms,"² a diagnostic recording technique that provided the underpinning of our understanding of this arrhythmia.

Observations in animal studies identified atrial fibrillation as a grossly irregular rhythm long before this arrhythmia was clinically documented in patients. Experimental studies revealed that the atria could "fibrillate" whereas the ventricles remained in an organized although irregular contraction, and vice versa, i.e., that the ventricles could "fibrillate" whereas the atria contracted in a regular fashion. Eventually, these observations led to an understanding of the physiology of conduction and refractoriness in the atrio-ventricular node.

The true nature of clinical atrial fibrillation, originally called auricular fibrillation, became apparent following the introduction of the electrocardiogram. Several terms were used to describe this arrhythmia: "delirium cordis," "complete irregularity of the pulse," and "arrhythmia perpetua." Early on, it was appreciated that auricular flutter and auricular fibrillation were related arrhythmias, with the difference involving the rate and regularity/irregularity of the two arrhythmias. Sir James Mackenzie, using graphical recordings of the jugular veins, showed that in auricular fibrillation the normal "a" waves of auricular contraction were absent and replaced by rapid vibratory "f" waves.³ In 1909, Rothberger and Winterberg described in experimental animals and in patients the electrocardiographic findings of "arrhythmia perpetua" that

consisted of absolute ventricular arrhythmia, absence of P waves, and presence of irregular oscillations of the string of the galvanometer due to the fibrillary waves.⁴ This publication antedated by only a few months the independent demonstration by Sir Thomas Lewis of auricular fibrillation in patients with mitral stenosis and in cases with "cardiovascular degeneration."⁵ Subsequent animal studies by Mayer,⁶ Garrey,⁷ and Mines⁸ gave rise to the circus movement origin of these arrhythmias, with auricular flutter its simplest manifestation and auricular fibrillation its more complicated form.

In 1911, Jolly and Ritchie published in the journal *Heart*, edited by Sir Thomas Lewis, their classic article entitled "Auricular Flutter and Fibrillation."¹ Selected portions of this 44-page article are reproduced in this history section of *Annals*. The abstracted article includes the table of contents, the method of examination with invaluable descriptions of the string galvanometer, a resume of the relevant literature up to 1911, the jugulo-carotid tracing and electrocardiographic findings in one of 10 patients with "arrhythmia perpetua" (auricular fibrillation), a summary of the article, and the references. This article should be read in its entirety for it shows how astute clinical observations and superb electrophysiologic reasoning advanced the science of clinical cardiology a century ago – an approach that is equally applicable today in the era of sophisticated electrophysiology and molecular genetics.

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*Introductory note to a classic article by Jolly and Ritchie.*¹

Address for reprints: Arthur J. Moss, M.D., Heart Research Follow-up Program, Box 653, University of Rochester Medical Center, Rochester, NY 14642, USA. Fax: 585-273-5283; E-mail: heartajm@heart.rochester.edu

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