



Avicenna and Tremor of the Heart

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Physicians have been mesmerized by a beating heart and its relationship to the peripheral pulse since the ancient times. Although William Harvey in 1628 was credited as the first to describe “fibrillation of the auricles,” chaotic irregularity of the pulse was acknowledged by some as early as in the antiquity. In fact, a close examination of history may reveal a description of cardiac arrhythmias long before the era of modern medicine.

Dhanvantari, the ancient Indian physician, concluded in the fifth century B.C. that assessment of the arterial pulse is an integral part of physical examination. In Ayurveda (knowledge of life), Dhanvantari was the first to provide a methodology for pulse examination and pioneered the modern-day approach of using the wrist to take the patient’s pulse^[1]. Years later, Claudius Galen described the relationship between peripheral pulse and the beating heart. Galen wrote, “the arterial pulse is an inherent property of the blood vessel. It is a vital power that springs from the heart and is transmitted through the coats of the arteries”.

In the early medieval period, Avicenna, a Persian scholar became well-known for his comprehensive medical text, the Canon of Medicine. Like his predecessors, Avicenna had a fascination with the pulse. He used Galen and Dhanvantari’s teachings to categorize the pulse according to its different features, but he also delivered a general understanding of cardiac arrhythmias based on the characteristics of the pulse. In fact, if dive into Avicenna’s medical texts, we can find the first narrative of the most common arrhythmia, atrial fibrillation.

In the Canon of Medicine, Avicenna describes two kinds of irregular pulses: regularly, irregular and irregularly, irregular. Interestingly, he was the first to believe that an “irregular pulse” was the result of “the fluttering in the heart.” Avicenna recognized the relationship between an irregular pulse, fibrillation of the heart, and a rapid heart rate. He wrote: “the irregularity increases until cardiac tremor comes on, and a thrilling pulse result.” He compared the rhythm of an irregular pulse to the flight of the gazelle and continued, “if the irregularity is orderly, it betokens lesser constitutional injuries; if disorderly, it shows that there are more serious constitutional defects to deal with.” It is in his narrative of the irregular pulse that we recognize, without excessive strain on the imagination, the first description of atrial fibrillation.

Avicenna’s captivation with the “fluttering of the heart” did not halt with a simple description of the irregular pulse as he also elucidated associated symptoms and factors. He described palpitations as the main symptom of an irregular pulse, stating that palpitation occur secondary to the unnatural movement of the heart, resulting in disharmony in the temperament of this organ^[2]. He further denoted that palpitations are associated with an increase in the heart rate, and when palpitations intensify, they bring about fainting^[3]. As we know today, tachycardia, palpitations and lightheadedness are considered as some of the cardinal signs and symptoms of atrial fibrillation.

Based on our understanding of atrial fibrillation today, we recognize that this arrhythmia can be triggered or exacerbated by a multitude of factors including sepsis, stress, alcohol, dehydration, and volume overload. Once more, if we closely explore Avicenna’s description of this arrhythmia, we are able to find some of these associated factors. For instance, he commented on the effect of alcohol consumption on the pulse, “wine has a notable effect on the pulse, in that if taken plentifully, being attenuated in nature; it gives rise to an irregular pulse.” He further speculated that an irregular pulse and palpitations occur as a consequence of infections, “when abscess formation comes on, the pulse also becomes irregular.” In the Cannon, he describes a patient in whom “the pulse becomes frequent, short, variable in fullness and strength, not vehement, and occasionally irregular, especially after an outburst of violent emotion.” By analyzing Avicenna’s account of this patient, might we conjuncture that he was describing a patient with paroxysmal atrial fibrillation?

One more illustration of how Avicenna may have recognized atrial fibrillation many centuries ago may be drawn from his treatment for an irregular pulse. In his Treatise on Cardiac Drugs, he mentions an herbal remedy named ‘zarnab’ (*Taxus baccata* L.) which he used for treatment of patients with an irregular pulse. He stated that, “zarnab sets the heart at ease” especially when the patient is suffering from palpitations. The findings of contemporary research have shown that *Taxus* produces negative chronotropic and atrioventricular blocking effects due to its calcium channel blocking activities suggesting that Avicenna may have pursued a “rate control strategy” for these patients.

Although Avicenna may have been the first to describe atrial fibrillation with the help of teachings from his predecessors

including Galen and Dhanvantari, this historical perspective would be incomplete without recognizing the contributions of modern-era physicians. Many centuries after Avicenna, William Harvey was the first to provide the precise description of the closed circulation of humans. Harvey also directly observed fibrillation of the atria in open



Figure 1: Portrait of Galen of Pergamon (131–200 AD). He wrote extensively about the pulse and used it for both the diagnosis and predicting the prognosis of disease. Source: National Library of Medicine (the history of medicine public domain image files).



Figure 2: Avicenna or Ibn Sina (980-1036 AD). He became known in the West as “the prince of physicians.” His medical text, the Canon of Medicine, was the final authority on medical matters in Europe for several centuries. Source: National Library of Medicine (the history of medicine public domain image files).

chest animals and his meticulous observations established that the heart beat was initiated in the atria. In the mid-eighteenth century, Jean Baptist de Sénac expanded on Harvey’s observations and made the connection between a “rebellious palpitation” to the stenosis of the mitral valve^[4]. James Mackenzie provided the first in-depth explanation of atrial fibrillation’s pathophysiology and demonstrated

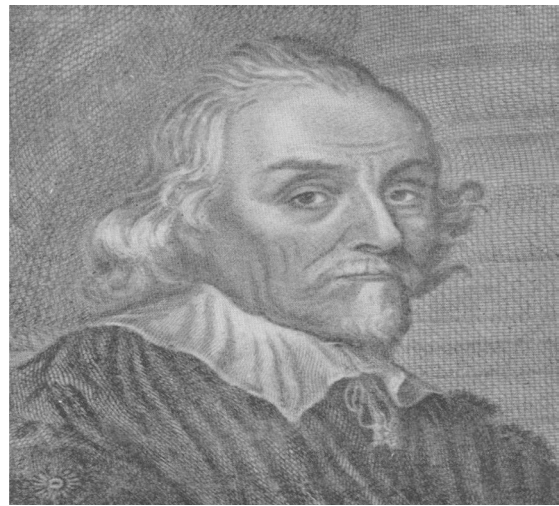


Figure 3: William Harvey (1578-1657). He is credited with directly observing fibrillating atria in open chest animal models. Source: National Library of Medicine (the history of medicine public domain image files).

the loss of the ‘a’ wave during “pulsus irregularis perpetuus”^[5]. The first human electrocardiogram (ECG) depicting atrial fibrillation was published by Willem Einthoven in 1903^[5] enabling Sir Thomas Lewis to study electrophysiologic characteristics of this rhythm^[6]. Subsequently, the foremost discoveries related to the pathophysiology and clinical features of atrial fibrillation in the 20th century developed on account of works done by Karel Wenckebach, Gordon Moe, and Maurits Allessie. Noticeably, contributions made by many physicians over the centuries have yielded a wealth of information and extraordinary growth in our understanding of atrial fibrillation and as a result many novel approaches for diagnosis and treatment of this arrhythmia have developed.

Today, we live in an era of rapid scientific advances in medicine and information drawn from ancient observations may not significantly alter our current perceptions. Yet, having a historical perspective and appreciation of the work of those before us will afford a better understanding of contemporary issues and a clearer vision as we look to the future. As Hippocrates once said: “Medicine has always existed since the beginning of time. The road has been revealed to us, and many good things have been discovered along the way. The rest remain to be discovered if one based on what is already known is capable enough to ask for more”.

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