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Avicenna (Ibn Sina; 980-1037) : Father of Early Medicine

Avicenna (İbn Sina; 980-1037): Erken Tıp Biliminin Babası

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Abstract

Avicenna (Arabic: ابن سينا) was a polymath and physician known as the "father of early medicine" who is considered one of the most influential doctors, astronomers, thinkers, writers, and scholars of the Golden Age of Islam. This article briefly overviews Avicenna's life, introduces his medical textbook, and presents his essential contributions to medical science.

Keywords: Avicenna, Ibn Sina, canon of medicine

Öz

Avicenna (Arapça: ابن سينا), "erken dönem tıbbının babası" olarak bilinen ve İslam'ın Altın Çağı'nın en etkili doktorlarından, astronomlarından, düşünürlerinden, yazarlarından ve bilginlerinden biri olarak kabul edilen bir bilgin ve hekimdi. Bu makale, Avicenna'nın hayatına kısaca bir genel bakış sunuyor, tıp ders kitabını tanıtıyor ve tıp bilimine yaptığı temel katkıları sunuyor.

Anahtar Kelimeler: İbn sina, Avicenna, kanul fil tıp

INTRADUCTION

Ibn Sina or Avicenna (980–1037) (**Figure 1**) was a Muslim polymath and physician who lived during the flourishing of Islam in the Middle Ages. He was particularly noted for his contributions to Aristotelian philosophy and medicine.

Avicenna is the author of approximately 450 works on different aspects of science, especially medicine. Two hundred forty of these writings have survived to the present day.^[1] He also made drawings in the field of human anatomy and included them in his book (**Figure 2**). Avicenna's most important book in medicine is the Canon, which, due to its chapter divisions, sound content, and intellectual discipline, influenced all medical books in the Islamic world and Europe for centuries. As an original source, this book was taught in scientific centers such as the Universities of Montpellier and Louvain.^[2] In this article, we will present Avicenna's contributions to medical science.



Figure 1. A portrait of Ibn Sina (Avicenna) (from, Krueger, H.C.: Avicenna's poem on medicine. Springfield, Illinois; Charles C Thomas, 1963; p 52a).





Figure 2. The human muscular and skeletal system drawn by Ibn Sina in his book Canon of Medicine

AVICENNA'S CONTRIBUTIONS TO MEDICAL SCIENCE

Cardiology

Avicenna's definition of heart disease was presented logically for perhaps the first time in the history of medicine. Ibn Sina was the first to describe carotid sinus hypersensitivity that occurs with vasovagal syncope. He pioneered the science of pulsation, and after developing Galen's pulsation theory, Ibn Sina gave the first accurate explanation.

Avicenna explained the symptoms, effects, and treatment of Palpitations in detail.^[3]

Avicenna did not use the concept of Atherosclerosis in his book on Medicine. However, she noted that local accumulation of abnormal fluids in veins or other areas can cause blockage. Additionally, Ibn Sina said that the blockages that could cause the worst outcome were in the arteries of major organs such as the heart, brain, and liver.^[4]

Ibn Sina has a remarkable book called "Kitab al-Adviyt-al-Qalbiye," which means "Book of Medicines against Heart Diseases."^[5] Due to its wide acceptance and importance, this treatise was translated into Latin under "De Medicines

Cordialibus" by Arnaldo de Villanova (d. 1310 or 1313 A.D.) in the early 14th century. It was translated into Latin for the second time by Alpagus in 1520.^[6] In this book, he describes simple and compound drug treatments for heart disease, but before that, he divides the drugs into several categories. These categories include stimulants, diuretics, and cooling agents.^[7]

Surgery

Avicenna was one of the most famous surgeons of his time.^[8] Although his surgical knowledge was greatly influenced by figures such as Galen (AD 130-200), Rhazes, and Haly Abbas, he developed techniques.^[9] He viewed surgery and medicine as a whole.^[10] Avicenna wore a green dress while performing surgery and emphasized that his assistant did the same.^[11] He recommended placing the patient in the prone position after surgery to prevent aspiration.^[11] He used materials such as single horse hair to stitch wounds after surgery.^[12]

Avicenna performed his surgeries under general anesthesia with sterilized devices.^[13] He recommended the administration of different preparations to provide adequate analgesia and anesthesia before surgery. For

example, he prescribed a mixture of mandragora and some other hypnotics to patients undergoing amputation.^[14] Additionally, Ibn Sina was alert to the possible toxicity and potency of some of these recipes.

He described specific techniques for head and neck surgeries, including those used for tonsillectomy and transection of the lingual frenulum in patients with ankyloglossia.^[15]

It appears that Ibn Sina initiated the use of tracheotomy in a drowning patient. He explains the process this way: "...extend the head [and neck] and hold it [in that position] and grab the skin [on the front of the neck] and cut it. Using a hook, it is better to hold the incised skin [in that position] Pull the skin away until the trachea becomes visible. Incise between the two exposed middle [cartilaginous] rings Each two [incised] skin margins should be folded and sutured later ..."^[15]

Internal Medicine

Avicenna likely provided the first description of post-hepatic jaundice secondary to biliary obstruction. According to Ibn Sina, post-hepatic jaundice manifests as pale yellow or whitish stools, dark yellow urine, abdominal discomfort on the right side, pain on the right side after feeding, and general itching.^[16]

He also gave a detailed explanation of the causes, clinical symptoms, and treatments of intestinal obstruction. Avicenna was the first person in medical history to introduce a squeezable enema device.^[9] He explained abdominal wall hernias, their clinical findings, and treatment.^[9]

Ibn Sina discussed the repair of rectal fistulas. In the first volume of the Canon, he described the anatomy of the anal sphincter; In the third volume, he debated the surgical treatment of perianal fistulas using silk thread as ligature.^[9]

Avicenna used different approaches to treat benign and malignant tumors. He emphasized the preoperative distinctions between these two types of lesions.^[17]

Urology, Obstetrics, and Gynecology

In his famous book Canon of Medicine, he discussed pregnancy, prenatal, and postnatal care.^[18] Existing research shows that he accurately described the prescription of contraception, prenatal and perinatal care, the heart as the first functional organ of the fetus, removal of the placenta after birth, as well as the identification and treatment of abnormal uterine bleeding with herbs.^[19-22] He also described perineal injury during birth and its surgical treatment.^[23] He also reported that diseases such as *Berberis vulgaris* were the cause of abortion.^[18]

Avicenna believed that the origin of the formation of the human body was the man's semen and the woman's ovum. He stated that the health of the puppies depends on the health of the semen and ovum.^[18] It was also believed in his time that sperm, semen, and eggs could deteriorate as a result of improper lifestyle and nutrition.^[24]

Orthopedics and Neurosurgery

Avicenna mentioned injuries and deformities of the spine in 8 chapters of the third volume of Canon Medicine.^[25] He proposed that the spinal cord consists of motor, sensory, sympathetic, and parasympathetic nerves. He defined injuries to different nerve types as causing different clinical signs and that other clinical signs and symptoms may develop depending on the injury site. He also made treatment recommendations based on these observations.^[25-27]

He described that paresis of muscles could occur due to spinal nerve injuries and spinal cord shock, and C1 injury can have devastating effects due to shortness of breath. Also, Avicenna observed that trauma to the spine often leads to neurological disorders and even death.^[25]

He advocated food therapy, medication, bloodletting, physiotherapy and exercise, dry sauna, surgery, spinal traction, cupping, and massage as treatment options for spinal trauma.^[26,28]

Avicenna was interested in orthopedics. Several pages of his canon are devoted to bone fractures, joint dislocations, tendons, and nerve injuries.^[9,29] Perhaps for the first time in the history of medicine, Avicenna distinguished between tendons and nerves. While explaining the nerves, he explained: "Voluntary movements of the extremities are under the control of brain commands that transmit them through the nerves..."^[30]

Ibn Sina demonstrated a technique for repairing injured tendons. He suggested anastomosis with stitches between the two ends of an injured nerve.^[31] Perhaps for the first time in medical history, Avicenna described limb compartment syndrome. He warned against tightly bandaging fractured extremities and warned of the possibility of occlusion of the arterial circulation as a result of this practice.^[31]

Neurology and Psychiatry

Avicenna made significant contributions to neurology, especially regarding headaches and migraines. Although Ibn Sina believed in the humoral theory and divided migraine into two categories, hot and cold, and suggested specific treatments and general evaluations, most of his definitions and the pathologies he explained are supported by current medical concepts.^[32] In addition, current findings show that most of the medicinal plants mentioned by Ibn Sina in the treatment of migraine (mint, chamomile, cannabis, opium poppy, etc.) are currently used in the production of central and peripheral sensitizers.[anti-neuroinflammatory agents, nitric oxide reducers, cyclooxygenase (COX)-2 inhibitors] as well as serotonergic, neuroprotective agents and analgesics.^[32]

Ibn Sina also contributed to the development of the diagnosis of different types of dementia and the discovery of its etiology.^[33]

Avicenna regards depression not only as a mental illness but as a disorder resulting from the effects of the brain, heart, and blood. He believed that the primary cause of depressive episodes was heart disease. In most cases, the brain is affected only secondary to the heart. For this reason, he stated that underlying cardiovascular diseases should be taken into account in the treatment of depressive disorders.^[33]

In his Code of Medicine, Ibn Sina defines various melancholic disorders as subheadings of brain diseases. He described a condition he called cerebral melancholia, which was very similar to the modern-day definition of depression.^[33]

Infectious diseases

Ibn Sina is also known for some of the first moves of crucial public health and safety measures, such as quarantine, that are still practiced today. In his observations in The Canon, he describes Tuberculosis as an infectious disease whose victims must be quarantined or isolated to prevent further spread. He also emphasizes that water and soil are possible disease agents and should be targeted and treated together.^[34,35]

CONCLUSION

Although Ibn Sina died in 1037 AD at 57, he lived on for hundreds of years through his legacy, books, and students. This is seen in Avicenna's teachings, which extend beyond the East and into the West. Avicenna's work was repeatedly adopted by physicians of later generations, adapting what he said as knowledge of previously obscure concepts was clarified. Al-Juzjani summarized this best with his words: 'Medicine did not exist until Hippocrates invented it. When he died, Galen revived him. He was blind; Hunayn bin Ishaq gave him an eye. Rhazes gave him consistency. And Ibn Sina made it whole and solid.

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