هو العلیم

Galen’s place in Avicenna’s The Canon of Medicine: respect, confirmation and criticism

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Galen's place in Avicenna's The Canon of Medicine: Respect, confirmation and criticism

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Introduction

- Claudius Galenus (**129–199 A.D.**) or Galen, an ancient Greek scholar, is one of the most influential and recognized physicians and surgeons in the history of medicine, who is also known as the **father of systematic medicine** [16,17]. Galen is the **most prominent Greek physician cited by the Persian medicine scholars**. In the great works of Persian medicine such as The Canon, “Al-Hawi fi al-tib” (Liber Continens) by Rhazes (865–925 A.D.) and “Ka mil al-Sina a al Tibbiya” (The Perfect Book of the Art and Science of Medicine) by Haly Abbas (949–982 A.D.), the name of this great Greek scholar is repeatedly mentioned [7,18].

Introduction

- Galen is highly cited in the text of The Canon. According to a search of a digital version of The Canon, using software from the “Comprehensive library of traditional and Islamic medicine” (Noor Digital Library) [19], Avicenna referred to Galen about 300 times. In most references, the name of Galen was explicitly mentioned in the text, and in a few cases, Avicenna indirectly referred to Galen.

Introduction

- Galen’s views on the theoretical foundations of medicine, physiology, anatomy, physiopathology, etiology, semiology, “Hefz al Seha” (health protection), pharmacology and treatment of diseases were mentioned [15]. The large number of references to Galen indicates the importance of the position of this brilliant scholar and his views to Avicenna—Avicenna called him “Hakim Fazal” (virtuous medicine man) [15].

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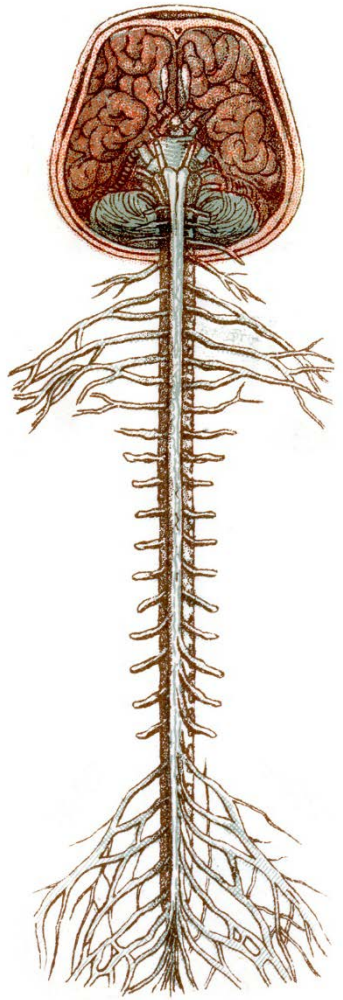
Brief history of Galen

- Galen was born in Pergamon, ancient Greece, in the early Roman era [20]. Galen was a follower of the philosophical school of Hippocrates [21]. He wrote hundreds of treatises and books which documented the science of medicine in ancient Greece and Rome, as well as his own discoveries and innovations

- Many anatomical discoveries have been attributed to Galen. He was the first person to identify the recurrent laryngeal nerve and introduced it by testing on animals [23]. Galen was the first anatomist to discover the **foramen ovale**, **ductus arteriosus** and placenta in the human fetus [24]. Galen described 347 herbal drugs and therefore, he is known as a pioneer in pharmacology [21].

Brief history of Galen

Galen was one of the pioneers of **experimental spinal cord studies**; he wrote prestigious scientific material on anatomy, physiology and pathology of the spinal cord and nerves [25]. He made significant contributions to the understanding of the anatomy and physiology of the cardiovascular system and sphygmology [7,26]. Galen also contributed to **surgical** knowledge and skills [27].



Confirmation and respect to Galen by Avicenna

Confirmation and respect to Galen

- In addition to many **direct quotations from Galen**, in cases where Galen's opinions differed from other scholars, Avicenna was interested in the dialogue.
- For example, in chapter three from part one of the first book, Avicenna wrote on the difference in **"Mizaj" (temperament) between children and young people**. He first expressed the opinion of two groups of physicians, then expressed the opinion of Galen in rejecting the views of these two groups and described it in detail. However, at the end, he expressed his own opinion which was different from that of Galen.

Confirmation and respect to Galen

- Furthermore, Avicenna cited Galen in cases where there was a **common opinion and Galen did not comment on its correctness**.

- As an example, Avicenna wrote on the effects of “Ustukhuddus” (Lavandula stoechas Linn) [28] on excretory organs: “It strengthens the urinary organs and purges out phlegm and black bile but Galen did not make any reference to it” [29].

Confirmation and respect to Galen

The significance of Galen and his words to Avicenna was so much that he cited **the true dream of Galen**: “The artery to venesect in the right hand is the one on the back of the hand between the thumb and the index finger (radial artery). It is strangely beneficial in chronic pains of the liver and diaphragm. It was said that Galen had a dream, and someone told him to venesect the artery to cure his liver problem, which he did, and recovered.

Avicenna’s criticism of Galen

Avicenna’s criticism of Galen

For example, Avicenna, in the book The Canon, confirmed the original pharmaceutical formulation of a drug called “Teryagh-e Faroogh” which was made by Andromakhes, a former Greek scholar, and sharply criticized the changes made by Galen and some other physicians in its formulation. Based on his own experience Avicenna believed that the original formulation was effective and needed no modification.

Avicenna’s criticism of Galen

- It is **not** the case that Avicenna **accepted and believed everything from Galen**.

- Avicenna sometimes cited the opinions of dissenting scholars, together with Galen’s comments. For example, Avicenna talked about Galen’s disagreement with Hunain on the temperament of “Aftimoon” (Cuscuta epithymum) [29]: “According to Galen, it is hot and dry in the third degree but Hunain holds that it is hot in the third and dry in the last part of the first degree” [29].

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Avicenna’s criticism of Galen

There are also many elements of **Galen’s views** that Avicenna challenged and explicitly criticized. Some of **Avicenna’s criticisms are related to his divergent views on the philosophical issues of medicine and methodology of medical education** [28]. One of Avicenna’s main criticisms of Galen was his introduction of philosophical views in medicine [28]. Despite the fact that Avicenna himself was a philosopher and wrote original works in philosophy such as “al-Shefa” [32], Avicenna opposed the introduction of philosophical views in medicine and prevented doctors from engaging in philosophical debates, because he believed that philosophical issues such as the nature of “Arkan” (element), “Mizaj” (temperament) and “Akhlat” (humours), unlike subjects such as physiology and anatomy, are not part of medical knowledge.

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Avicenna’s criticism of Galen

- On the other hand, sometimes Avicenna criticized Galen’s medical views. For example, Avicenna **rejected Galen’s view on the physiology of pain**. Unlike Galen, Avicenna believed that temperament change could cause pain independently, while Galen believed that “Tafarogh-e etesal” (interruption of continuity) was the only cause of pain [33].
- As another example, Avicenna corrected Galen’s misconceptions about pulse. According to Galen’s view, every part of the artery simultaneously generates pulses, due to the natural motion of the arteries in opposition to the force of the heart. Avicenna made the first accurate description of pulse [34]. He said, “Every beat of the pulse is made up of two movements and two pauses, namely expansion, pause, contraction and pause.” In medical training, it is believed that cardiac dysfunction can be diagnosed by interpreting the cardiac pulse [35].

Avicenna’s criticism of Galen

- In addition, Avicenna **did not accept Galen’s hypothesis about the similarities between the tendon and nerve**. In contrast, Avicenna believed that the nerve originated from the spinal cord and the brain, while the tendon originated from the muscle, each of which had a distinct role. Besides, he mentioned the exact position of the tendons in the joints and their strengthening role in The Canon [36]. He was the first scholar to reject Galen’s belief that tendon was a blend of nerve and ligament and thus advocated suturing tendons.

Avicenna’s criticism of Galen

- There are also disagreements between Avicenna and Galen’s views on the definition of health and disease, classification of organs, temperament of some body organs, difference in temperament of children and youth, the nature of salty phlegm and some anatomical issues such as the number of body muscles and classification of fixed and movable joints.

Avicenna’s criticism of Galen

The important point is that in almost all of his criticisms of Galen, **Avicenna follows a critical thinking style**. He first quoted Galen’s point of views completely, then quoted other views opposed to Galen’s views, and finally he presented his own opinion with strong arguments.

Development of Galen’s ideas by Avicenna

Development of Galen's

- The review of The Canon shows that **Avicenna did not simply adopt the views of Galen**, but also added a lot to them.

- For example, Avicenna classified 15 types of **pain**, while Galen mentioned only four types [33,39].

Development of Galen's

- Galen's doctrine in **neuroanatomy** is significant and noteworthy, and many of The Canon's texts on this subject correspond to Galen's writing. Avicenna additionally systemized Galen's ideas perfectly, and added his own observation [40].
- For example, Avicenna was the first to describe trigeminal neuralgia [40,41]. Also, Avicenna evolved Galen's initial descriptions of **stroke**. He provided detailed descriptions of diagnostic symptoms, differential diagnoses, stroke classification into hemorrhagic and ischemic, and various stages of stroke (acute, subacute and chronic); he also presented specific treatment strategies for each step, most of which are very similar to contemporary findings. Further, he suggested a number of medicinal plants for management of stroke, many of which have been supported by documented pharmacological effects [42–44].

Development of Galen’s

- In the field of cardiology, there were detailed categorized diagnostic and therapeutic approaches to cardiovascular diseases, such as cardiac tamponade, palpitation, hypertension and atherosclerosis, in The Canon, which are scientifically significant [10,42,43,45].

Development of Galen’s

- We also see the evolution of the ideas of Galen and the Greek sages in medical diagnostics, such as the analysis of urine in The Canon. Avicenna provided a precise classification of the macroscopic features of urine including color, texture, clarity, sediment, volume, odor, foam and their association with the clinical manifestations of various diseases [46].

Discussion

Discussion

- Avicenna, like other Persian scholars, frequently quoted Galen’s ideas in The Canon by mentioning his name. This matter reflects Iranian’s observation on the role of intellectual honesty in the ancient world. Sometimes, the name of Galen’s work and the persons who have narrated Galen’s ideas are mentioned. More interestingly, sometimes citations from other scholars through Galen are given in Persian medicine sources. It is unfortunate that, unlike Avicenna’s attention to his sources, sometimes plagiarism occurred in the translation of the works of scholars of Persian medicine. For example, “Ka-mil al-Sina-a al Tibbiya” (The Perfect Book of the Art of Medicine) was first translated to Latin under the name “Pantegni” by Constantinus Africanus (1015–1087) without the name of its original writer, Haly Abbas [47– 49].

Discussion

- Although, Galen was held in high esteem by Persian physicians, they always considered experimentation and testing prior to adopting his ideas. For example, Al-Akhawayni Bukhari (?– 983 A.D.) referred to the number of human muscles counted by Galen in “Hidayat alMutaallimin fi al-Tibb”. After stating Galen’s opinion, Al-Akhawayni indicated that he had quoted Galen without independently confirming the finding, as he had no observation or experience in this regard.

Discussion

- In addition, by reviewing the anatomical sections of The Canon and observing the detailed descriptions of the anatomical structures of the aorta, eye, heart, vertebrae, brain and some new anatomical discoveries, we clearly understand that the knowledge of Avicenna in anatomy resulted from his observations through surgery and possibly human dissection, not merely quoting the work predecessors [3,51].

Discussion

- Other Persian scholars, despite the general respect for Galen and his ideas, wrote **critically of his works in various texts**.
- **Jabir Ibn Hayyan** (720–813 A.D.), a prominent Persian polymath, is one of the scholars who criticized Galen's medical theory. After Jabir, Rhazes was the next scholar to challenge Galen's medical theory [56].
- Although, **Rhazes** was one of the followers of the Galen's school and considered Galen as his master, he rejected many of his medical comments in a treatise entitled "Al-Shukuk Ala Jalinoos" (Doubts about Galen) [57].
- Also, Haly Abbas in the introduction to "Ka-mil al-Sina-a al Tibbiya" (Royal Book) criticized Hippocrates and Galen and explained that the reason for writing his book was the lack of a complete medical encyclopedia. Thus, Haly Abbas provided a new medical system based on experimental data [50,58].

Conclusion

Conclusion

- Avicenna respected Galen very much and held similar views on many topics. Although the views of Greek scholars, especially Galen, in The Canon have been quoted abundantly, Avicenna revised the knowledge of the ancient scholars through critical thinking and relying on observation and testing, systematized the science of medicine [8,38,9] and introduced many ideas and innovations [13]. As such, Europeans considered Avicenna as the most prominent physician of the Islamic Golden Age [8]. Galen is one of the greatest physicians in history and was praised by Europeans alongside Hippocrates and Avicenna in the middle ages (Fig. 1).

Conclusion

- This paper concludes with a famous statement written in “Gharabadin-e-Kabir” by Aghili Khorasani Shirazi (17th–18th century):
- “**It is quoted that there was no medicine, Hippocrates created it. Medicine was dead, Galen revived it. Medicine was dispersed, Rhazes assembled it and it was incomplete, Avicenna completed it** [59].”

Fig. 1. Drawing of Galen, Avicenna and Hippocrates by Mehdi Alizadeh (the fourth author of this article), Tehran, Iran.