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In pursuit of the heart: A comparative analysis of Medieval Western and Islamic medical approaches to cardiac diseases

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ABSTRACT

This study examines how cardiac diseases were understood, defined, and treated in medieval Western Europe and the Eastern Islamic world, and explores the historical transformation of cardiac knowledge within its intellectual and cultural context. This study adopted a historical–comparative qualitative approach. Medieval medical texts and scholarly traditions were analyzed by situating knowledge of the heart at the intersection of belief, morality, and medical practice. The study focuses on conceptual definitions of cardiac disease, the impact of Islamic medical knowledge on Western perceptions of the heart, and the therapeutic approaches used in cardiac treatment. The findings indicate that medieval knowledge of the heart and cardiovascular diseases emerged within a dynamic intellectual milieu shaped by continuous interaction between East and West. Cardiac anatomy and physiology were addressed with a notable degree of conceptual depth for the period, while therapeutic approaches largely reflected dietetic and humoral principles. The transmission of Islamic medical scholarship played a key role in the development of institutional medical learning in medieval Europe. Medieval cardiac medicine reflects a complex and multifaceted process of knowledge exchange rather than a simple East-West divide. This period constitutes a formative stage in the historical development of cardiovascular thought and represents an important intellectual foundation for the emergence of modern cardiology.

Keywords: Medieval medicine, cardiac diseases, humoral theory, Islamic medicine, Western medicine.

Modern historiography of medicine has long characterized the Middle Ages as a “dark age,” interpreting the period as one dominated by scientific stagnation and scholastic dogmatism. A significant part of the misconception that portrays the Middle Ages as a period devoid of scientific progress stems from an insufficient awareness of the intellectual accumulation and scientific developments that took place during the Late Middle Ages.^[1] However, since the late twentieth century, the comprehensive transformation that has taken place in historiographical approaches to the Middle Ages has led to a profound reassessment of this conventional perception. In this context, the Middle Ages is no longer portrayed in the scholarly literature as a uniformly “dark” period.^[2] This approach has gradually been replaced

by historiographical reinterpretations which emphasize that the intellectual world of the Middle Ages possessed its own internal logic and a specific form of rationality. Although the intellectual production of the period was largely shaped by religious references, it is evident that processes of observation, experience, and transmission in the production of knowledge were carried out within a certain framework of intellectual coherence. At the core of this intellectual framework, the “heart” occupies a significant symbolic and physiological position. In Medieval thought, the heart was not only regarded as a physiological organ, but also as the centre of the soul and faith, and as the point at which human existence came into contact with divine order. Accordingly, heart diseases in this period were perceived not only as bodily disorders,



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but also as manifestations of moral and spiritual disruption.^[1] From this historiographical perspective, it becomes evident that knowledge production in the Middle Ages was not confined to abstract intellectual speculation.

In practice-oriented disciplines such as medicine, knowledge developed within a particular order and internal coherence, and a continuity was established between theoretical approaches and practical experience. Reflections on the human body in this period were shaped within an intellectual milieu in which religious and moral assumptions intersected with observation-based medical practice.

PATIENTS AND METHODS

This study examines how heart diseases were understood, defined, and treated in medieval Europe and in the Islamic world, with careful attention to their historical contexts. Using a historical-comparative qualitative approach, it frames knowledge of the heart not only as a medical topic but also as part of wider processes of knowledge production shaped by belief and moral thought. Accordingly, rather than establishing a direct continuity between medieval medicine and modern cardiology, the study seeks to reveal the historical transformation of the concept of the heart.

Within his framework, the research focuses on the following questions:

- How were heart diseases defined in medieval Western Europe and Islamic world of the East?
- In what ways did the transmission of medical knowledge from the Islamic world contribute to the transformation of European conceptions of the heart?
- What were the principal methods employed in the treatment of heart diseases in the Middle Ages?

The Heart in Medieval Thought: Symbolic and Medical Perceptions

It is generally stated that knowledge concerning the anatomy of the cardiovascular system (CVS) can be traced back to around 3500 BCE, to the civilization of ancient Egypt. The body of knowledge concerning the heart—which was defined as a major organ that carried air, urine, blood, and the vital spirit through a series of channels—was further developed over the course of history in parallel with advances in this field, particularly through the Hippocratic Corpus, eventually giving rise to the recognition of the heart as “the central organ of the CVS”.^[3] In the 4th century BCE, Aristotle attributed a philosophical meaning to the heart, conceiving it as the seat of the mind or the soul.^[4] By the 2nd century CE, Galen approached the subject from a more medical perspective and, in the context of cardiac function, advanced the theory that the arteries contained blood rather than air.^[3] Galen’s theories on medicine—and particularly on the heart—nourished and informed not only the intellectual world of his own time, but also the knowledge of medieval European society on these matters for many centuries.^[4] By synthesizing the teachings of Hippocrates and Aristotle, Galen attributed to the heart not only a physiological role but also a philosophical meaning, defining it—together with the brain and the liver—as one of the principal organs of the soul. At the same time, he regarded the heart as the center of vitality and emotions.^[5] In particular, the humoral—that is, “four-fluid”—theory proposed by Galen in Antiquity, which became

the theoretical foundation for the anatomy and physiology of the CVS throughout Medieval medicine, was endorsed by the Catholic Church and, for a long period, enjoyed considerable authority in Medieval Europe.^[1,4] However, although Galen’s humoral theory was accepted for many centuries, he misinterpreted the circulation of blood within the body and, under the erroneous assumption that there were perforations in the interventricular septum, maintained that blood was consumed as it passed through the organs and tissues.^[6] For this reason, his views not only delayed a proper understanding of physiology, but also led to the misinterpretation of anatomy. Nevertheless, Galen ultimately provided subsequent generations with a scientific groundwork upon which more detailed and accurate analyses of the CVS could later be developed.^[7]

“..أَلَا وَإِنَّ فِي الْجَسَدِ مُضَغَةً إِذَا صَلَحَتْ صَلَحَ الْجَسَدُ كُلُّهُ، وَإِذَا فَسَدَتْ فَسَدَ الْجَسَدُ كُلُّهُ، أَلَا وَهِيَ الْقَلْبُ.”

“...Verily, in the body there is a piece of flesh; if it is sound, the whole body is sound, and if it is corrupted, the whole body is corrupted. Indeed, that (piece of flesh) is the heart”.^[8]

As noted above, this hadith transmitted by al-Bukhārī and included in the *Kutub al-Sitta*—the canonical collection regarded as comprising sound (ṣaḥīḥ) traditions—demonstrates that in Islamic thought the heart occupies a central position for both bodily and spiritual well-being. The studies carried out by Muslim physicians on the heart and the circulatory system in the Middle Ages indicate that the significance attributed to the heart in this hadith also found a counterpart within the medical literature. Drawing upon the theoretical legacy of Greco-Roman physicians such as Hippocrates, Aristotle, and Galen—and at times criticizing, developing, or even surpassing this tradition—Muslim physicians including al-Rāzī, ‘Alī b. al-‘Abbās, Ibn Sīnā, al-Akhawaynī al-Bukhārī, and Ibn al-Nafīs made significant contributions through their medical works, shaping not only the intellectual horizon of their own age but also their medical knowledge of subsequent periods. In the Medieval Western world as well, the meanings attributed to the heart were shaped through a holistic perspective comparable to that found in the Islamic world. In this period as well, the treatment of the heart not merely as a physiological organ but in conjunction with moral and spiritual dimensions indirectly—yet distinctly—influenced the medical thought of the time; this perspective also played a role in shaping diagnostic and therapeutic practices. Within the Christian intellectual tradition, the conception of the heart articulated by Augustine in his “confessiones” provides a crucial framework for understanding the mental and spiritual background of medieval Latin medicine. Augustine, by emphasizing that God knows the depths of the heart (cor)—which was regarded as the centre of human identity and bodily existence—located faith, conscience, and moral order within the heart.^[9] This perspective provided an intellectual framework in the medieval Western world that enabled physicians, when addressing heart diseases, to interpret such conditions not only in terms of physiological causes, but also in relation to spiritual, emotional, and moral imbalances.

Hildegard von Bingen (1098-1179), a German Benedictine nun and one of the most influential female intellectuals of twelfth-century Western Europe, is also known as the “Sybil of the Rhine”.^[10] In “Physica”, Hildegard von Bingen offers noteworthy observations concerning the diagnosis and treatment of cardiac disorders within the framework of herbal therapeutic practices.^[11] In this context, she states that the

plant known as galingale (galangal),^[12] which continues to be used in traditional medicine in some Asian countries even today, has a healing effect on individuals who experience cardiac pain or whose hearts are weakened. Hildegard expresses this situation in the following words: “*One with pain in his heart, or with a weak heart, will soon be better if he eats enough galingale.*” In the same work, Hildegard describes yellow gentian as an herbal remedy that alleviates cardiac pain and restores the vital force of the heart through its warming quality, stating: “*Yellow gentian (gentiana) is fairly hot. One who suffers heart pain, as if his heart is just barely alive, should pulverize yellow gentian and eat that powder in broth, and it will strengthen his heart.*”^[11]

In the sections devoted to gemstones in “Selected Writings of Hildegard of Bingen”, Hildegard von Bingen identifies heart pain as a clear medical symptom and, particularly through her discussion of the onyx stone, proposes a heat-based therapeutic approach. The practice of heating the stone with body warmth and using it together with wine is presented as a treatment that can be interpreted within the prevailing Galenic framework, in which excess heat was understood as a sign of imbalance requiring therapeutic correction. The statement in the same work, “*Also for anyone suffering pains in the heart: make the sign of the cross over their heart with the hyacinth and say the aforesaid words, and they will feel better*”, clearly illustrates that, medical elements are closely intertwined with symbolic and religious components. The act of holding the hyacinth stone over the heart and performing the sign of the cross while reciting a prayer constitutes a significant example of the principle of body-soul unity that shaped the medical understanding of medieval Europe. Therefore, the practice in question represents not so much a medical prescription in the modern sense as a conception of healing in which humoral balance and religious symbolism are interwoven.^[13]

However, this mystical–medical approach did not constitute a singularly dominant orientation within the medical world of Medieval Europe; rather, it continued to exist alongside the medical tradition that developed in the Mediterranean basin during the same period, which was grounded in written texts and the systematic production of knowledge. In this context, the Salerno Medical School played a significant role in the institutionalization of European medicine. “The Regimen Sanitatis Salernitanum”,^[14] one of the most widespread and influential dietetic texts of Medieval European medicine, was composed in the twelfth century within the intellectual milieu of the Salerno Medical School. Although the author of the work is unknown, it is generally accepted that it represents the collective intellectual contribution of physicians belonging to the Salernitan tradition. Its composition in “Leonine” verse facilitated its memorization and circulation among wide audiences; in this respect, the work was used for centuries not only within scholarly circles, but also as a practical health guide. Working within the established Galenic model, the Regimen articulated cardiac health through dietary moderation and emotional regulation, assuming that equilibrium of qualities was essential to bodily stability. The dietetic and lifestyle practices recommended in “the Regimen Sanitatis” aim to preserve the balance among these humors; excessive eating, intense emotional states, and irregular modes of living are presented as among the primary causes of illness. In particular, emotions such as anger, sorrow, and excessive joy may have adverse effects on the body, and consequently on the heart.^[15]

In the “Regimen Sanitatis”, the following statements concerning the heart are included: “*Take saffron if your heart make glad you will, but*

not too much, for that the heart may kill,’ which may be rendered as, “*If you wish to cheer your heart, take saffron — but do not exceed the proper measure, for excess may harm the heart.*”^[14] As previously noted, this statement is significant in that it reflects the perception, within Medieval medical thought, of the heart as the center of vital heat and emotional equilibrium. Furthermore, the warning that excessive use of saffron may be fatal for the heart highlights the importance of the concept of moderation (temperantia), which constituted a fundamental principle in the preservation of health. In the “Regimen Sanitatis Salernitanum,” cardiac health is approached within a regimen of life that simultaneously takes into account the balance of body and soul. The work treats a proper diet, mental tranquility, and the maintenance of a cheerful and unburdened heart as primary elements in the preservation of health. While the adverse effects of excessive anxiety and anger on the human body are emphasized, it is stated that balanced nutrition, regular physical activity, and consistent sleep habits have a soothing effect on the whole body, including the heart.^[14] This approach demonstrates that, in Medieval medicine, the heart was also perceived as a center directly associated with emotional states.

In the Middle Ages, the body of knowledge concerning heart diseases in Western Europe was largely based on the medical tradition of Ancient Greece and Rome. However, this heritage circulated in a relatively limited manner in the West throughout the early Middle Ages, and the texts of authorities such as Galen and Hippocrates were transmitted largely without substantial commentary. From the eleventh century onwards, however, this classical corpus gained a new sphere of circulation through the political, commercial, and intellectual contacts that intensified across the Mediterranean basin.^[1,3,7] In this process, the translation activities carried out particularly within the milieu of the Salerno Medical School not only enabled the rediscovery of Ancient Medical knowledge, but also facilitated its transmission to the West together with original contributions that had been developed within different intellectual traditions. At this point, Constantinus Africanus played a decisive role in broadening the intellectual horizon of the Salerno Medical School during the second half of the eleventh century. Having also taught at the school for a period, Africanus became closely acquainted with the Islamic medical tradition during his extended travels in the Islamic world. By translating medical texts written in Arabic into Latin, he facilitated the transmission to Western Europe of classical works by Islamic physicians, particularly those concerning the diagnosis and classification of diseases. Constantine’s translation activity provided an important intellectual foundation for the development, in the twelfth century, of a systematic and text-based medical education at the Salerno Medical School. In this context, Johannitius’s “Isagoge” and the “Ars Parva” attributed to Galen, both translated into Latin by Africanus, were among the core texts incorporated into the Salernitan curriculum.^[15] At this point, one aspect requires particular emphasis: the translation activities carried out through the agency of Constantinus Africanus should not be regarded as a simple transmission of Ancient and Islamic medical heritage to the West; rather, they should be understood as an original form of intellectual production shaped by personal experience, observation, and critical evaluation.

At precisely this juncture, the studies conducted in the Islamic world on the heart and the CVS provided, for Western Europe, an indirect yet decisive framework of reference. The cardiac theories of the Greek and Roman periods were not only preserved by Islamic physicians but were also re-examined through methods grounded in observation. In works

such as “*al-Ḥawāʾī fī al-Ṭibb*” by al-Rāzī (d. 925), “*al-Kitāb al-Malikī*” by ‘Alī b. ‘Abbās al-Majūsī (d. 994), “*Hidāyat al-Muta’allimīn fī al-Ṭibb*” by al-Akhawaynī al-Bukhārī (d. 983), and “*al-Qānūn fī al-Ṭibb*” by Ibn Sīnā (d. 1037), the heart is treated not merely as a theoretical center, but as an anatomical, physiological, and clinical organ. When transmitted to the Latin world, the approaches developed in these works played a significant role in the transformation of Western conceptions of the heart. In this framework, al-Rāzī’s rejection of Galen’s view that a bony structure existed at the base of the heart constitutes an early example of the critique of authority-based knowledge. Meanwhile, the morphological descriptions provided by ‘Alī b. ‘Abbās concerning the aorta, the coronary arteries, and the pulmonary artery contributed to the development of circulatory understanding by drawing attention to the functional relationships among these vessels. Al-Akhawaynī al-Bukhārī’s explanations concerning pulmonary circulation and his restriction of the heart’s primary function to the pumping of blood indicate a gradual departure from earlier pneuma-centered theories. Although some of his explanations are regarded as inaccurate from the standpoint of modern medicine, the identification of the coronary arteries and the thoracic descending aorta may nonetheless be considered a noteworthy advancement in Medieval cardiovascular anatomy. Moreover, ‘Alī b. ‘Abbās explains the function of the pulmonary artery in a manner that closely corresponds to modern terminology, defining it as the vessel that carries blood to the lungs in order to nourish them and to receive air from them.^[3,16]

Ibn Sīnā, one of the leading figures of the Middle Ages in the field of cardiovascular studies and a major source of inspiration for modern research through the theories he proposed, did not disregard the ideas put forward by physicians of the Greek and Roman periods, particularly Galen. While Ibn Sīnā accepted some of these theories, he critically examined others and introduced new approaches to the field. For instance, like Galen, Ibn Sīnā did not regard the heart merely as an organ that functioned as a pump within the body of living beings; rather, he conceived of it as a center of power — a source of life that directed all bodily and emotional functions.^[1,17] In relation to the cardiosentric model, Ibn Sīnā, who accepted Aristotle’s theory concerning the presence of pores in the interventricular septum, made important observations regarding the origin of the arteries arising from the heart and the veins located in the liver, as well as the differences in the thickness of the ventricular walls. In addition, as the first scholar to identify the difference between atrial and ventricular contractions and to point to the existence of capillary circulation, he made significant advances in the anatomical understanding of the heart.^[1]

Ibn Sīnā attached great importance to the subject of the heart, a fact clearly demonstrated by his treatise entitled “*Kitāb al-Adviyāt al-Qalbiyya*” (The Book of Remedies for Cardiac Diseases). In this work, Ibn Sīnā provided information on cardiac diseases and certain psychological disorders that affect the physiology of the cardiovascular organs, and introduced the medicines that were beneficial in their treatment. The effects of some of the medicines mentioned by Ibn Sīnā have been scientifically demonstrated in modern times.^[18]

In this work, which examines not only cardiac conditions such as dyspnea, palpitations, and syncope but also the effects of psychological disorders—including depression, stress, and anxiety—on the CVS, Ibn Sīnā focused on the relationship between the patient’s temperament and the disorder affecting the heart, and provided significant detail regarding the medicines required for cardiac diseases. The significance

attributed to this work is reflected in the fact that it was translated into Latin twice—in the fourteenth and sixteenth centuries—under the title *De Medicines Cordialibus*.^[19]

Another prominent Islamic scholar who made significant contributions to the medieval field of cardiovascular studies through his work on the anatomy and physiology of the heart was Ibn al-Nafīs (d. 1288). Ibn al-Nafīs’s most important discovery was the idea with on the movement of blood between the heart and the lungs”.^[20] Ibn al-Nafīs was also the first physician to define the true function of the coronary vessels that supply the heart.^[1] Ibn al-Nafīs stated that, after being carried to the right ventricle, the blood is conveyed to the lungs through the pulmonary artery, and from there returns to the heart via the pulmonary veins, before being distributed to the body through the aorta.^[3] By rejecting Galen’s claim that the pores in the septum allowed the passage of blood and spirit between the two chambers, he opposed Galen’s theory concerning the functioning of the heart.

RESULTS

This study demonstrates that knowledge concerning heart and cardiovascular diseases in the Middle Ages did not emerge—contrary to common assumptions—within a stagnant or intellectually regressive medical framework, but was instead shaped within a dynamic intellectual milieu that developed through the continuous exchange between Eastern and Western scholarly traditions and the legacy of the ancient world. The theoretical framework of ancient medicine was reinterpreted in the Islamic world and enriched through original contributions. Consequently, this body of knowledge, transmitted through translation movements and scholarly channels of exchange, became incorporated into the institutionalization of Western European medicine and made a substantial contribution to its development. At the same time, the Western scholarly milieu did not merely receive this heritage passively; rather, it re-interpreted and reconstructed it, further enriching it through its own original intellectual contributions. Accordingly, the history of medieval medicine reflects a multilayered circulation of knowledge that developed not through opposition between East and West, but through processes of continuity and synthesis.

Another significant finding of the study is that investigations concerning the cardiovascular organs and heart diseases were extensively addressed throughout the Middle Ages across different regions and by many of the leading physicians of the period. Observations and explanations concerning the anatomy of the heart and the great vessels—and, to some extent, their physiology—display a noteworthy degree of conceptual depth within the limits of the period’s scientific possibilities. A key implication of the present analysis is that medieval approaches to cardiac illness, while commonly grounded in Galenic humoralism and expressed through regimen and materia medica, cannot be read as a linear step toward modern cardiology. Rather, they should be situated within a period-specific epistemology that explained cardiac disorder in terms of balanced qualities, bodily temperaments, and affective states, and that shaped therapy through the medical rationalities of the time.

The pioneering approaches developed by physicians of the Islamic world concerning the heart, the pulse, the vascular system, and cardiac diseases were not only influential within their own scholarly milieu, but were also received with interest by Western medicine and, for centuries, served as authoritative references in both medical education

and therapeutic practice. This reception highlights the cross-cultural mobility of medical knowledge; however, it also suggests that what circulated in Latin Europe was not a transparent transfer but a mediated corpus shaped by translation strategies, institutional and curricular priorities, and the durability of inherited explanatory models—thereby privileging some claims while muting or reconfiguring others. This case underscores that medical knowledge circulated through translation, adaptation, and institutional filtering. Rather than a seamless flow, transmission involved negotiation, selective uptake, and occasional resistance—processes that shaped what was preserved, transformed, or left aside.

In conclusion, the Middle Ages represents a critical period in which the earliest universities emerged—such as the Salerno Medical School—and in which medical thought began to acquire an institutional framework. The diagnostic and therapeutic approaches developed in relation to heart and vascular diseases during this period are not merely matters of historical curiosity; they are also of great significance for understanding the intellectual background of modern medicine. For this reason, the medical heritage of the Middle Ages constitutes a significant scientific legacy that deserves to be re-examined, both for understanding the historical development of heart and vascular diseases and for revealing the intellectual continuity within which modern clinical knowledge was formed.

Footnotes

Authorship Contributions

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