

Contribution of Greek-O-Arab Physicians in Tashreeh of Nizam-E-Kabidi Wa Safrawiya (Hepatobiliary System): A Review

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Abstract

Introduction: The Unani system of medicine is an all-encompassing medical framework that intricately addresses the diverse conditions of well-being and illness. It offers supportive, precautionary, remedial, and restorative healthcare with a comprehensive perspective. (The literal meaning of Tashreeh is “to cut,” “to dissect,” and “to open,” according to Arabic lughat.) The word Tashreeh used for anatomy as describing the human body, practicing the science of dissection, and the forensic sense of autopsy. The Nizam-e-Kabidi wa Safrawiya (hepatobiliary system) consists of the Kabid (liver), Majra-e-Safrawiya (bile ducts), and Marara (gallbladder). The liver is the largest and unique organ, considered a source of Hararat-e-Ghariziya (innate heat), and performs a wide range of metabolic activities required for homeostasis, nutrition, and immune defense. **Objectives:** To collect and compile the detailed understanding of Greek-o-Arab physicians in the field of Tashreeh of Nizam-e-kabidi wa safrawiya (hepatobiliary system) and analyze the original literature by Greek-o-Arab scholars who published books on Tashreeh of Nizam-e-kabidi wa Safrawiya (hepatobiliary system). **Materials and Methods:** This study involves the exploration and compilation of information sourced from traditional Unani texts such as Alqanoon fi'tib, Kamil-al-sana, Kitab-al-Mansoori, Kitab-al-Miat, and Kitab-al-kulliyat, as well as contemporary sources like journals, research papers, and modern books. **Conclusion:** This paper will provide the literature on Nizam-e-Kabidi wa safrawiya (hepatobiliary system) given by Greek-o-Arab physicians, which can open many doors for reviewers as well as clinical researchers in the future.

Keywords: Unani medicine, Kabid (liver), Marara (gallbladder), Akhlat (humors), Hararat-e ghariziya (innate heat), Quwwat-i-Tabi-iyah (somatic power).

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INTRODUCTION

The Unani system of medicine, which is one of the most ancient medical systems, offers a scientific foundation for treating a wide range of diseases. It aims to restore health by employing a comprehensive approach that includes protective measures, therapeutic interventions, and a holistic perspective [1]. Unani medicine is a form of traditional medicine that originated in Ancient Greece almost 2500 years ago. It is a rich storehouse of principles and philosophies of medicine, along with being the original science of medicine. This comprehensive medical system meticulously addresses the diverse conditions of both well-being and illness [2].

Ibn Sina has defined Unani Tibb as “the science by which the states of the human body, regarding health and decline in health, are identified. Its purpose is to preserve health if it is already attained and to restore it when it is lost.” [3]. Aristotle was the first person to use the term “anatomē” a Greek word meaning “cutting up or taking apart.” [4]. (The literal meaning of Tashreeh is “to cut,” “to dissect,” and “to open,” according to Arabic lughat.) The term dissection, known as tashreeh in Arabic, is utilized in the field of anatomy to elucidate the structure of the human body, engage in the scientific practice of dissection, and conduct forensic autopsies [5].

Tashrih-al-Badan serves as the fundamental subject in Tibb-e-Unani, as the central theme across all medical disciplines is the human body, with the primary objective being the preservation and enhancement of human health. [6]. There are various organs in the human body, including four organs of primary importance in Unani medicine called A‘dā’ Ra’īsa. These are Dimagh (brain), Qalb (heart), Kabid (liver), and Khusyatayn (testes), or Khusya al-Rahim (ovaries) [7].

Nizam-e-Kabidi wa Safrawiyya (hepatobiliary system) consists of the Kabid (liver), Majra-e-Safrawiyya (bile ducts), and Marara (gallbladder) [8]. Kabid (liver): Jigar is the Persian name for liver. In Arabic, it is called Kabid, and in Hindi and Urdu, Kaleja. In Unani Medicine (Greek-o-Arab Medicine), Kabid (liver) is one of the principal vital organs of the body, the source of origin of Quwwat-i-Tabi‘iyah (physical or somatic power), and the seat of digestion of chyme. Unani scholars are assuming liver as the Matbakh (kitchen) of the body, which prepares material for the badal ma tahallul (replenishment) of all body organs in the form of four Akhlat (Humour) viz. Dam (blood), Balgham (phlegm), Safra (yellow bile), and Sauda (black bile) [9].

The liver, being the largest and most distinctive organ, is often regarded as the origin of Hararat-e-Ghariziya (innate heat). Galen described the liver in the human body as analogous to the sun in providing energy to other planets, much like how the liver supplies energy to other bodily organs [10]. The size of the liver also varies according to sex, being smaller in females. The liver is responsible for metabolic functions, which are essential to homeostasis, nutrition, and immune defense. Marara (the gallbladder) also known as the cholecyst and it is the flask-shaped, blind-ending diverticulum attached to the bile duct by the cystic duct. Connective tissue attached it to the inferior surface of the right lobe of the liver firmly. The union of the common hepatic ducts and cystic ducts forms Majra-e-safrawiyya (Bile duct). [8] The liver releases bile through a wide passage into it and a separate broad pathway directs the bile towards the duodenum in the intestines [11].

Objectives

This comprehensive research paper is designed to accomplish the following objectives:

- a) To gather and organize comprehensive knowledge on Greek-o-Arab physicians specializing in the Tashreeh of Nizam-e-kabidi wa safrawiyya (hepatobiliary system).
- b) To examine the primary texts authored by Greek-o-Arab scholars focusing on the Tashreeh of Nizam-e-kabidi wa safrawiyya (hepatobiliary system) to gain insights.
- c) To analyze the original literature produced by Greek-o-Arab scholars to deepen understanding

of the Tashreeh of Nizam-e-kabidi wa safrawiyya (hepatobiliary system).

MATERIALS AND METHODS

This study delves into the analysis and synthesis of information derived from historical Unani literature like Alqanoon fi’tib, Kamil-al-sana, Kitab-al-mansoori, Kitab-al-Miat, Kitab-al-Kulliyat, Kitab-al Mukhtaraat-fil-Tibb, Firdaous-al-Hikmat, Kitab-al-Hawi, in addition to modern resources like academic journals, research papers, and contemporary publications.

Contribution of Greek Physicians

Buqrat (Hippocrates of Cos, 460 BC–377 B.C.):

Widely acknowledged as the preeminent figure in the realm of medicine and bestowed with the title of the Father of Medicine, he is revered as the greatest physician of all time, having stated, “The nature of the body is the beginning of medical science” and giving rise to the moral and ethical codes of medical practice through his teachings and oaths in the Greek world [12]. He postulated that Anatomy should essentially be the foundation of medicine [11]. Hippocrates advised, “diseases caused by overeating are cured by fasting, diseases caused by indolence are cured by exertion, and tenseness by relaxation.” [12]. He also said, “If we live a good life, it is because of the health of our liver.” [13].

Arastu (Aristotle, 384–322 B.C.):

Although Arastu was a philosopher, not a physician; he is well known for his anatomical studies and is so called the Father of comparative Anatomy [14]. According to him, the human’s liver is round-like that of an ox, and it is believed that the liver assists in the digestion of food. He identified the Bab al-kabid (Porta hepatis) and described warid (veins) in relation to it, but did not see any connection with the Awrita (Aorta) [12].

Herophilus (335–280 B.C.):

Herophilus was referred to by many as the “Father of Anatomy.” According to Galen, he was the first to publicly dissect the human body [14]. None of his works have been preserved; they disappeared with the destruction of the library in Alexandria, including his book “On Anatomy.” [12]. He made the first accurate description of the kabid (liver), and two Fusus al-Kabid (two hepatic lobes) were distinguished by him. He had extensive knowledge of its conformation and observed that it differs in size in different species [15]. He was the first to define the Nizam warid al-Bab (portal vein system) and discover the velocity of the warid al-Bab (portal vein) [12].

Erasistratus (330–250 B.C.):

In the 3rd century BC, the eminent Alexandrian physiologist and anatomist Erasistratus of Chios contributed appreciably to the knowledge of Tashrih-e-kabid (hepatic anatomy). He described and studied the kabid (liver) and Majra-e- Safrawi (bile duct) with

special attention and found the liver of an Ascitic patient looked like a stone. He also coined the name "parenchyma" (literally, "poured out beside") for liver tissue. However, the liver parenchyma was of no value to him. The "choleodochos," which he believed absorbed the useless and perhaps harmful bile that the intrahepatic bile ducts carried into the liver with the blood from the warid al-Bab (portal vein), was also first described by him [16].

Jalinus (Galen, 129–200 AD):

The most celebrated anatomist of antiquity was the great physician Claudius Galen, who described the liver as the center of the venous system and considered it to be the source of blood—the basis of life itself.

Galen explains the function of the warid al-Bab (portal veins) by comparing them to city porters who transport cleaned wheat from the storehouse to a public bakery. Similarly, these veins transport the already prepared nourishment from the stomach to a central location in the body, known as the kabid (liver), where it becomes suitable for the entire organism.

According to Galen, "when the liver has received the nutrient already prepared by its servants and looks like an indistinct resemblance of blood, it provides the final elaboration itself so that the nutrient becomes actual blood." [13]. He believed that the right side of the heart was a derivative of the liver, from which blood exits to pass through the Ajwaf (vena cava) either by extending to either the head or arms or to the lower extremities. [12].

Galen believed that the circulatory system consists of two unidirectional blood distribution systems rather than a single, unified circulatory system. His understanding was that venous blood would be generated in the liver (from where it would be distributed to the body and then consumed), and arterial blood would be produced in the heart. The liver and heart would then be responsible for regenerating the blood, completing the cycle [17].

Contribution of Arab Physicians

Rabban Tabari (770–850 A.D.):

He wrote in his book "Firdaus Al-Hikmat" that the liver is home to the blood [18]. The liver has four vital powers (quwaa), namely Quwat-e-jaziba (power of absorption), Quwat-e-ghaziya (power of digestion), Quwat-e-masikah (power of retention), and Quwat-e-dafiya (power of excretion), which perform all the functions related to the liver. The derangement of function of any of these four powers produces a derangement in the temperament of humors, which may result in the disease condition [7]. He also described the conditions of "Warm-e-Haar" occurring in the liver due to an excess of blood in the body and "Warm-e-Barid" occurring due to an excess of phlegm [18].

Zakariya Razi (Rhazes, 854–925 A.D.):

Two of Al-Razi's well-known books are Al-Hawi fi al-Tibb (The Comprehensive Book in Medicine) and Kitab al-Mansuri. Al-Hawi fi al-Tibb is his most famous medical encyclopedia, known in Europe as Liber Continens. He described in Kitab al-Mansoori that the liver is located on the right side under the ribs and is lunar in shape. The inferior part of the liver is the concave, which is connected to the stomach. The superior part of the liver is convex, connected to the diaphragm, and binds with the ligaments. The appendages of the liver are called shob-e-kabid (lobes of the liver). Sometimes it is four in number or five in number, in which the smallest appendages are called Zaida-e-kabid, which is the right part of the stomach. He wrote that the Majra al-Bab (portal duct) that originates from its concave surface and warid al-Bab (Portal vein) looks like a vessel but does not carry blood; it has many openings in the stomach and intestine and brings the food to the liver (through the superior mesenteric vein, inferior mesenteric vein, etc.). He considered the splenic and short gastric veins as two vessels connecting the spleen to the liver and to the stomach, respectively. The food becomes blood in the liver and then moves to the body parts through the great blood vessel that attaches to its convex surface [19].

Ibn Abbas Majusi (930–994 A.D.):

Ali Ibn Abbas Majusi is now regarded as one of the greatest physicians of the Tibb-e-Unani and said the size of the liver is not the same in all people. In some people, it is large and in others, it is small, but in proportion to the body, it is bigger in human beings as compared to animals of the same size. The liver extends from the inner side of the body to the outside, and it is longest on that axis. The Bab al-Kabid (portal vein) is on the abdominal side (the concavity of the liver) and has many tributaries to it. The liver depends on these tributary branches for bringing the Usara and Ghiza (chyle) to the liver, where it is turned into blood, which is supplied to all the organs through the Ajwaf Tahtani (inferior vena cava). The Marara (gallbladder) has two ducts: Majra kabidi Mushtarak (common hepatic duct) starts from the concave surface of the liver and carries out the bile from the blood of the liver and the other is divided into two branches; Majra Safrawi Mushtarak (common bile duct) that attaches onto the intestine and Majra Banqarasiya (pancreatic duct) that attaches onto the stomach [20].

Ibn Sina (Avicenna, 980–1037 AD):

Ibn Sina, popularly known as Avicenna, was one of the greatest scholars of Unani medicine. The Persian physician Avicenna absorbed the Galenic teachings on anatomy and expanded on them in the Canon of Medicine. From the 12th to the 17th centuries, the Qanun served as the chief guide to medical science in the West. Avicenna described the close relationship of the convex surface of the liver to the right dome of the diaphragm and suggested that the dome shape of the

diaphragm allows for the free movement of the diaphragm and acts as a fan over the liver. The liver is attached to the diaphragm through the folds of the visceral peritoneum on the diaphragm and this visceral peritoneum form the anterior and posterior coronary ligaments. In addition, the falciform ligament attaches it to the anterior abdominal wall and conveys the left umbilical vein during embryonic development [21].

Avicenna wrote, "The liver is a large factory where, due to digestive and metabolic changes, the various humors of the body are formed in plenty." [13]. The gallbladder, as Avicenna described, is located on the concave side of the liver, closer to the stomach. He emphasized that bile serves the dual purpose of eliminating excessive foam from the intestines and purifying the blood [10]. According to Avicenna, the veins of the liver, spread through the substance of the liver, are the roots of the vessels that grow out of the liver. Some of them are the roots of the Bab al-Kabid (portal vein) and are called Asl al-Bab, and the others are the roots of the Ajwaf Tahtani (inferior vena cava) and are called Asool-al-Ajwaf [7]. The veins of the liver serve the liver either by Khidmat-i-Mohayya or by Khidmat-i-Mowaddia.

Abu Sahl Masihi (10th century A.D.):

Abu Sahl Masihi stated about the kabid (liver) that the natural faculty is the faculty that supplies nutrients to the entire body and expels waste products. Marara is a sac that is more long than broad, slightly bends at one end, is made of a single layer, and is more or less suspended from the liver on its abdominal (concave) side [9].

Ibn Rushd (Averroes, 1126–1198 AD):

Ibn Rushd was very interested in anatomy and famously wrote, "Practice of dissection strengthens the faith." He stated that the left side of the heart is the origin of the Sharayin (arteries), while the liver is the origin of Warid (vein), and mentioned that in the liver, nutrients are converted into blood, which provides nutrition to every organ. That's the reason Ibn Rushd has called the Kabid (liver) the Rais-e-Mutlaq (chief organ) of the natural faculty [9].

Ibn Hubul Baghdadi (1121–1213 AD):

He believed in his book "Kitab-al Mukhtaraat-fil-Tibb" that the mouth, esophagus, intestine, and mesenteric vessels are servants of the liver, which deliver food in the form of chyle. He explains that the Bab al-Kabid (portal vein) is like a tree for the liver, and the Ajwaf tahtani (inferior vena cava) is like a branch of the tree of the liver. The liver also sends water to the kidneys, yellow bile to the gallbladder, and black bile to the spleen. He also described the hepatogastric, hepatoduodenal, and hepatocolic ligaments, as well as the suspensory ligaments of the liver. A duct emerges from the gallbladder connected to the intestine, which

carries bile to wash the intestine from solid waste and help in the digestion of solid foods [22].

Ibn Quf (1233–1286 A.D.):

The essence of the liver is not sensitive, but its covering membrane is sensitive because some nerve fibers from the cord come to it. The covering membrane is a continuation of the peritoneum and has many folds, which are four or five in number. The liver lies on the right side of the body (opposite to the spleen), but at a slightly higher level. The posterior surface of the liver is attached to the spinal column and the ribs by ligaments. It is related to the diaphragm towards the front surface and to the intestines and mesentery on the under surface [23].

Ibn Al-Nafis (1210–1288 AD):

The Arab physician Ibn al-Nafis was prominent in dissections of human bodies and performing necropsy. In his notable work "The Commentary on Anatomy in Avicenna's Canon," Ibn Al-Nafis aligned his views with those of Galen and other scholars concerning the origin of blood in the liver. He acknowledged that the liver plays a crucial role in converting the nutrients derived from digested food, namely "chyle and chyme," which are produced in the stomach, into blood. Most of the Ibn Al-Nafis anatomical descriptions were similar to our current anatomical knowledge [3].

DISCUSSION

Although each era of human history, like Greek-o-Arab and Roman physicians, has contributed significantly to modern anatomy, the impact of classical Greek heritage can be seen, as that was the period when remarkable anatomical discoveries were made. Even so many mistakes have been made in the journey of understanding hepatic anatomy, but these mistakes subsequently helped to clarify the correct anatomy of the hepatobiliary system. Previous works have been lost intentionally or accidentally, that's why the complete history of anatomy has remained elusive. Herophilus, the father of anatomy, has none of his works preserved since the destruction of the Library of Alexandria, including his book "On Anatomy," but a little bit of his work was recorded in the works of other writers. He was the first to define the portal vein system and discover the velocity of the portal vein. Erasistratus was the first to describe "parenchyma" for liver tissue, but the liver parenchyma was of no value to him. Nevertheless, in modern anatomy, parenchyma cells are essential for storage, secretion, assimilation, excretion, and transport of water and solutes. Galen explained that blood is formed in the liver from the useful matter taken by the body; he does not say exactly which particular fluid fills the veins running from the stomach and intestine to the liver. Ibn Abbas Majusi described that the size of the liver is not the same in all people; in proportion to the body, it is bigger in a human being as compared to an animal of the same size. Avicenna asserted that the gallbladder is

situated on the concave side of the liver, in proximity to the stomach. In acceptance of modern anatomy, Avicenna described the biliary tree, although he did not mention the anatomical names of its tributaries. Bile is used for cleaning extra foam from the intestines and for purification of blood. Physiologically, bile helps in the emulsification of the fats during digestion and increases their absorption; it also facilitates the absorption of vitamins A, D, E, and K.

CONCLUSION

This paper enlightens the praiseworthy work done by Unani physicians, who compiled their observation and research work about Tashreeh-e-Kabid wa Marara (anatomy of liver and gall bladder), which is present in our ancient Unani literature. Today's advanced understanding of anatomy is indebted to the ancient Unani literature, which served as its foundation. In the contemporary era, where empirical evidence holds paramount importance, Unani physicians have been acknowledged for their reliance on observations and evidence. Notably, significant progress in comprehending the structure, location, and function of the liver and gallbladder can be traced back to ancient Greece.

The ancient Unani literature has played a pivotal role in shaping the current knowledge of anatomy. In the present evidence-based world, Unani physicians have garnered recognition for their emphasis on observations and empirical evidence. It is worth noting that ancient Greece witnessed notable advancements in comprehending the intricate details of the liver and gallbladder, including their structure, location, and function. Therefore, it can be asserted that the foundational research conducted by Unani physicians in the past serves as the basis for our contemporary understanding. This statement highlights the significant contribution of early Unani physicians to the development of medical knowledge over time.

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