

**TAREEKH-E-TASHREEH-E-QALB (HISTORY OF HEART'S ANATOMY) IN
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Article Received on 05/12/2022

Article Revised on 26/12/2022

Article Accepted on 16/01/2023

ABSTRACT

Introduction: Unani Medicine is a form of traditional medicine originated in Ancient Greece almost 2500 years back.^[1] Ancient Greek period is conventionally broken down into: Archaic period, Classical period and Hellenistic period. The Archaic Period is from 750 to 480 BCE, the Classical Period is from 479 to 323 BCE and the Hellenistic Period is from 323 to 30 BCE.^[2] Tashreeh means “to cut”, “to dissect” and “to open” according to Arabic lugat (dictionary). It is “study of organs” in which shape & form (shakl wa surat), color (rang), quality (kaifiyat), structure (saakht), relations (baahmi nisbat), and functions (afa'al) are studied.^[4] The Nizam-e-Uruqi Qalbi or “Cardio-Vascular System” is also called as blood-vascular, or simply the circulatory system. It consists of the heart, a muscular pumping device, and a closed system of vessels called arteries, veins, and capillaries.^[8] For those who want to understand cardiac function not only in the normal heart but more importantly in diseased heart, a precise understanding of cardiac anatomy is a prerequisite.^[9] **Background:** The history of the cardiac anatomy dates back to 3500 B.C. when the Greeks and Egyptians based their understanding of this structure on their religious beliefs. **Material and Methods:** This literature review seeks to collate and discuss peer-reviewed articles on the history of cardiac anatomy. **Conclusion:** The history of the cardiac anatomy was widely influenced by intellects of varying backgrounds, which led to significant contributions to our current understanding.

KEYWORDS: Unani Medicine, Classical Greece, Tashreeh-ul-badan (Anatomy), Nizam-e-Uruqi Qalbi (Cardiovascular system), Qalb (Heart), Aza-e-raisa.

INTRODUCTION

Unani Medicine is a form of traditional medicine originated in Ancient Greece almost 2500 years back.^[1] Ancient Greek period is conventionally broken down into: Archaic period, Classical period and Hellenistic period. The Archaic Period is from 750 to 480 BCE, the Classical Period is from 479 to 323 BCE and the Hellenistic Period is from 323 to 30 BCE.^[2]

Unani medicine is a rich store house of principles and philosophies of medicine along with being original science of medicine. It is a complete medical system which deals carefully with the various states of health and disease.¹ Ibn Sina popularly known as Avicenna, one of the greatest scholars of Unani medicine, has defined Unani Tibb as "It is the science by which the states of 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]

Tashreeh-ul-Badan is the basic subject of *Tib-e-Unani*. Since essence of every field of medical sciences is

human body and aim of medical science is to maintain good health of human body.^[4] That's why it is necessary to study the normal structure & functions of the body for proper diagnosis and successful treatment.^[5] Tashreeh means “to cut”, “to dissect” and “to open” according to Arabic lugat (dictionary). It is “study of organs” in which shape & form (shakl wa surat), color (rang), quality (kaifiyat), structure (saakht), relations (baahmi nisbat), and functions (afa'al) are studied.^[4] It provides detailed information of the basic structure of the body and paves the path for understanding the basic functions of the body.^[5] *Buqrat* (Hippocrates) writes that “Anatomy is the basis of medical discourse” in his book “*De Locis in Homine 2*”.^[6]

The concept of riyasat of aza also plays an important part in unani medicine. There are 3 aza-e-raisa or necessary quwa for the preservation of individual, these are- qalb, dimag, kabit. According to Galenus the number of aza-e-raisa is the same as there are necessary quwa (faculties) in the body.^[7] The Nizam-e-Uruqi Qalbi or “Cardio-Vascular System” is also called as blood-vascular, or

simply the circulatory system. It consists of the heart, a muscular pumping device, and a closed system of vessels called arteries, veins, and capillaries.^[8] For those who wants to understand cardiac function not only in the normal heart but more importantly in diseased heart, a precise understanding of cardiac anatomy is a prerequisite.^[9]

Since 3500 BC, anatomists, physicians and scientists have tried to develop an understanding of the anatomy and physiology of the cardiovascular system.^[10] It took centuries in piecing together the gross anatomy of heart. From Buqrat to Galenus to Leonardo da Vinci, great anatomists, philosophers, and even artists have contributed in illustrating the puzzle which was the structure of heart once. Ancient philosophers fought against cultural and religious restrictions to provide us with the foundation on which we have built our sciences and so medicine. The knowledge about the heart's anatomy has been a slow and steady journey, traveled by intellects of various background, who remained diligent committed in their chasing for the "truth" despite various challenges.^[11]

The exploration of the Nizam-e-Uruqi Qalbi has a history of at least five millennia.^[12] The knowledge which led to the discovery of blood circulation, was achieved only gradually through the ages. It started in Egypt around 3500 BC, was expanded by ancient Greeks, was better defined in Alexandria, and, in the West, stopped after the fall of the Roman Empire. This knowledge was conserved in the Islamic world and in European cloister, and it later advanced with the revival of the anatomical dissection in European universities, paving the way to today's discovery.^[13]

This review provides an overview about how knowledge about the CVS has started in Classical Greece.^[13]

CONCEPTS GIVEN BY DIFFERENT PHYSICIANS

Asclepius: Ancient writings affirms that Asclepius was a surgeon and a great healer. He closed and healed several wounds as Homer noted that Greek doctors of his time were taught to check blood flow after bandaging a wound.^[14] It was Asclepius who is considered to be one of the first to possess significant knowledge as it relates to the anatomy of cardiovascular system. Sadly, there are no written records found to support the fact.^[11]

Empedocles (c. 494 BC- c. 434 BC): Empedocles was a physician, philosopher and poet.^[15] He was the first who recognizes that heart formed prior to any other organ in the body.^[11]

Buqrat (c. 460 – c.370 BC): Buqrat, the Father of Medicine, greatest of all physicians had established the healing art as a science, far removed from the magic and superstition.^[14] Buqrat wrote his first book, "On the Heart", detailing the anatomy of the heart and the

cardiovascular system.^[10] It is the first extant treatise that mentions the pericardium, the four chambers and four valves of the heart, and the great vessels.^[16]

In this book, the heart was defined as a very strong muscle in an ovoid hollow which is placed on the left side of the body and is surrounded by the lungs.^[10] The shape of the heart is described as pyramidal and it is covered with a smooth membrane. There is a small quantity of fluid present in this membrane.^[16] The heart has two ventricles connected by orifices through the interventricular septum.^[10] It contains two separate cavities in one circumference: the one on the right side lies face downwards, fitting closely against the other. The right chamber is very spacious, and hollower than the left. It does not extend to the extremity of the heart but leaves the apex solid. The left cavity lies somewhat lower, and extends towards the line of the left nipple, which is the place where its pulsation is observed. The inside surface of both chambers is rough; the left is more than the right one. Buqrat apparently recognized the chordae tendineae, the papillary muscles, and the trabeculae carneae as these cavities has membranes as well as fibers, spreading out like cobwebs through the chambers of the heart and surrounds the orifices on all sides and implanting filaments into the wall of the heart.^[16]

The auricles or atria were mentioned as hollow and soft structures around the ventricles in close proximity to the origins of vessels. They are referred here as "ears" devoid of holes that served for capturing air. Auricles were recognized as parts of the vessels connected to the heart not as part of the heart itself. These vessels were considered to be connected to the heart through these extensions from the cardiac wall.^[10]

Arastu (384–322 BC): Although Arastu was a philosopher not physician, he is well-known for his anatomical studies of the heart.^[10] Descriptions of the Nizam-e-Uruqi Qalbi are found throughout the writings of Arastu where he depicted the heart with detail, mainly in the two treatises of *Historia Animalium* (The History of Animals) and *De Partibus Animalium* (The Parts of Animals).^[10]

Arastu believed that heart lies in the center and therefore can be reached by all other organs.^[10] His great innovation in the anatomy of the Nizam-e-Uruqi-Qalbi was the introduction of three cavities i.e., ventricles of heart, all connected to the lungs.^[13,18] He considered the right atrium as a venous dilatation.^[18] The translation of the most relevant part of Aristotle's text (*Historia Animalium*, book 1, chapter 17) is given below: The heart lies above the lung at the point where the windpipe divides into two and has a fat thick membrane at the place where it is attached to the Great Blood-vessel and the Aorta. Further, it is not large and is almost rounded in shape except at the end where it is pointed. The rounded end of the heart is at the top and its pointed end lies upon

the Aorta which is projected forward in all animals. This pointed end lies towards the chest in the animals having chest. In animals other than man which have a chest, its position is in the middle of the chest, but in humans it is somewhat towards the left, slightly inclining from the breasts partition towards the left breast in the upper part of the chest. The end is very fleshy and firm in texture and there are sinews in its cavity.^[17] According to Arastu there are three ventricles in the heart, the largest is on the right side, the smallest on the left, and the medium one in the middle. These three ventricular heart models were similar for all the animals. However, all the ventricles are distinguishable in larger animals only, while in the middle-sized animals only two ventricles are distinguishable and in small animals even the large right ventricle is scarcely notable.¹⁹ Furthermore, he believed that the origin of all nerves and vessels was the heart.^[13] He also observed the presence of the papillary muscles and tendinous chordae.^[11]

Herophilus (335–280 BC): Herophilus was referred to by many as “the father of anatomy.”^[10] According to Galen he was the first to publicly dissect the human body.^[20] None of his works have been preserved, they disappeared with the destruction of the library of Alexandria, including his book “On Anatomy”. But it was recorded in the works of other writers that he dissected extensively and made unprecedented number of anatomical discoveries and accompanied them with precise descriptions.^[14]

Beside his other works, Herophilus was also credited with recognizing that the “atria” were components of the heart anatomically by going against the previous school of thought which states that the “atria” were not the part of the heart but the dilatation of the great vessels.^[18] Since he recognized the auricles as an internal feature of the heart therefore, he was one of the first to state that the heart is made up of four chambers.^[11]

He believed that arteries were originated from the heart, but he did not specify from where these were originated.^[13] He also mentioned the heart valves briefly.^[10] According to Galen, Herophilus also noted the presence of the tendinous chordae and papillary muscle, to which he referred to as “neural diaphyses”.^[11]

Erasistratus (c. 304 – c. 250 BC): In 3rd century BC, the eminent Alexandrian physiologist and anatomist Erasistratus of Chios contributed appreciably to the knowledge of cardiac anatomy.^[21]

The scrupulous description of all four heart valves was a great innovation of Erasistratus. In particular, he observed the presence of cusps in the valve, in addition to the sigmoid shape of the valves of the pulmonary artery and the aorta.^[22] He described the atrioventricular valves as tricuspid and bicuspid; those on the right side has 3 cusps and those on the left side has 2 cusps.^[13] Followers of Erasistratus gave the name “tricuspid

valve” to the attachment of the vena cava to the heart (Galen, 1984). Erasistratus also described the function of valves in preventing backflow of material to the heart.^[9]

He believed that the heart is made up of two chambers and not four as told by herophils.^[10] He considered atria or auricles as earlike structures which were just a dilatation of the vena cava and aorta, and not the part of the heart.^[23] He claimed that veins, just like arteries, originated in the heart not the liver, in contrast to earlier investigators. The left side of the heart was the origin of the arteries and the right side was the origin of the veins.^[10]

DISCUSSION AND CONCLUSION

Although, each era of human history has contributed significantly to the modern anatomy of the heart. The impact of the classical Greek heritage can be seen as this was the period where remarkable anatomical discoveries were made. Even though many mistakes have been made in the journey of understanding the cardiac anatomy but these mistakes subsequently helped to interpret the correct anatomy of the heart. Previous works have been intentionally or inadvertently lost that’s why the complete history of anatomy of the heart was remained elusive.

The early discoveries were the outcome of close connections between medicine, religion, and spirituality. The pre-Hippocratic era provides a more religious and holistic understanding of cardiac anatomy. However, most of the work of many eminent physicians is lost and not available including Asclepius and Empedocles. Buqrat described the detail anatomy of heart and CVS in his first book, “On the Heart”. Arastu was the first to who experimented upon animals and human corpses to make detailed observations of the anatomy of the heart and blood vessels. Herophilus was the first to state that the heart is made up of four chambers. He recognized the “atria” as anatomically components of the heart by going against the previously school of thought which states that the “atria” were dilatation of the great vessels. Erasistratus was the first to describe heart valves in detail.

Advances in the understanding the structure, location and function of the heart has occurred in ancient Greek. Therefore, we can say that it was the early work of Unani physicians on which our current knowledge of the Cardio-vascular system is based. Hence, we can conclude that without their astounding observations current medical knowledge would not have been reached so far.

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