

Expedition of Cardiac Anatomy in the History

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Received: August 06, 2019; **Published:** September 30, 2019

Cardiology is the most fascinating part of the medicine, which keeps captivating the enthusiasm of the medical student and common person alike, as it is the leading cause of mortality and morbidity. Cardiology is one of the most evolved and developed specialties of medicine with regard to understanding the anatomical and physiological changes that could lead to ailment, and in using the technology in diagnosis in prevention as well as in therapeutic intervention. The expedition of cardiovascular anatomy and physiology is a very long one, from the first heart depiction in a mammoth 15000 years ago by a prehistoric person till date.

A mammoth with a heart drawing, found in the prehistoric “*El Pindal cave*” in Spain that dates back to 15000 years ago, is the first existing mention of the heart [1]. Documented evidence of description of the human heart in medical literature first appeared in ancient Egyptian medical manuscript “*Ebers Papyrus*”. This document was written around 1550 BC [2], but the text is believed to be transferred from the earlier texts dated back to 3500 BC. The anatomical descriptions were not accurate in these texts. There was mention of the heart, pulse, and blood in the ancient Chinese and Indian medicine as well [3]. Since then, there were many contributions to the cardiovascular anatomy and physiology by many great medical explorers, who even snatched corpses from the burial ground to enlighten us. Even some brave scientists were killed for their medical discoveries during the process of disseminating truthful knowledge, by monarchies and religious institutions.

Hippocrates [460 BC] the father of the modern medicine, described the location, chambers [mainly the ventricles], valves and vessels of the heart. He described that interventricular septum has openings connecting two ventricles and left ventricle generates “pneuma” the pure air and spirits [4]. *Aristotle* [384 BC] described the heart as having three chambers and named the great artery as “aorta”, but he thought nerves are originating from the heart [5]. In the period around 300 BC, *Herophilus* was one of the first to believe that the heart has four chambers and *Erasistratus* described the structure and function of the valves.

Galen [130 AD] described the heart having two chambers, the right chamber for blood and the left chamber for air. He also stated that these two chambers are separated by a septum with pores. He found that the vessels both arteries and veins contained the blood in contrary to the earlier belief the arteries contain pneuma only. Galen’s anatomical descriptions dominated unchallenged for about 1200 years.

After *Galen*, there was long dormancy in the scientific explorations in cardiovascular medicine due to religious dominance over science. *Ibn Nafis* [1210-1288 AD] was the first one to contradict Galen’s descriptions that interventricular septum has pores and blood goes from the right ventricle to the left ventricles. His book “*Sharah al Tashreeh al Qanoon*” (Commentary on anatomy of the Canon of Avicenna) was the first medical document written describing the pulmonary circulation [6].

Leonardo DaVinci, a great scientist, painter, astronomer, architect and a man of vision and wisdom ahead of his times made many first and correct anatomical discoveries during the 16th century. His contributions to the cardiac anatomy are the first-ever description of the four chambers, two atria and two ventricles; and his drawings beautifully detailed the anatomy of the heart, aorta and coronary arteries [7]. *Andreas Vesalius*, the father of modern anatomy in his book "*De Humani Corporis Fabrica*" described the anatomy of cardiac valves and named the bicuspid left atrioventricular valve as "mitral valve" because of its resemblance with bishop's mitre [8]. In the 17th century, *William Harvey* was first to describe the heart as a pump and detailed the circulation correctly. *Richard Lower* described the contraction of the heart muscle and its role in pumping blood [9]. He identified the tubercle between the inferior vena cava and fossa ovalis, the intervenous tubercle of Lower [10].

It was during the 18th century, many eminent researchers have contributed detailed anatomical facts. *Raymond Vieussens'* descriptions detailed the coronary arteries and veins; he also identified the valve between the great cardiac vein and coronary sinus [11]. *Adam Christian Thebesius* gave the particulars of the coronary veins and the coronary sinus valve, which we are now calling as "Thebasian valve". *Jean Baptiste de Senac*, in the pages of his book, gave great detail of ventricular features, the trabeculae carneae [12]. *Antonio Scarpa* explained the innervation of the heart; he was the first one to identify the nervous connections to cardiac myofibers [13].

During the next centuries, 19th and 20th further cardiac anatomical details were revealed. *His* and *Purkinje* studied the conducting system of the heart and the structures identified by them are named after them. "Bundle of His", the bundle of fibers in myocardium below the AV node. Purkinje fibers, the specialized cardiac myocytes that are distributed in the ventricular wall [14]. The pacemaker of the heart SA node was first discovered by *Martin Flack* and *Sir Arthur Keith* in 1907 [15] and the AV node by *Tawara* in 1906 [16].

With all these great contributions from great pioneers, today the advances in the diagnosis, therapeutic interventions and integration of technology in diagnosis as well as treatment are possible.

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Volume 2 Issue 8 October 2019

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