ORIGINAL ARTICLE

Heart Vs Hridaya: Correlating Modern Science with Ancient Wisdom

Abstract

Ayurveda, often regarded as the world's oldest medical system, traces its origins back more than 5,000 years to the Vedic civilization of India. Rooted in a holistic philosophy, Ayurveda emphasizes the interconnectedness of body, mind, and spirit, while also presenting remarkably detailed descriptions of human anatomy, physiology, disease pathology, and therapeutic strategies. Much like modern biomedical science, Ayurvedic literature includes systematic observations on organ structure and function, mechanisms of disease, and approaches to prevention and treatment.

Among its areas of focus, cardiovascular health occupies a prominent place. Ancient Ayurvedic texts describe not only disorders of the heart itself but also systemic conditions that influence cardiac function, closely paralleling the modern understanding of comorbidities and risk factors. For example, the concept of Hridaya (heart) is elaborated not merely as an anatomical structure but also as the seat of consciousness, emotion, and vitality, reflecting an integrated perspective that encompasses both physical and psychosomatic health. This review article aims to revisit these classical Ayurvedic perspectives in the light of contemporary cardiology. Specifically, it will explore ancient descriptions of the heart's structure and embryological development, classifications of cardiovascular disorders, and the conceptual parallels between Ayurvedic nosology and modern clinical entities such as coronary artery disease. To conclude, the review seeks to demonstrate how Ayurveda's timeless principles not only enrich the historical understanding of cardiology but also provide a complementary perspective that may guide integrative and preventive approaches to cardiovascular health in the modern era.

Key words: Ayurveda, Cardiovascular, Heart, Hridaya, Modern Science

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Introduction

Science is a continuously evolving field, constantly uncovering new knowledge. However, it is often surprising to find that many modern discoveries were already mentioned long ago. For example, during the COVID-19 pandemic, the traditional Indian greeting of "*Namaste*" used for thousands of years, was preferred over handshakes. Namaste, which means "*I bow*" (Cologne Digital Sanskrit Lexicon, 2013), "*I bow me you*" (Harper, 2014) or "*I bow to you*" (Ying, et al., 1999), I honor the spirit within (Lawernce, 2007) reflects a deep cultural understanding of respectful, contactless interaction.

In modern medicine, the study of the heart is said to begin with Herophilus, the "*Father of Anatomy*," who, in the 4th century B.C., first demonstrated the synchronization between the heart and the pulse (Hoff, et al., 2012). Since then, science has evolved to recognize numerous cardiovascular disorders, along with evidence-based diagnostic and therapeutic techniques. Yet, when we revisit our ancient texts, such as the Vedas (around 2400 B.C.), especially the Atharva Veda, which outlines the foundation of Ayurveda, we discover profound insights into health and disease. These include the concepts of Triguna, Pancha-mahabhuta, Tridosha, and Sapta-dhatu (Thakar, Eminent scholars like Charaka (1500 B.C.)) (Gupta, 2014), Sushruta (300–400 A.D.), and Vagbhata (500 A.D.) (Jaiswal, 2016) documented the principles and practices of Ayurveda in their texts. This holds true for the science of the heart which is one of the most essential organs in the human body." The concepts of Hridaya (heart) and Hridroga (heart disease) have been acknowledged since those early periods, with references to heart disease and its treatment found in classical Ayurvedic texts. Many facts emerging in modern science were documented long ago in ancient texts. For instance, conditions such as Hridroga caused by Krimi (parasites) (Agnivesha, 1998a) were described in Ayurvedic literature well before the discovery of streptococci as a cause of heart valve infection (Merck, 2017).

Here are some concepts that have been described from both modern and ancient perspectives.

Anatomy and Physiology of the Heart

The heart is a fist-sized muscular organ situated in the middle of the chest, slightly tilted toward the left side. The word "*heart*" is derived from the Latin phrase Cor meum tange or Cor meum tuo, which translates to "*touch*/*protect my heart*" (Kochovska Stevovikj, 2017). Herophilus, known as the "*Father of Anatomy*," was the first to demonstrate the synchronization between the heart and the pulse in the 4th century B.C. The heart serves as the key component of the cardiovascular system. Deoxygenated blood from the body enters the right atrium through the superior and inferior vena cava and then flows into the right ventricle. From there, it is pumped to the lungs for oxygenation. Oxygen-rich blood returns from the lungs to the left atrium, passes into the left ventricle, and is then pumped throughout the body via the arterial system. The cardiovascular system comprises a vast network of arteries and veins through which the heart maintains continuous circulation. The coronary arteries, running along the surface of the heart, supply oxygenated blood directly to the cardiac muscle. In addition, a web of nerve tissue innervates the heart, coordinating the electrical signals responsible for its rhythmic contraction and relaxation (Anderson, 2012). Celsus (25 B.C. – 50 A.D.) introduced the term cardiacus (heart disease) and proposed the concept of blood returning to its point of origin, hinting at the circulation of blood (Howick, 2016). Galen (131–201 A.D.) further contributed to early cardiovas-

cular understanding by coining the term Pneuma zoticon (vital spirit), which he believed was produced in the heart and responsible for regulating blood flow and body temperature. Later, in 1616 A.D., William Harvey revolutionized cardiovascular science by presenting the theory of blood circulation. He described the heart as a muscular pump that drives blood flow through the body using its contractile force (Boyle, 2008).

According to the ancient Ayurvedic text Brihadaranyaka Upanishad, the meaning of the heart (Hridaya) is deeply symbolic and well-articulated. The term Hridaya is derived from three Sanskrit roots: Hri, Da, and Ya. Hri represents "*harana*" or receiving—referring to the heart's role in receiving deoxygenated blood from the body through the veins. Da signifies "*danam*" or giving—symbolizing the heart's function of supplying oxygenated blood to the body through the arteries. Ya denote "*gati*" or movement—highlighting the heart's continuous state of contraction and relaxation. Therefore, Hridaya can be understood as "*that which receives, gives, and remains in constant motion*," embodying perfect balance. Additionally, classical texts describe the heart as a fleshy, muscular organ, red in color and resembling a lotus, from which vessels and capillaries spread throughout the entire body (Shukla, 2017; Suśruta, 2011).

In Ayurveda, the heart is among the Tri-Marmas: specifically, a Sadhya Pranhar Marma (vital organ essential for life) (Suśruta, 2011). Even a minor injury to it is considered potentially fatal. The heart is uniquely identified as the seat of Sadhaka Pitta (Mamgain and Singh, 1993) Avalambaka Kapha (Vāgbhaṭa, 2015), and Vyana Vayu (Mamgain and Singh, 1993). It is a pulsating organ located in the thoracic cavity. To its left, lies the Pleeha (spleen) and Phupphusa (lungs), while to its right are the Yakṛt (liver) and Kloma (often interpreted as the pancreas or duodenum) (Suśruta, 1997). The movements of the heart are governed by Vyana Vayu, which can be correlated with the Autonomic Nervous System. Sadhaka Pitta is understood to represent the intracellular enzymes within cardiac cells, playing a role in the digestion and utilization of nutrients and oxygen. Avalambaka Kapha corresponds to the intracellular and interstitial fluids of the heart and chest, including pericardial and pleural fluids.

Embryology of the Heart

The heart originates from the embryonic mesodermal germ layer, with its cells differentiating into three main components: the mesothelium, endothelium, and myocardium. The pericardium is the outermost layer of the heart which develops from the mesothelium, while the endothelium gives rise to the inner lining of the heart, as well as the lymphatic and blood vessels. The process of heart development, known as cardio-genesis, begins with the formation of two endocardial tubes, which eventually fuse to create a single tubular structure referred to as the primitive heart tube. This structure elongates and undergoes complex folding and septation, gradually forming the four chambers and paired arterial trunks that constitute the adult heart. The heart is the first functional organ to develop in vertebrate embryos. In humans, it begins beating spontaneously around the fourth week of development, approximately 21 days after fertilization (Moorman, 2003).

According to Ayurveda, the formation of the heart is influenced by maternal contributions, particularly Rakta (blood) and Kapha (one of the three doshas), which are considered vital in the early developmental stages (Suśruta, 1997). The Sushruta Samhita states that the heart is fully formed by the fourth month of gestation, which also marks the emergence of Chetana (consciousness) (Suśruta, 1997). By this stage, sensory faculties such as hear-

ing, touch, taste, temperature perception, and smell are believed to be developed. Owing to the coexistence of two hearts of the mother and of the fetus, the pregnant woman is poetically referred to as Do-Hridini, meaning "*a woman with two hearts* (Suśruta, 1997)." The Charaka Samhita records that the heart begins to function in the third month of gestation (Agnivesha, 1998b), whereas Vagbhata's Ashtanga Sangraha places this development as early as the second month (Vāgbhaṭa, 2015).

Heart Diseases as Per Their Etiology

In cardiovascular disorders, the normal anatomy and physiology of the heart become disrupted. These conditions may be congenital, such as in certain structural heart defects like mitral valve abnormalities. Other defects can involve the blood vessels, as seen in coronary artery disease (CAD), which may lead to heart attacks, chest pain (angina), or even stroke. Some disorders affect the heart's electrical system, resulting in irregular heart rhythms (arrhythmias). Additionally, other conditions may impair the function of the heart muscles, valves, or its overall rhythm (Mendis, 2011). In Ayurveda, heart diseases are collectively referred to as Hridroga. The concept of Hridroga dates to the Vedic period (around 2400 B.C.) and is extensively discussed in classical Ayurvedic texts such as the Samhitas and Puranas. These texts offer detailed descriptions of the causes (Nidana), manifestations (Lakshana), and treatment (Chikitsa) of Hridroga (Agnivesha,1998a).

Various abnormal heart conditions described in modern medical science have also been recognized and discussed in ancient Ayurvedic texts, albeit under different terminologies and conceptual frameworks. Some notable examples include:

Coronary Artery Disease (CAD) and Angina: CAD refers to the narrowing or blockage of one or more arteries that supply blood to the heart, primarily due to atherosclerosis, which is a condition characterized by the hardening and thickening of arterial walls. In the stable angina pectoris, narrowed coronary arteries limit the heart's ability to receive increased oxygen during physical exertion, resulting in predictable chest pain or discomfort that typically improves with rest. In contrast, unstable angina pectoris is an acute condition marked by sudden chest pain or discomfort, which can even occur at rest. It may precede serious events such as myocardial infarction (heart attack), life-threatening arrhythmias, or cardiac arrest. A myocardial infarction occurs when a coronary artery becomes acutely and completely blocked, leading to oxygen deprivation and eventual necrosis of a portion of the heart muscle (Shahjehan, 2024).

These conditions have been described in Ayurveda under various terms. Diseases of the coronary arteries are classified based on the predominance of doshas:

- Vataja disorders of the coronaries manifest as symptoms resembling angina pectoris,
- Pittaja involvement leads to inflammatory conditions like specific or non-specific arteritis,
- Kaphaja disorders are linked to the development of atherosclerotic changes.

From an Ayurvedic pathological perspective, CAD can be correlated with conditions such as Srotorodhajanya Hridroga (heart disease due to channel obstruction), Tridoshaja Hridroga (involving all three doshas), or Dhamani Pratichaya (thickening of the arteries). In particular, the symptoms of Dhamani Upalepa which is a Kapha-nanatmaja vikara (disease caused predominantly by Kapha), closely resemble those of CAD (Jadhav and Ghorband, 2017).

Congestive Heart Failure (CHF)

In Congestive Heart Failure (CHF), the heart becomes either too weak or too stiff to pump blood effectively, resulting in an inadequate supply of oxygen and nutrients to meet the body's needs. Common symptoms include shortness of breath, fatigue, and swelling in the legs and ankles. Based on symptom severity and physical limitations, patients are classified into functional categories ranging from New York Heart Association (NYHA) Class I to Class IV. Over time, CHF can progress to cardiomyopathy, a condition where the heart muscle becomes structurally abnormal, enlarged, thickened, or stiffened, resulting in impaired pumping efficiency. Cardiomyopathy is further classified into subtypes such as:

• Dilated Cardiomyopathy (DCM): Characterized by enlargement and weakening of the heart chambers.

• Restrictive Cardiomyopathy (RCM): The heart becomes rigid and less compliant, limiting its ability to fill properly.

• Hypertrophic Cardiomyopathy (HCM): Involves abnormal thickening of the heart muscle, often affecting the left ventricle (Mayo Clinic, 2009).

In Ayurveda, these conditions are closely associated with Vatika Hridroga, a type of heart disease caused predominantly by an imbalance of the Vata dosha. The classical features of Vatika Hridroga include:

• Severe, sharp, or crushing pain in the cardiac region,

• A sense of squeezing or tightness in the chest,

• Breathlessness (Shvasa),

• Palpitations (Hritspandana),

• Sudden fatigue, a feeling of emptiness in the chest, and even loss of consciousness (Murchha) (Mamgain and Singh, 1993).

Myocarditis, Pericarditis and Endocarditis

Myocarditis refers to inflammation of the heart muscle, typically caused by infections and the most commonly viral. Pericarditis is the inflammation of the pericardium, the protective sac surrounding the heart, which can result from infections, kidney failure, or autoimmune disorders. Endocarditis is the inflammation of the innermost lining and often affects the heart valves, usually due to serious bacterial infections.

In Ayurveda, these inflammatory heart conditions are correlated with Pittaja Hridroga, a form of heart disease attributed to an aggravation of the Pitta dosha. The classic symptoms of Pittaja Hridroga include:

• Hridayadaha – burning sensation in the cardiac region, resembling the discomfort seen in pericarditis,

• Hridaya-Klama – heaviness or fatigue in the chest,

• Murchha – fainting or loss of consciousness,

• Bhrama – dizziness or giddiness.

These symptoms closely align with the systemic and localized manifestations observed in myocarditis, pericarditis, and endocarditis (Oakley, 2000).

Pericardial Effusion

There is a protective double layer membrane around the heart called as pericardium and whenever an excess fluid gets collected in this pericardial sac the symptoms like chest pain or pressure, shortness of breath, fatigue, cough, and, in severe cases, rapid heartbeat, low

blood pressure, and fainting (signs of cardiac tamponade, a life-threatening condition may occur These conditions have been well described in Ayurveda as Kaphaja Hridroga. It is characterized by symptoms such as:

- Hridaya Suptata – a feeling of numbness in the cardiac region
- Hridaya Stimitata – a sense of stiffness in the heart area
- Hridaya Bharikata – a sensation of heaviness in the chest
- Asmavrta Hridaya – a feeling as if a stone is placed over the heart
- Hridaya Stabdhata – indicative of partial cardiac blockage or obstruction

These descriptions align closely with the signs of pericardial effusion and other Kapha-dominant cardiac conditions (Osuo-Genseleke, 2019).

Arrhythmia (dysrhythmia)

Abnormal heart rhythms, known as arrhythmias, occur due to disruptions in the electrical conduction system of the heart (Agabegi and Agabegi, 2008). Valvular-diseases involve dysfunction in one or more of the heart's valves, such as the bicuspid, tricuspid, and semilunar valves, which may lead to impaired blood flow. These conditions may be starting by birth or may get acquired due to some super imposed infections. Heart murmurs, which are unusual sounds heard during the heart's contraction (systole) or relaxation (diastole), often indicate underlying valve abnormalities. An example is Mitral Valve Prolapse, a condition where the mitral valve bulges backward slightly after blood has passed through it.

In Ayurveda, congenital heart conditions are described under Adibala-pravritta and Janmabala-pravritta-hridroga, while acquired heart disorders correspond to Sanghatabala-pravritta hridroga (Agnivesha, 1998b). Additionally, heart diseases with unknown or idiopathic causes are categorized in Ayurveda as Daivabala-kritta Rog meaning conditions believed to be influenced by divine or unseen forces (Naito and Kasai, 2015).

Correlation with Other Systems

In the current era of scientific advancement, studies have revealed a genetic correlation between the cardiovascular system and other physiological systems. There is a strong link between type 2 diabetes mellitus and coronary heart disease. It has been demonstrated that genetic variability affecting intestinal cholesterol absorption can influence cardiovascular disease risk. Current research is investigating several newly discovered gut microbial metabolic pathways that seem to play a role in the development and progression of cardiovascular diseases, including heart failure. The findings have led to the emerging hypothesis that the gut microbiome may serve as a novel therapeutic target for the treatment of cardiovascular disease (Trøseid, 2020).

Ayurveda also provides insights into the interconnectedness of the cardiovascular system with other bodily systems, such as the gastrointestinal, respiratory, and cerebrovascular systems. Various symptoms described under different types of Hridroga have been mentioned as these correlations. For instance, Hridayavedana (heartache) is noted as a symptom in Vātaja Jwara (a fever of Vata origin). Hridaya Avishuddhi, referring to a sense of impurity or lack of clarity in the heart, has been mentioned in Āmāj Jwara. (fever due to toxin accumulation) (Dwivedi, et al., 2017). Sanshushka Hridaya (atrophy or dryness of the heart) is described as a symptom of Kshaya (tuberculosis) (Yadav, 2022) along with intense thirst (Trishna). Additionally, Hriddaha (burning sensation in the heart) is observed in Pittaja Gulma, a type of gastrointestinal disorder. These classical descriptions

offer a deeper perspective on the systemic associations recognized in traditional medicine (Agnivesha,1998a).

Genetic Basis

To explore the genetic foundations of diseases in greater depth, an analysis was performed utilizing the GWAS Catalog (The NHGRI-EBI Catalog of published genome-wide association studies), concentrating on cardiovascular diseases (CVD). These findings highlight that CVD is a multifactorial disorder influenced by both genetic and environmental factors (Kessler, et al., 2016). Hundreds of genetic associations were identified in this context. When exploring databases such as GeneCards and Mala-Cards, it was observed that conditions like atherosclerosis, hyperlipidemia, and heart failure are categorized individually. Some studies provide initial insights into the involvement of athero-thrombotic genes related to lipid metabolism, inflammation, and cell growth. Moreover, several novel genetic variants and unique haplotypes linked to CVD have been reported. Overall, the literature reveals that a significant number of genes and SNPs are associated with CVD (Wang and Wang, 2018).

In Ayurveda, every individual is believed to have a unique Prakriti or constitutional type, determined by the relative proportions of the three Doshas: Vata, Pitta, and Kapha. An imbalance among these Doshas is considered the root cause of disease (Roga). There exists significant inter-individual variability within a population, which contributes to differences in disease susceptibility, prognosis, and response to environmental factors. These variations are also reflected in diverse responses to medications and the occurrence of side effects. Emerging research suggests that Prakriti may have a genetic foundation (Patwardhan, 2006). Several recent studies have explored biochemical, physiological, genomic, and epigenetic markers that may correlate with an individual's specific Dosha Prakriti. A study, which examined biochemical, hematological, and genome-wide expression profiles in individuals with the three most contrasting Prakriti types, revealed distinct patterns that may underpin these constitutional differences (Govindaraj, 2015). Moreover, some there were some associations among the distinct types of Prakriti and their biological activities even at the molecular level. (Tiwari, 2017).

The studies have also demonstrated the regarding the common variations in extreme Prakriti types (Vata, Pitta, and Kapha) which can be differentiated based on their molecular origin. In a study, 251 differentially expressed genes were found in different Prakriti types, and EGLN1 was one of those genes. The study reported a link between high-altitude adaptation and common variations rs479200 (C/T) and rs480902 (T/C) in the EGLN1 gene. The same was more expressed in a specific prakriti type also. The study resulted in genetic analysis of healthy individuals. Phenotypic classification as per Ayurveda in different prakriti types could uncover genetic variations that are associated with adaptation to the external environment and susceptibility to diseases (Aggarwal et al., 2010).

Studies demonstrate that individuals with the three most contrasting constitutional types have striking differences in their biochemical, hematological parameters, and genome-wide expression levels. Liver function tests, lipid profiles, and hematological parameters like hemoglobin exhibited differences among various Prakriti types. It was revealed by the study that individuals with Kapha prakriti have elevated lipid levels. (Prasher, et al., 2008) Even in people selected from comparable genetic, dietary, and environmental backgrounds, a study revealed that the human gut microbiome, when analyzed using Prakriti



stratification, could provide deeper insights into the host's disease predisposition and may evaluate the effectiveness of interventions in reducing disease-related risk factors and promoting better health (Chauhan et al., 2018). A recently completed study demonstrated the role of Prakriti in risk stratification both in the stable patients of CAD and seemingly healthy controls (Dua et al., 2025)

Conclusion

Cardiovascular diseases remain the leading cause of morbidity and mortality worldwide, accounting for a substantial proportion of the global health burden. Despite remarkable advances in diagnostics, pharmacotherapy, and interventional cardiology, modern drugs and procedures are often limited by issues such as partial efficacy, recurrence of disease, adverse effects, high cost, and challenges in long-term patient compliance. This underscores the pressing need for complementary approaches that not only address the disease process but also emphasize prevention, holistic care, and lifestyle modification. In this context, it becomes a responsibility of researchers and clinicians in the cardiovascular field to revisit traditional systems of medicine, particularly Ayurveda, which has documented detailed insights into the etiology, progression, and management of cardiac diseases for thousands of years. The classical Ayurvedic literature, under terms such as Hridroga (cardiac disorders) and Dhamani Pratichaya (arterial changes), provides descriptions that align closely with modern understandings of heart disease pathology, including atherosclerosis, hypertension, and ischemic heart disease. Importantly, Ayurveda emphasizes preventive cardiology through diet (Ahara), lifestyle (Vihara), mental well-being, and use of cardio-protective botanicals (Medhya Rasayana, Hridya dravyas), concepts that are now echoed in contemporary scientific research on nutraceuticals, stress reduction, and integrative therapies. Science, by its very nature, should remain a continuous, evolving pursuit. The integration of knowledge from multiple streams, whether derived from modern biomedicine, molecular genetics, or ancient indigenous wisdom, should not be viewed as competing paradigms but as complementary contributors toward human health. Assimilating and scientifically validating such knowledge can contribute to safer, more effective, and more sustainable strategies for cardiovascular health promotion.



Authors' Contribution

Conceptualization: Pamila Dua. Literature search and data collection: Pamila Dua and Paavan Dua. Original draft preparation: Pamila Dua. Writing, review and editing: Pamila Dua, Paavan Dua and Samdisha Dua. All authors read and approved the final version of the work.

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Conflict of Interest

None.

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