

# A conceptual study of Cardiovascular diseases Ayurvedic and Modern perspective

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Date of Submission: 15-03-2025

Date of Acceptance: 25-03-2025

## I. INTRODUCTION

The cardiovascular system consists of the heart and blood vessels. Cardiovascular disease (CVD) is a group of diseases affecting the heart and blood vessels. These diseases can affect one or many parts of heart and/or blood vessels, and it includes the conditions like,

- Arrhythmia: Problem with your heart's electrical conduction system, which can lead to abnormal heart rhythms or heart rates.
- Valve disease: Tightening or leaking in your heart valves (structures that allow blood to flow from one chamber to another chamber or blood vessel).
- Coronary artery disease: Problem with your heart's blood vessels, such as blockages.
- Heart failure: Problem with heart pumping/relaxing functions, leading to fluid buildup and shortness of breath.
- Peripheral artery disease: Issue with the blood vessels of your arms, legs or abdominal organs, such as narrowing or blockages.
- Aortic disease: Problem with the large blood vessel that directs blood from your heart to your brain and the rest of your body, such as dilatation or aneurysm.
- Congenital heart disease: Heart issue that you're born with, which can affect different parts of your heart.
- Pericardial disease: Problem with the lining of your heart, including pericarditis and pericardial effusion.
- Cerebrovascular disease: Issue with the blood vessels that deliver blood to your brain, such as narrowing or blockages.
- Deep vein thrombosis (DVT): Blockage in your veins, vessels that bring blood back from your brain/body to your heart.

Ayurvedic concept of cardiovascular system, its anatomy, physiology, clinical manifestation of various cardiovascular disease (Hridroga) there preventive and curative measures and dietary control etc have been described in several thousands of years ago.

Important References of Hridroga in Ayurveda

- Caraka Samhita - Sutra Sthana , Chapter No.17
- Caraka Samhita - Cikitsa Stana ,Chapter No.26
- Susruta Samhita – Uttara Tantra ,Chapter No.43
- Astanga Hridya – Nidana stana ,Chapter No.5
- Astanga Hridya- Cikitsa Stana ,Chapter No.6
- Madhava Nidana- Hridroga Nidana ,Chapter No.29

According to Caraka, Madhava Nidhana and Ashtanga Hridaya describe five type of Hridroga(8).Susruta describe four types of Hridroga , and has not explained about Sannipatika Hridroga.

1. VatajHridroga
2. PittajHridroga
3. KaphajaHridroga
4. TridoshajHridroga
5. KrimijHridroga

The incidence of Hrdroga was very low in the times of Acarya Caraka , Susrutha and Vagabhatta , because people used to follow various codes and conducts of life as depicted in terms of Ritu Charya ,Dina Charya .People used to follow proper diet and physical activities also.

Nowadays cardiovascular diseases (CVDs) have become the leading cause of death in India. Indians tend to experience CVD about a decade earlier than people of European ancestry, often during their most productive midlife years. For example, while only 23% of CVD-related deaths occur before age 70 in Western populations, this figure rises to 52% in India. Additionally, CVD case fatality rates are considerably higher in low-income countries, including India, compared to middle- and high-income nations.

Given the rising incidence of cardiovascular disease (CVD), it is relevant to compare and study the principles of cardiovascular diseases in both Ayurveda and modern science. To compare Ayurvedic and modern views of cardiology, it is essential to understand the basics of

both system of medicine, such as the anatomy and physiology of the cardiovascular system. In this review article it is mainly focused to Identify the strengths and limitations of Ayurvedic approach to CVD. That may contribute valuable insights, supporting the development of Ayurveda by incorporating new perspectives into traditional Shastra and promoting integrated approaches to enhance individuals quality of life.

## II. MATERIAL AND METHODS

This article is based on Ayurvedic literature Various modern textbook and useful websites.

### CONCEPTS OF CARDIOVASCULAR SYSTEM

#### Heart Anatomy – Ayurvedic Concepts

Bruhadaranyaka Upanishad describes the Hridaya as a fleshy muscular organ (Mamsa-Pesichayo) resembling a red lotus bud and hangs with its apex downwards; from which vessels and capillaries spread all over the body. Ten major blood vessels originate from it

Hridaya is derived from three verbs (as per Satpathbrhman and Brihadaranyak). Hrun which means to abduct, dad which means to donate and in Gatouself generated rhythmicity for contraction and relaxation. The Hridaya thus means an organ which draws fluid including blood from all over the body and then supplies it to all the parts of the body.

**Location:** Hridaya is located in the thorax (Uras) in between the two breasts (Stanyormadhye) and near to that of oesophageal orifice (Amashaya-Dwar).

**Sandhi:** There are three Sandhis in Hridayam. And the type of sandhi present in Hridaya is "Mandala Sandhi".

**Peshi:** Hridaya consist of two Peshis

**Marma:** Hridaya is coming under Sira Marma also it's include in Sadyopranahara Marma.

**Embryology:** Embryologically, the Hridaya originates from the essence of Shonita Andkapha tissues and develops into a muscular organ. Hridaya become more obvious by the 4th month of Garbha Utpatti Krama.

#### Heart Anatomy-Modern Concepts

The heart is a muscular organ that serves to collect deoxygenated blood from all parts of the body, carries it to the lungs to be oxygenated and release carbon dioxide. Then, it transports the oxygenated blood from the lungs and distributes it to all the body parts

- The heart pumps around 7,200 litres of blood in a day throughout the body

- The heart is situated at the centre of the chest and points slightly towards the left.
- On average, the heart beats about 100,000 times a day, i.e., around 3 billion beats in a lifetime.
- An adult heart beats about 60 to 80 times per minute, and newborn babies heart beats faster than an adult which is about 70 to 190 beats per minute.

**Size and position :** The heart is a conical hollow muscular organ situated in the middle mediastinum and is enclosed within the pericardium. It is positioned posteriorly to the body of the sternum with one-third situated on the right and two-thirds on the left of the midline. The heart measures 12 x 8.5 x 6 cm and weighs ~310 g (males) and ~255 g (females). It pumps blood to various parts of the body to meet their nutritive requirements. The Greek name for the heart is cardia from which we have the adjective cardia

**Layers of the heart walls:** The heart wall consists of three layers enclosed in the pericardium. outer Epicardium middle Myocardium and innermost Endocardium.

**Structure :** The heart is subdivided by septa into right and left halves, and a constriction subdivides each half of the organ into two cavities, the upper cavity being called the atrium, the lower the ventricle. The heart, therefore, consists of four chambers.

- right atrium
- left atrium
- right ventricle
- left ventricle

**Heart Valves:** The valves of the heart maintain unidirectional flow of the blood and prevent its regurgitation in the opposite direction. There are two pairs of valves in the heart, a pair of atrioventricular valves and a pair of semilunar valves. Apart, it has four valves. All four valves of the heart have a singular purpose: allowing forward flow of blood but preventing backward flow.

**Blood supply:** The heart is supplied by two coronary arteries:

- Left main coronary artery carries 80% of the flow to the heart muscle. It is a short artery that divides into two branches
- Right coronary artery: branches supply the right ventricle, right atrium, and left ventricle's inferior wall.

**Venous drainage and Lymphatics:** Venous drainage is via the variable coronary veins and the coronary sinus.

**Nerve supply:** The nervous supply to the heart is autonomic, consisting of both sympathetic and parasympathetic parts. The sympathetic fibres arise from the pressor centre, while the parasympathetic fibres arise in the depressor centre.

### Cardiac Physiology – Ayurvedic Concepts

The concept of blood circulation is available in Atharvaveda stressing upon that different type of fluids circulate throughout the body and return back to its original source.. Hridaya keeps on contracting and relaxing by its own nature.

Acarya Sarangadhara has described the process of circulation with its significance. He has stated that impure blood (venous blood or Deoxygenated Blood), through the Nabhi (Abdominal Aorta or vena cava) goes to Hridaya and from there it goes out (lung bed), where it stays for a moment and takes Visnu Padamrita and Ambara Piyusa (Gaseous Exchange), again comes back inside (cellular Exchange) then it nourish and maintain the body.

The circulation of blood takes place by integrate functioning and coordination of Vyana Vayu, Sadhaka Pitta and Avalambak Kapha. Vyana Vayu is responsible for distribution of nutrients, oxygen and essential components all over the body. Sadhaka Pitta is responsible for proper action of Hridaya a indirectly circulation and functions of nervous system Avalambak kapha lies in the Ura Pradesh and gives support to the heart in its contractions and relaxations and also provide necessary lubrication to the heart and blood vessels

### Cardiac Physiology – Modern Concepts

This is a transport system, within which the blood is propelled by the heart in a closed circuit through vessels.

This continual circulation of fluid throughout the body serves:

- As a means of delivery and removal of substances;
- It provides all the living cells of the organism with the materials required for their normal functions (e.g., O<sub>2</sub> and nutrients)
- It carries away the products of cell metabolism (CO<sub>2</sub> and other metabolites).
- These substances do not enter and leave the bloodstream directly; their passage is indirect, by way of the interstitial (extracellular) fluid.

The regulation of the cardiovascular system occurs via an innumerable number of stimuli, including changing blood volume, hormones, electrolytes, osmolarity, medications, adrenal glands, kidneys, and much more. The parasympathetic and sympathetic nervous systems also play a key role in the regulation of the cardiovascular system.

**Type of circulation:** The human circulatory system consists of two main sections arranged one after the other :

- Systemic circulation: Left ventricle as the pump with a high intravascular pressure



- Pulmonary circulation: Right ventricle as the pump a low-pressure system with low intravascular pressure



The pulmonary circulation allows for oxygenation of the blood, and the systemic circulation provides for oxygenated blood and nutrients to reach the rest of the body

### Cardiovascular Disease Cause -Ayurvedic Concepts

All the causative factor which are likely to precipitate Hridroga can be grouped in two broad groups:

- Dietary factors  
Excessive and regular indulgence in diets containing Atiusna (Excessive intake of hot food), Guru (Heavy meals), Kasaya Rasa (Astringent materials) and Tikta Rasa (Spicy Food)
- Life Style Related Factors  
Excessive indulgence in activities like Physical exertion, Abhighata (Traumatic injuries) Adhyayana (long sitting for the purpose of studying), Cintana (mental stress/anxiety) etc and Vegadharana (suppression of Natural Urges)

### Cardiovascular Disease Cause - Modern Concepts

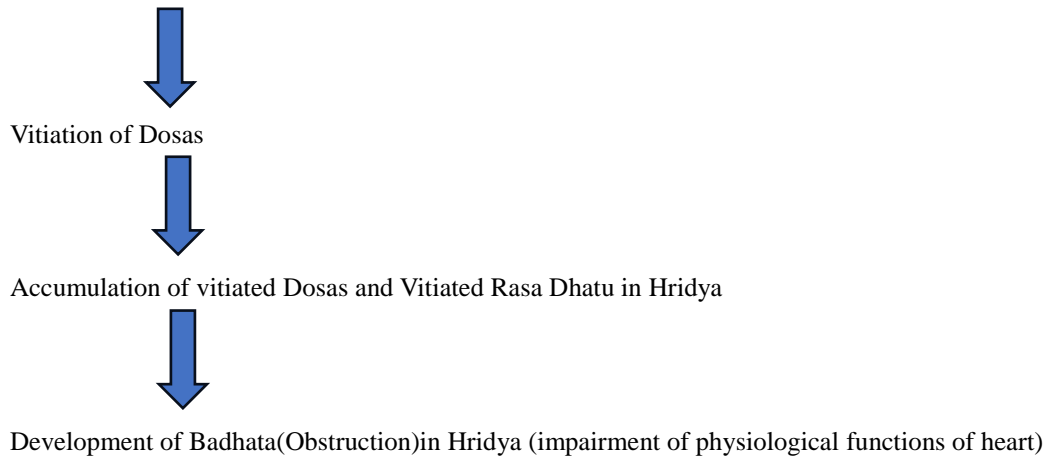
According to modern medicine there are many etiological factors described regarding to heart disease or coronary heart disease, such as sedentary lifestyle, old age, endomorphic body

structure , tobacco chewing, obesity, diabetic mellitus, family history(hypercholesteroma),less

physiological activity ,psychological factors, stress syndrome, sleeping at late night (increase cortisol)

### Pathophysiology of Cardiovascular Disease –Ayurvedic Concepts

Etiological factors leads to



#### The constituents of Hridroga Samprapti:

Dosa : (a)Samanya Dosa: Vata ,Pitta, Kapha  
          (b)Visista Dosa: Avalambaka Kapha,  
Sadhaka Pitta, Prana Vayu, Vyana Vayu  
Agni :Agnimandya, Dhatvagni-  
Rasagnimandaya  
Dusya :Rasa Dhatu, Ojas, Meda  
Utthana :Amasaya, pakvasya  
Srotas :Rasavaha Srotas  
Rogamarga:Madyama Roga Marga  
Vyadhi bala:Daruna  
Svabhava:Cirakari  
Prabhava:Krichrasadhya, in chronic cases Asadhya  
Adhithana:Hridya

#### Pathophysiology of Cardiovascular Disease-Modern Concepts

Cardiovascular diseases are a group of disorders of the heart and blood vessels. They are a set of heterogeneous diseases whose underlying cause of development is most often atherosclerosis. CVDs are chronic diseases that gradually evolve throughout life and remain asymptomatic for a long time. Atherosclerosis is the main cause of cardiovascular-related death worldwide. Followings are the major events in the pathophysiology of CVD

- Endothelial dysfunction in atherosclerosis
- Inflammatory and oxidising factors in atherosclerosis

- Epigenetic factors in atherosclerosis

#### Common Symptoms Of Cardiovascular Disease Ayurvedic And Modern Concepts

The common clinical features of Hrdroga have been described by acharya Charaka. Vaivarnya, it is localized or whole-body discoloration. Murccha (syncope), Rasa-Raktavikshepana of Hridya is hampered in Hridroga. Prana and Pranayatnani is not proper nourishment, hence Murccha may occur. Jwara (Fever), Kasa(cough) & Shwasa (Dyspnea), Hikka (Hiccough), Asyavairasya (Change of taste), Pramoha(Confusion), Chardi(Vomiting), Kaphotklesha(Expectoration), Ruja (Pain), Aruchi (Tastelessness), Trishna (Thirst) may also occur.

In cases of severe mitral stenosis, patients may present with a malar flush, along with a bluish and pinched facial appearance. Symptoms like breathlessness or fatigue, particularly noticeable during routine activities, as well as nighttime cough while lying down, are common in all forms of cardiomyopathy. Low cardiac output can lead to under-perfusion of the brain, often resulting in syncope episodes. Nausea and vomiting are reported in more than 50% of patients experiencing a transmural myocardial infarction (MI), and a mild fever (up to 38°C) may occur due to muscle necrosis.

Old age is considered the Vataprokopaawastha phase of life, during which Vatapradhan vyadhi (disorders dominated by Vata) are more prevalent. In Vatika Hridroga (Vata-associated heart disease), the movement (Chala), lightness (Laghu), and rough qualities (Khara) of Vata are thought to contribute to arterial calcification, which corresponds with

atherosclerosis in modern medicine and is more commonly seen in older individuals. The characteristics (Lakshana) of Kaphaj Hridroga include heaviness and a sensation as if a stone is pressing on the chest, which mirrors the chest heaviness experienced during a myocardial infarction.

**Investigation for diagnosis of Cardiovascular diseases Concepts**

Ayurvedic tools	Modern tools
Nidana panchakam	History taking
Trividha	Inspection
Pareksha(darhsnam, sparshanam, prashanam)	Percussion
Ashtavidha Pareksha	Palpitation
	Osculation
	ECG
	TMT,
	CT
	Angiography heart,
	Holter monitoring
	Angiography
	Bio markers(blood assay).

**Management Of Cardiovascular Disease- Ayurvedic Concepts**

- Nidana Parivarjanam (Avoidance of Aetiological Factors)

Prevention is better than cure is the basic principle on which Ayurveda relies upon. Great stress is laid on these preventive methods to achieve better health. Though prevention of heart diseases is not mentioned specifically in the chapter of Hridroga Chikitsa, it is accepted as a general rule. So prevention of etiological factors like faulty dietetic habits, excessive physical exertion, emotional stress. Alcohol consumption and trauma bear considerable importance.

- Hridya Aushda  
Hridyamahakshaya, Arjuna, Rasona, Kankola, Gojiviha, Tulsi, Chakarmarda, Sunthi, Yavani, Shigru, Bakuchi, Chorak, katuki, Pippali, Shatavari, Erandataila, etc.

Hridyamahakshaya group of drugs are mainly Amla Rasapradhana (dominating) and rich source of Vitamin C. Some modern studies proved, Vitamin C have potent antioxidant in addition to good stress buster and to increase HDL and reduce LDL to considerable levels.

Treatment with; Mangifera indica leaf extract caused a significant decrease in the levels of CK-MB, CK-NAC, LDH, AST, ALP, and ALT enzymes suggesting the membrane stabilizing and

reparative action of the extract preventing damage to the rat myocardium.

- Shodhana Karma  
Vamana karma: Vamana karma is described particularly in Kaphaja Hridroga.  
Virechana Karma: In Pittaja and Kaphaja Hridroga, related with Pitta Dosha, Krimija Hridroga, Virechana Karma is useful.  
Basthi Karma: It is the best Upkaram for vitiated Vata Dosha, which is always, affected in diseases of vital organs (Marmas like heart) hence different types of Basti has indicated in all types of Hridroga and particularly in Vataja Hridroga.
- Samshamanachikitsa  
✓ Pushkarmoola, Tila Taila, Sovarchala Lavana, Hingu, Mrigshringa, Rasona, Madya, etc. are very effective in Hritshoola  
✓ Jivaniya, Triyushanadi, Vasa, Chitrakadighrita and Arjunaghrita, Vallabhaka, Swadanshradya, Baladya Ghrita is used Hridroga.

**Management of Cardiovascular Disease -Modern Concepts**

Gene Therapy: New gene therapies are being developed to repair or replace faulty genes associated with heart disease. Techniques such as using harmless viruses to deliver healthy genes to heart cells are showing promise in improving heart function and reducing symptoms.



**Bioabsorbable Stents:** Unlike traditional metal stents that stay in the body permanently, bioabsorbable stents dissolve after stabilizing an artery, potentially reducing long-term complications like inflammation

**RNA-based Therapies:** RNA-targeted treatments are emerging for specific heart conditions such as cardiac amyloidosis, hypertrophic cardiomyopathy, and heart failure. These therapies can target "undruggable" pathways, providing options where few previously existed.

**AI in Diagnosis and Management:** Artificial intelligence is improving heart disease diagnosis and treatment by analysing medical images, genetic information, and patient data to provide more accurate diagnoses and personalized treatment plans.

**Stem Cell Therapy:** Advances in stem cell therapy are allowing for regeneration of damaged heart tissue, helping patients recover lost heart function. Techniques have improved, making these treatments safer and more efficient.

**Anti-inflammatory Medications:** New drugs that target inflammation in the arteries are being developed to reduce a primary cause of heart disease. Additionally, metabolic enhancers for heart cells help them resist stress, contributing to better overall heart health.

These innovations, while promising, are costly, and long-term studies are needed to confirm their efficacy and safety. Nonetheless, they represent significant progress in the fight against CVD, offering hope for improved outcomes and quality of life for heart disease patients.

### III. DISCUSSION

In Ayurvedic classics very brief description of Hridroga is available in various texts. This description although brief, provides very important fundamental knowledge in the field of Cardiology as available today. The basic knowledge of Hridroga as depicted in various classical Ayurvedic Texts seems to be very systemic and on scientific basis.

Anatomy of cardiovascular system explained in ayurvedic texts are not that much elaborated as it is in the modern medicine. Modern medicine has developed treatments like valve replacement and Repair, Coronary Artery Bypass Grafting(CABG),Septal Myectomy, congenital Heart Defect Repair, Left Ventricular Assist Device (LVAD)and Heart Transplantation, which are advanced heart therapies that involve anatomical corrections based on detailed anatomical

knowledge. This highlights the critical importance of anatomy in medical advancements. Ayurveda, however, lacks the same level of detailed anatomical knowledge, particularly regarding the heart.

Ayurvedic and modern physiological principles differ significantly. Ayurveda explains physiology based on the concept of the three doshas, which govern various bodily functions. In contrast, modern medicine describes physiology through mechanisms like electrical impulses, ion channels, and the conduction system in cardiology, which regulate heart rhythms and functions.

Ayurveda primarily diagnoses diseases through clinical examination methods such as Trividha and AshtaVidha Pareeksha. In contrast, modern medicine has developed advanced diagnostic techniques that provide more precise information. Incorporating such advanced tools could strengthen Ayurveda. For example, in cardiology, modern diagnostic techniques include electrocardiograms (ECG) for heart rhythm analysis, echocardiography for assessing heart structure and function, and coronary angiography for visualizing blood flow in coronary arteries. Integrating these methods could enhance the diagnostic capabilities of Ayurveda.

In Ayurveda, the term Hridroga encompasses a range of heart-related diseases, though specific cardiac disorders such as congestive heart failure and myocarditis are not explicitly detailed in Ayurvedic classics, reflecting differences in the conceptual framework and classification of cardiovascular conditions. However, numerous clinical research studies have demonstrated the efficacy of Ayurvedic formulations in managing conditions like hypertension, coronary artery disease (CAD), heart failure (HF), and myocardial infarction (MI). These findings indicate that Ayurvedic medicine can be effective in addressing these conditions alongside modern cardiovascular care.

In modern cardiology, new interventions are being introduced regularly based on ongoing research and development. In contrast, Ayurvedic science has not been introducing as many new interventions. To advance Ayurveda, there is a need for more effective research, and increased collaboration within the field.

### IV. CONCLUSION

In conclusion, Ayurvedic and modern cardiology offer distinct but complementary perspectives on cardiovascular health. While

Ayurveda provides a holistic framework rooted in the principles of doshas and traditional diagnostic techniques, modern cardiology advances in anatomical knowledge, physiological insights, and technological diagnostics. Integrating modern diagnostic tools and treatment approaches into Ayurvedic practice could strengthen its diagnostic and therapeutic potential. Embracing an integrative approach that combines the strengths of both systems may lead to more comprehensive and effective care for cardiovascular conditions, highlighting the importance of innovation and research in Ayurveda."

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