



## CARDIOVASCULAR DISEASES IN AYURVEDA- A REVIEW

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### ABSTRACT

Cardiovascular diseases share large and increasing global burden of morbidity and mortality worldwide. Although many types of cardio-vascular diseases are enlisted in contemporary science. Only a few explanations are available in ayurvedic classics. Ayurveda considers *Hridaya* as vital organ of the body. As it is one among the *Tri-marmas*, any injury to *Hridaya* leads to the severe complication and even death. Cardiovascular diseases are discussed under *Hridroga* in Ayurveda. Cardiovascular diseases accounted for around one fourth of all deaths in India in 2008. It will be the largest cause of death and disability by 2020 in India. It has been forecasted that 2.6 million peoples will die from coronary heart disease which constitutes 54% of deaths caused due to cardiovascular disease, making an impact to the society and the economy even more significant. Cardiovascular diseases are the current burning problem in the society understanding the heart diseases with respect to *dosha & dushya* involved in them is very essential. An attempt has been made in this paper for consideration of *doshas & dushyas* involved in the pathogenesis of various cardiac disorders.

**KEYWORDS:** *Hridroga, Dosha, Dushya*, Cardiovascular disease.

### INTRODUCTION

#### Concept of *Hridaya* in Ayurveda

In Ayurvedic classics and its allied literature the organ "Heart" is considered as "*Hridaya*", which is a Sanskrit word, used as a synonym to Heart. The term '*Hridaya*' is so scientific that it confines the whole physiology of vascular system. According to '*Halayudha Kosha*' and '*Sathapatha Brahmana*' (*Sat.Br.14/8/4/1*), the term is derived from three following verbal roots:

- (i) *Hri* = *Harati* (To receive).
- (ii) *Da* = *Dadati* (To give/to send away).
- (iii) *Ya* = *Yeti* (To move/Pulsatile action).

The heart thus means an organ which receives fluid including venous blood, sends it to both the lungs for purification and again receives it, to be sent throughout the body by the continuous process of contractions and dilatations of the heart.

This circulation is continued throughout the life. According to *Acharya Sushruta*, formation of heart of foetus occurs by the *Sara* of *Kapha*, *Medas* and *Ashrika*<sup>[1]</sup> Therefore, both *Kapha* and *Ashrika* should remain in its normal state to maintain normal function of heart. Muscles of the heart nourished by the *Sara* of

*Rakta*, *Kapha* resembles properties like *Oja*, retains the *Bala* of Heart which is utilized for *Rasa-Rakta samvahana*. *Hridaya* is considered as *Chetana Sthana*<sup>[2]</sup> (*Ch. Sha. 7/8; Su. Sha. 4/30; As. H. Sha. 4/21*). Embryologically endocardium is derived from *rasa* (body fluids) and *rakta* (blood). Myocardium is derived from *mamsa dhatu* (muscular tissue) and pericardium is derived from *meda dhatu* (fatty and connective tissue). Each of these layers can be affected by one or all the three *doshas*. *Hridaya* forms the seat of *udana*, *vyana* & *prana vayu*, *sadhaka pitta*, *avalambaka kapha* & *ojas*. In Ayurveda the word *prana vayu* is used for oxygen and functional component of nervous system controlling respiration and deglutition. Oxygen is required for very existence of all cells, organs and life. It is vital for functioning of heart, mind and intellect. *Vyana vayu* controls all the movements of body both voluntary and involuntary. It controls contraction, relaxation and rhythm of heart. *Sadhaka pitta* represents enzymes in the heart eg: SGOT, aldose etc. whereas *avalambaka kapha* represents interstitial fluid in the heart and lungs.<sup>[3]</sup> Equilibrium of these *doshas* present in the heart is responsible for normal functioning of heart. Vitiation of any of them is invariably necessary for causation of heart diseases.

### Hridroga Nidana

In general *hetu* (causes) can be broadly classified as *doshaja hetu* (that causing *doshik* vitiation) and *vyadhija hetu* (those directly causing *vyadhi*). *Doshaja hetu* can be further classified as *shareerika hetu* (physical factors) and *manasika hetu* (psychological factors). Improper treatment to any disease, trauma and improper purification therapies acts as *vyadhija hetu* for *hridroga*. *Ruksha shushka alpa bhojana* and *upavasa*, *Ushna amla lavana katu kshara pradhana ahara* along with *madya sevana* and *guru snigdha bhojana*, *achesta* act as *shareerika hetus* for production of *vataja*, *pittaja* and *kaphaja* variety of *hridroga* respectively. Whereas *shoka*, *krodha* and *achinta (kapha prakopa kara)* act as *manasika nidanas* in causing *hridroga*.<sup>[4]</sup>

### Pathogenesis of Hridroga<sup>[5]</sup>

Pathogenesis of *hridroga* begins with *hetu sevana* causing *doshadusti* and *agnidusti*. Because of *mandagni (agnidusti)* there will be formation of *ama*, which in combination with vitiated *doshas* produces *samadoshas*. As there will be predisposition of *khavaigunyata* in *hridaya*, these *samadoshas* takes *sthana samshraya* in *hridaya*. The presence of *samadoshas* causes improper nourishment of *hridaya* due to *srotorodha* or *margavarodha* (obstruction to channels carrying nourishment) leading to improper functioning of *hridaya* producing symptoms like *vaivarnyata*, *ruja*, *murcha*, *shwasa*, *shotha* and *atisweda*.

<i>Dosha</i>	– <i>Udana, Vyana &amp; Prana Vayu, Sadhaka Pitta, Avalambaka Kapha</i>
<i>Agni</i>	– <i>Mandya</i> ,
<i>Dhatwagni</i>	– <i>Rasa, Rakta Agni mandya</i>
<i>Dushya</i>	– <i>Rasa, Rakta, Meda, Ojas</i>
<i>Strotasa</i>	– <i>Rasa, Raktavaha</i>
<i>Rogmarga</i>	– <i>Madhyam Rogmarga</i>
<i>Adhithana</i>	– <i>Hridaya</i>
<i>Sambhava</i>	– <i>Chirkari</i>
<i>Srotodushiti</i>	– According to disease
<i>Sambhava</i>	– <i>Chirkari</i>
<i>Vyadhibala</i>	– <i>Daruna</i>

### Hridroga Roopa

In *Charaka Samhitha trimarmiya chikitsa*, explanation regarding general signs and symptoms of *hridroga* is stated as *vivarnyata* (cyanosis), *shwasa* (dyspnoea), *shotha* (oedema) and *atisweda* (sweating), *murcha* (syncope) & *ruja* (chest pain/chest discomfort).<sup>[6]</sup> These *samanya lakshanas* very well matches with general signs and symptoms of cardiac diseases as mentioned in contemporary science.

### Classification of Various Cardiac Diseases<sup>[7]</sup>

The general classification of diseases as explained in *Sushruta Samhita* can be applied to various cardiac diseases also. It is as follows:

- *Bijadoshaja (adibalapravrutta)* - hereditary cardiovascular disorders

- *Douhrudaapacharaja (janmabalapravrutta)* - congenital cardiovascular disorders
- *Sanghatabalapravrutta*- heart disease due to trauma.
- *Upasargaja*- infective cardiac disorders
- *Doshabalapravrutta* – *vataja, pittaja, kaphaja, sannipataja*

**Bija doshaja vyadhis** are those which manifest due to morbidity of *shukra* and *shonita* by vitiated *vataidoshas* i.e abnormal genome. It is nothing but hereditary cardiac diseases. These are the cardiac problems that run through the family. For eg: Coronary artery disease, Cardiac amyloidosis etc. One can also inherit risks for high cholesterol (hyperlipidaemia), diabetes, high blood pressure (hypertension) and obesity, which further acts as potential risk factors for the manifestation of various cardiac problems.

**Douhruda apacharaja vyadhis** occur due to unwholesome behaviour of the mother during conception and pregnancy. This can be considered as congenital heart diseases. It is a problem with the heart's structure and function that is present at birth. For eg: Total anomalous pulmonary venous return, Transposition of the great vessels, Aortic stenosis, Atrial septal defect (ASD), Ventricular septal defect (VSD), Patent ductus arteriosus (PDA).

Prime *dosha* involved in *bija doshaja* and *douhruda apacharaja vyadhi* is *vata dosha* because *vata dosha* is responsible for all *garbha vikruti*.<sup>[8]</sup>

**Sanghata bala pravrutta vyadhis** are those diseases which manifest due to assault or injury.

**Upasargaja vyadhis** are those cardiac disorders caused due to infection for eg: Endocarditis, Myocarditis, Pericarditis etc.

**Doshabala pravrutta vyadhis** are those manifesting due to disturbed *shareerika* and *manasa doshas*. The causative factors for these are incompatible dietetics and erratic activities. They can be further classified as *Vataja hridroga*, *Pittaja hridroga*, *Kaphaja hridroga* and *Sannipataja hridroga*.

**Vataja hridrogas** are those cardiac disorders manifested due to deranged *prana* or *vyana vayu*. It is characterized by pain or alteration in the normal rhythmicity of heart. Diseases like angina pectoris, aneurysm, cardiac arrhythmia and hypertensive cardiomyopathy can be considered as *vataja hridroga*. In addition it can be viewed that *vataja* diseases of endocardium leads to valvular affections like aortic and mitral stenosis and regurgitation. *Vataja* disorders of myocardium include atrophy or fibrosis of heart muscle and that of pericardium include constrictive pericarditis. *Vataja* disease of coronaries gives rise to angina pectoris.

Angina pectoris can be compared to *Hridshoola* as described in *Sushruta Samhita* where it is explained that *kaphapitta avarodha* leads to *vataprakopa*. This *prakupita vata* further vitiates the *rasa-rakta dhatu* thus leading to *hridshoola* which is characterized by *teevra shoola* (severe pain in heart) & *uchwasaavarodha* (difficulty in expiration). A similar explanation is available in contemporary science regarding angina pectoris. Pathogenesis involved is vitiating *vata* leads to spasm of coronary vessels which results in temporary ischemia of heart and gives rise to severe pain. The predisposing factors being thickening of coronaries due to *kapha* (atherosclerosis) or *pitta* (inflammatory) and abnormalities of *rasa & raktha* (hypercholesteremia).

Aneurysm is an abnormal widening or ballooning of a portion of an artery due to weakness in the wall of the blood vessel. Aneurysm may be considered as *gulma* as it is explained as '*sparshaupalabyaparipindita granthi*'<sup>[9]</sup> (palpable mass) and '*hritnabhiantaraachalagranthi*' (immobile mass between heart and umbilicus). Also *gulma* is among *raktapradoshaja vyadhi*<sup>[10]</sup> (disease caused due to vitiating blood). Some even consider it as *siragranthi*, the key feature of it being *vruttagranthi*. These aneurysms are caused by weakness of *Mamsa dhatu* (muscular tissue) and an increase in *Vata dosha*.

Cardiac arrhythmia is characterised by abnormal electrical activity in the heart. The heartbeat may be too fast or too slow or even irregular. A heart beat that is too fast is called tachycardia and a heartbeat that is too slow is called bradycardia. *Vyana vayu* controls all the activities of the heart including its rhythm. Disturbance of *vyana vayu* results in disturbance in the normal rhythm of heart. Its association with *pitta* leads to tachycardia and with *kapha* leads to bradycardia.

Hypertensive cardiomyopathy occurs when hypertension is sustained for an indefinite period of time leading to hypertrophy of the left heart ventricle. The most common symptoms include Chest pain during exercise, difficulty in breathing during exercise. Additional symptoms of loss of appetite, mild fatigue & increased Urinary frequency. Symptoms of severe hypertensive cardiomyopathy include: palpitations, fainting, severe difficulty in breathing, pedal oedema, chest congestion, wheezing. *Ayurveda* views that *rasa-rakta dushti* and *vyana vayudushti* are responsible for hypertension and hypertensive cardiomyopathy as *vata dushti* in initial stage which further involves *kapha dosha* in the later stage.

***Pittaja hridrogas*** are the cardiac disorders associated with inflammation. Those effecting endocardium cause endocarditis, myocardium cause myocarditis and that of pericardium cause pericarditis. Pericarditis associated with fluid accumulation (pericardial effusion) can be viewed as *pitta* associated with *kapha* and stiffness (constrictive pericarditis) with *vata*. Also *pittaja* disease

of coronaries gives rise to specific and non-specific arteritis.

***Kaphaja hridrogas*** are the cardiac diseases caused by derangement of *kapha dosha*. Diseases like corpulmonale, coronary artery disease and ischemic heart disease can be considered as *kaphaja hridrogas*. The same can be viewed as *kaphaja* disease of the endocardium includes endocardial fibroelastosis. *Kaphaja* disease of myocardium includes hypertrophy of heart muscle as well as storage diseases of heart like glycogen storage diseases and that of pericardium includes thickening of pericardium. *Kaphaja* disease of coronaries gives rise to atherosclerotic changes.

Corpulmonale is enlargement of the right ventricle of the heart as a response to increased resistance or high blood pressure in the lungs (pulmonary hypertension). When there is presence of lung disease like emphysema, COPD or pulmonary hypertension- the small blood vessels become very stiff and rigid. The right ventricle is no longer able to push blood into the lungs and eventually fails. This is known as pulmonary heart disease. Symptoms are shortness of breath, wheezing, ascites, raised JVP, hepatomegaly, pedal oedema. From an Ayurvedic perspective, there is *kapha avarana* leading to *vata prakopa* & thus manifestation of the disease.

Coronary artery disease is the result of the accumulation of atheromatous plaques (*kaphavargeeya dravya*) within the walls of the coronary arteries. This causes provocation of *vata* due to *margavarodha*. Symptoms are Chest pain or discomfort, also called angina, Shortness of breath when exercising or during any vigorous activity, a fast heartbeat, weakness, dizziness, nausea & increased sweating. *Ayurveda* views atherosclerosis according to the symptoms. Degeneration of the blood vessels is caused by increased *vata* in the vessels, which make them hard, thin, dry and rough. Deposits of lipids and calcium represents deposition of *kapha* in the degenerated vessels resulting in irregular thickening of blood vessels, so from Ayurvedic point of view, it can be said that this disease is caused by vitiation of *kapha dosha* associated with *vata dosha* in *raktavaha srotas* (blood vessels).

Ischemic heart disease or myocardial ischaemia, is a disease characterized by reduced blood supply to the heart muscle, usually due to coronary artery disease (atherosclerosis of the coronary arteries). It presents as Angina pectoris (chest pain on exertion, in cold weather or emotional situations), Acute chest pain: acute coronary syndrome, unstable angina or myocardial infarction ("heart attack", severe chest pain unrelieved by rest associated with evidence of acute heart damage), Heart failure (difficulty in breathing or swelling of the extremities due to weakness of the heart muscle) and even as Heartburn. *Ayurveda* views it as a *kapha medo vrudhi* causing *margavarodha* pathology. Due to *santarpaneeya nidana* and *virudha ahara* there will be

*kapha medha vrudhi* which causes *shonita abhishyandana*. Here *shonita pradhushana* can be considered as accumulation of excessive fat in blood vessels (dyslipidaemia) which causes *rasaraktamargaupalepa* and then *dhamanipratichaya* further leading to *rasa raktamargavarodha*. This *margavarodha* when takes place in heart causes ischemic heart disease.

Probable Modern – Ayurvedic correlation regarding development of I.H.D<sup>[11]</sup>

- Familial predisposition for coronary artery diseases - *Kulaja Vikriti* or *Beejaswabhaba*
- Dietary factors of hyperlipidaemia - *Ati Snigdha, Madhura, Guru Bhojana*
- Failure of mechanisms to maintain blood levels of lipids, glucose, lipoproteins-*Agni Dushti*
- Hyperlipidaemia, high levels of LDL & VLDL & low levels of HDL - *Medo Dushti*
- Initial structural disintegrity of intima of coronary arteries - *Khavaigunya*
- Stage of appearance of fatty streaks in the intima of coronary arteries-*Sthana Sansryavastha* Coronary atherosclerosis (Pre-clinical stage) - *Hrit-Dhamanipratichaya*
- Narrowing of coronary arteries due to atherosclerotic plaque - *Sroto Sanga*
- Disproportion in the myocardial oxygen supply & requirement- Improper nutrition *Hridaya*

**Tridoshaja hridroga** are the cardiac disorders which has multifactorial origin. There will be involvement of all *tridoshas* with predominance of one or two *doshas*. Congestive heart failure and Rheumatic heart disease can be considered as a *tridoshaja hridroga*.

Congestive heart failure (CCF) is a condition in which the heart's function as a pump is inadequate to deliver oxygen rich blood to the body. Heart failure may develop suddenly or over many years. The symptoms of congestive heart failure vary, but can include fatigue, diminished exercise capacity, shortness of breath, and swelling. Ayurveda recognises that a mild disturbance in the balance of *tridoshas* in the heart muscle results in the impairment of the cardiac function, which is usually compensated by augmenting the heart rate and increasing the force of ventricular contraction. Marked disturbance in the balanced state of *tridoshas* in the heart muscle give rise to uncompensated heart failure.

Rheumatic heart disease can be viewed as a *kaphapradhana tridoshaja vyadhi*. The symptoms of this disease correlate with that of *amavata* such as *dourbalayata* (fatigability due to low cardiac output), *gatrastabdata* (due to arthritis, soft tissue & muscular inflammation) *aruchi* (anorexia) which occurs as a prodromal symptom of rheumatic fever, *alasya* (lethargy) also due to fatigability, *jwara* (low grade continuous fever), *shoonangata* (swelling of joints) due to polyarthritis.

**Upasargaja or Krimija hridroga** is the cardiovascular disease caused due to parasite, viral or bacterial infections. The following conditions may be considered for *krimija hridroga*- Infective Endocarditis caused from infection by different microorganisms and by fungi, pseudocyst of *Toxoplasma gondii* in muscle fibre of the heart causing myocarditis, hydatid cyst of the heart caused by *Echinococcus granulosus* infestation and acute infection by trypanosome *cruxi* which terminates into myocardial infarction within 20 to 30 days. Chronic form of this is characterised by disturbed cardiac rhythm.

## DISCUSSION

Heart is a muscular organ primarily formed by potent part of *Kapha, Medas & Asrika*. It gets its nutrition from *Rasa*, oxygen from *rakta* (blood) and vital energy from *Oja*. *Vyana vayu* is responsible for contraction & relaxation of heart. *Sadhak pitta* acts as intracellular enzymes in the heart and helps to digest and utilise nutrients and oxygen. *Avalambak kapha* protect the heart from continuous friction and wear & tear. Thus vitiation of any one of these basic element, disturbs the normal heart function and creates heart disease.

Circulation of *rasa-rakta* to all over the body is main function of *vyana vayu* any disturbance like hypo function cause hypo nutrition and oxygen supply to different cells of body, sluggishness of both *rasa-rakta* circulation may lead to coronary thrombosis while increase in its function cause tachycardia palpitation etc. Increased in blood volume cause hypertension and may also lead to congestive cardiac problem while acute blood loss cause shock and chronic anaemia can give rise to heart failure as RBC carries oxygen, it is caused due to *rakta dushti*. *Rasa* supplies nutrition to body, its loss causes dehydration and in acute condition lead to shock.

Also heart is the muscular organ and any deformity regarding muscular tissue may lead to heart disease. Hypertrophy or atrophy are because of *mamsa dushti*. *Medas* is in chief component in heart formation so its deformity like dyslipidaemia leads to cardiac problem.

## CONCLUSION

*Hridroga* is not mentioned in Ayurvedic classics directly, but it is clear that no disease is caused without vitiation of *dosha*. (*Vyana vayu, Sadhak pitta, Avalambak kapha*) and *dushya* (*rasa, rakta, mamsa, meda*) are supposed to be involved in the pathogenesis of the disease. But the exact etiopathogenesis is not mentioned directly in Ayurvedic classics. And comprehending all references from ayurvedic samhitas a genuine try has been made to understand the involvement of *dosha* and *dushya* along with correlation of modern cardiovascular diseases through the ayurvedic aspect.

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