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***Hridroga*- Ayurveda Concept and Prevention with Reference to Contemporary Heart Disease**

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ABSTRACT

Ayurveda defines *Hridaya* as a multi-compartmental abode of *Mana* (Mind), *Chetana* (Consciousness) and root origin of *Rasa-vaha* and *Prana-vaha srotas* (channels). Previous studies consider it a matter of great difficulty to correlate *Hridroga* in Ayurveda and Cardiac disorders in contemporary medicine. But understanding and defining *Hridaya* in terms of its *Sharira* (anatomy and physiology) first, gives a clear picture of *Hridroga* in Ayurveda. It is a common understanding among everyone that, Ayurveda is insufficient or unreliable in acute conditions. But people fail to understand that the common cause of sufferings today leading to any acute disease or condition is the failure of maintenance of proper lifestyle and diet regimen. Similarly, major cardiac manifestations and their causes are defined in order to find out a way to prevent them, as Ayurveda suggests. Heart, being a *marma* (vital spot) must be saved from internal attack of *doshas* by *Vata* dominated aggravated *doshas*.

KEYWORDS

Hridroga, Heart disease, Rasa-vaha srotas, Prana-vaha srotas, Cardiac



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INTRODUCTION

Hridayais considered one amongst ten 'Pranayatana' or 'Store house' of Prana(Life)¹. It is a *Sadya-Pranahara*(Instant fatal) *Marma*(Vital spot)². Destruction or trauma to this vital spot gives rise to various untreatable disorders or annihilation of the body itself. It is caused due to *abhighat*(trauma)- Either by external injury or Internal trauma by *Vata* dominated aggravation of *Doshas*³. A similar kind of manifestation is seen nowadays in various Heart conditions, acute or chronic, which in the end turn fatal due to damage to the vital organ viz heart. In modern science, Myocardial infarct generally termed as a 'heart attack' is one of the worst painful conditions among heart diseases. As of 2012, it is the most common cause of death in the world and a major cause of hospital admissions⁴. Similarly, Cardio-vascular disorders are major causes of mortality and disease in Indian sub-continent, causing more than 25% of deaths⁵. According to modern science, the data indicate that poor diet, tobacco use, physical inactivity, excess alcohol use and psychosocial factors are the major contributors for Heart diseases⁶. Likewise, high blood pressure, high blood cholesterol, diabetes, obesity are also major risk factors of heart diseases⁷.

It is a common understanding among everyone that, Ayurveda is insufficient or unreliable in acute conditions. But people fail to understand that the common cause of sufferings today leading to any acute disease or condition is the failure of maintenance of proper lifestyle and diet regimen. Ayurveda has always focused on maintaining health in individuals first⁸. It has advised proper diet and lifestyle regimen in terms of *Dinacharya*(Day-to-day regimen) and *Ritucharya*(Seasonal regimen) for healthy individuals. A failure to act in accordance with it, may give rise to accumulation and aggravation of doshas ultimately leading to different kinds of untreatable conditions or even, death.

Thus, it is very necessary to study the various factors responsible for vitiation of *doshas* leading to development of a disease entity like *Hridroga* in order to protect it from internal aggravation of vatadi doshas⁹. Therefore, Knowledge of *Hetus* (Causes) of *Hridroga* will be beneficial for *Nidanparivarjan Chikitsa*(Cause exclusion treatment) mentioned in Ayurveda¹⁰.

Similarly *Hetu Viparita Chikitsa*(Treatment against cause) is of utmost importance in Ayurveda¹¹. Understanding the exact causes can lead to proper *upashaya*(relief) from disease. Conceptual Study of *Hridroga* will help delineate the similarities and differences



between Hridroga mentioned in ayurveda texts and contemporary heart disease.

MATERIALS AND METHODS

References from *Ayurved brikhatrayee* texts and from modern medicine texts (Davidson's Principles and practice of medicine, Hutchinson clinical methods) were collected and reviewed for comparative study of concept and causes of *Hridroga* in Ayurveda vis-à-vis Cardiac disease presentations and causes.

RESULTS

The word *Hridaya* is formed from root words *hri* (*harati*- Seizes from outside), *da* (*dadati*- Gives away), *ya* (*yati*- motion). According to Sushruta, the heart is anatomically situated in the centre of breasts in-between the thorax. The lung is situated on the left side of *hridaya*, spleen towards left downwards. Similarly, while *kloma* (origin of *udakvaha srotas*) is situated towards its right side, liver is situated downwards from *hridaya* towards right¹². Vagbhat, in *Sharira sthana* has further elicited *Hridaya* as an opening door towards the *Aamashaya* (Stomach)¹³.

Hridaya is a *moolsthana* of *Pranavaha* and *Rasavaha srotas*(channels) as described by Charak¹⁴. Sushruta considers *Hridroga* as a *Rasa doshaja vikara*(disease caused due to

vitiating of *Rasa dhatu*) and also an abode of *Pranavaha dhamani*(vessel)^{15,16}.

Sushruta explains, that *Hridroga* is manifested due to vitiating of *Rasa dhatu* by aggravated doshas, ultimately leading to *Hridbadha*(Pain in chest region)¹⁷. Here *badha* refers to different types of pain or fracture like pain¹⁸.

While, Sushruta has explained the symptoms of *Hridroga* according to the *dosha* specificities only¹⁹, Vagbhat has cleverly included symptoms of *Rasa dhatu kshaya* (decline of *Rasa-dhatu*) in *Vataja Hridroga* and that of *Rasa dhatu Vriddhi* (increase in vitiating *Rasa dhatu*) in *Pittaja* and *Kaphaja Hridroga*²⁰.

Acharaya Charak also has emphasised on *Dosha* specific symptoms in *Kiyantashiraseeya adhyaya* of *Sutra Sthana*²¹, but has included *lakshanas* of *Rasa-vaha, Pranavaha* and *Sandhya vaha srotas* in *Trimarmeeya Chikitsa Sthana*. He has included pain in the chest, related to the timing of food as well²².

Hridaya is an abode of *Mana*(mind) and *Chetana* (Consciousness/Activeness) according to Charak²³. It is where *Satva, Raja, Tama* (mental dosha's) reside and thus if heart is concealed by excessive *tamas*, the individual either sleeps or loses sensations. Therefore, psychological and *sadnyavaha srotas* (nervous system related)



symptoms are also included in *Hridroga* according to Ayurveda²⁴.

Considering the above facts, all the symptoms of *Hridroga* mentioned in Ayurveda *Bruhatrayee* texts are categorised on the basis of Character of

pain, *dosha*-specific symptoms, symptoms related to Character of pain, *dosha*-specificities as also; those related to *Mano-vaha*, *Rasa-vaha*, *Prana-vaha*, *Anna-vaha* and *Sadnya-vaha* as shown in Table 1.

Table 1 Symptoms of Hridroga according to Mano-vaha, Rasa-vaha, Prana-vaha, Anna-vaha srotas and Sadnya-vaha

	VATAJA	PITTAJA	KAPHAJA
CHARACTER OF PAIN	atyartha shoola- excessive pain tudyate (vichinno atishayen ruk) – strong pricking pain sputat iva – exploding pain bhidyate – penetrating / piercing pain ayamyate – dirghikriyat iva – stretching pain nirmathyate– vilodyat iva – stirring pain diryate – aaryeva – cutting pain patyate – dwidha kriyat iva – pain as if broken into two parts dara – daradarika – breaking pain	madhyama shoola – moderate pain chosha – chushyata iva vedana vishesh – sucking pain	alpa shoola – less pain
DOSHA SPECIFIC SYMPTOMS	stabdha – stiffness		stabdha - stiffness
	vepathu – tremors	usha – pradeshiko daha – local heat daha – burning sensation sweda – excessive sweating dhoomaka – dhumodvamana – feeling of hot fumes emerging from external orifices especially mouth	shaitya– anganam shishiratva (feeling of chills)
	veshtana – feeling of obstruction and tightness in the chest		bharika / guru – heaviness in chest ashma garbhavat – heaviness like a stone
		peetata – yellowish discolouration of skin/ sclera	shwaitya – gatra shuklata (whitish appearance or paleness of skin)
	vepathu – tremors	tapa – excessive feeling of heat all over body	supta– less sensation/emptiness stimita– like a wet cloth wrap



MANO-VAHA SROTAS (RELATED TO MIND)	shunyata – aamashayasya manaso wa – feeling of emptiness in stomach or/and mind akasmat deenata – feeling of weakness – physical / mental shoka – feeling of sorrow bhaya – feeling of fear	santras – anxiety	
RASA-VAHA SROTAS	shabda-asahishnuta – unable to withstand sound	trishna – udakapanabilasha – increased thirst	agni sada - agni mandya – “samyak anna api chirat pachet, with asya shosha, aatopa, antra-kujan, adhmana, gaurav- food takes longer time to digest, along with symptoms like dryness of mouth, flatulence, gurgling of intestines, bloating, heaviness aruchi – reduced appetite
	shushyati – dryness of mouth /throat	mukha shosha– dryness of mouth	praseka– excessive salivation
	drava – dhug dhugati- palpitation	amlaka / amla udgiran – sour taste in mouth/ sour eructation tikta udgiran – bitter eructation	
		tikta vakra - bitter taste in mouth	asya madhurya – sweetness in mouth
	glani – klama– weakness without exertion	klama – fatigue	aalasya -anutsaha - laziness- physical/mental
		amla pittasya chardan – sour vomiting of pitta/ regurgitation	nishthiva – excessive spitting/ cough in mouth/ throat
		jwara – fever	jwara – fever
PRANAVAHA SROTAS	shwas rodha – obstructed breath		kasa – cough shwas– breatlessness / asthma
SADNYA-VAHA SROTAS	alpa nidrata – reduced sleep	alpa nidra – reduced sleep bhrama – giddiness moorcha – fainting tama uduyana (c-c) – giddiness moha – confusion	nidra – excessive sleep tandra – feeling of sleep/ yawning/ head heaviness



RELATED TO FOOD	jirne atyartha vedan – pain after digestion of food	jiryati atyanta shoola – pain in chest while digestion	jeerna arambhe shoola – bhojanante shoola – pain in chest immediately after eating food
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The factors causing vitiation of *Prana-vaha* and *Rasa-vaha srotas* vitiation are grouped in Table 2. According to Ayurved, the internal trauma by *doshas* to a *Marma* (Vital spot where life energy is stored) is the reason for acute conditions or even death. As *Hridaya* is a *Marma*, it must be saved

from internal trauma of *vata dosha*, specifically. Because *vata dosha* is *Pranamoola* (major factor in sustaining life), it leads to aggravation of *Pitta* and *Kapha dosha* and gives rise to acute conditions as well²⁵.

Table 2 Table showing factors causing vitiation of *Rasa-vaha* and *Prana-vaha srotas*

RASA-VAHA SROTAS	PRANA-VAHA SROTAS
Guru (Heavy to digest food items refined wheat flour, non-veg)	Pranavaha srotas Dushti hetus
Sheeta (Cold or refrigerated food)	Kshaya- Emaciation
Atisnigdha (Excessive oily, greasy food stuffs like ghee, deep fried food)	Sandharan – Supression of Natural urges
Atimatra (Excessive eating leading to obesity)	Raukshya – Extreme dryness
Chintyanam atichintanat (Excessive worry or stress)	Ativyayam – Excessive Exercise
	Atidarun Kshudhitasya – Exertional activity after a meal

DISCUSSION

The meaning of the word *Hridaya* is *Vaksha* (Chest), *Bukkagra* *Mamsa* (Muscular part of *Hridaya*), *Mana* (Mind). Considering the definition of *Hridaya* as *harati* (extracting), *dadati* (giving), *yati* (motion); and its anatomical and physiological connections, the following output could be derived. *Harati* – Extracting *Aahar* (food), *Udaka* (Water), *Prana* (Life-oxygen) from external environment. *Dadati* – Providing *Rasa* to the whole body. *Yati* – Continuing the motion of *Rasa*, thus maintaining life.

Rasa dhatu is formed from food containing *Shada-rasa* (six tastes). It is the first and foremost *dhatu* amongst total 7 *dhatu*s successively formed from food intake. *Rasa dhatu* formed from food is circulated through the whole body by *Vyana Vayu*, which resides in heart. The prime function of this *dhatu* is to provide nourishment and sanctity to each and every part of the body through its property of *dravata* (liquidity) and *gati* (movement) according to its *Nirukti*.

The function of blood circulation throughout the body is attributed to Aorta,



and as *Hridaya* is said to be *Sira marma* (vascular *marma*); the ‘*Dadati*’ function of *Hridaya* is carried on by this part.

The root of *Prana-vaha srotas* is *Hridaya* and *Mahasotas* (Gastro-intestinal tract). The prime functions like breathing (inspiration and expiration) and *Annapravesh* (diverting food into the stomach) are done by *Pranavayu*; which can be attributed to the trachea and oesophagus respectively. Both of them together carry out the ‘*Harati*’ function of *Hridaya*.

Thus, extraction of *prana* (oxygen) through wind-pipe and oxygenation through lungs,

along with extraction of *udaka* (water) and *aahar* (food) through oesophagus is included in the function of *Hridaya*. Similarly, providing nourishment to the whole body through aorta and consistently carrying out this function throughout life, realised through beating of heart, cover all the functions of *Hridaya* according to Ayurveda.

Comparing symptoms of *Hridroga* in Ayurveda and that seen in cardio-vascular disorders, gives us a clear picture of their similarity as shown in Table 3, 4 and 5.

Table 3 Comparison of Cardiac sign and symptoms with Vataja hridroga

	VATAJA HRIDROGA	CARDIAC PRESENTATIONS	NON-CARDIAC PRESENTATIONS
Character of pain	Atyartha Shoola- Excessive Pain tudyate (vichinno atishayen ruk) – strong pricking pain sputat iva – exploding pain bhidyate – penetrating / piercing pain ayamyate – dirghikriyat iva – stretching pain nirmathyate– vilodyat iva – stirring pain diryate – aaryeva – cutting pain patyate – dwidha kriyat iva – pain as if broken into two parts dara– daradarika – breaking pain	Pericarditis	Organ related Organ related Muscle related Organ related Musculo-skeletal Musculo-skeletal
Dosha specific symptoms	veshtana – feeling of obstruction and tightness in the chest	Aortic dissection Angina due to Myocardial ischemia or MI	Oesophageal pain Broncho-spasm
Manas Symptoms (Related to the mind)	shunyata – aamashayasya manaso wa – feeling of emptiness in stomach or/and mind akasmata deenata – feeling of weakness – physical / mental shoka – feeling of sorrow bhaya – feeling of fear		Emotional distress Emotional distress Emotional distress Emotional distress



Rasavaha srotas	shabda-asahishnuta – unable to withstand sound		Depression and anxiety
	shushyati – dryness of mouth /throat		Dehydration
	drava – dhug dhugati- palpitation	Unstable angina due to Myocardial ischemia Anterior MI	Oesophageal pain
	glani – klama– weakness without exertion	Heart failure	
Pranavaha srotas	shwas rodha – obstructed breath	Angina due to Myocardial ischaemia (Stable and Unstable) Angina due to MI Acute left ventricular failure Chronic heart failure	Pulmonary oedema Orthopnoea
Sadnya vaha srotas	alpa nidrata – reduced sleep		Psychiatric
Related to food	jiirne atyartha vedana– pain after digestion of food		Oesophageal pain

Table 4 Comparison of Cardiac sign and symptoms with Pittaja hridroga.

	PITTAJA HRIDROGA	CARDIAC MANIFESTATIONS	NON-CARDIAC MANIFESTATIONS
Dosha specific Symptoms	daha – burning sensation	Angina due to MI	Oesophageal Pain
	sweda – excessive sweating	Unstable angina due to Myocardial ischemia MI	Oesophageal pain
Manas Symptoms (Related to the mind)	santras – anxiety		psychological
Rasavaha Dushti	trishna – udakapanabhilasha – increased thirst		
	mukha shosha – dryness of mouth		Dehydration
	amlaka / amla udgiran – sour taste in mouth/ sour eructation tikta udgiran – bitter eructation tikta vakra - bitter taste in mouth		Gastro-intestinal disorders
	klama – fatigue	Cardio-vascular diseases	
	amlu pttasya chardan – sour vomiting of pitta/ regurgitation	MI	Oesophageal pain or disorder
Sadnya vaha	alpa nidra – reduced sleep bhrama – giddiness moorcha – fainting tama uduyana – giddiness moha – confusion	MI Heart failure Cardio-vascular disorders	Oesophageal pain
Related to food	jiiryati atyanta shoala – pain in chest while digestion		Oesophageal pain

Table 5 Comparison of Cardiac sign and symptoms with Kaphaja hridroga.



	KAPHAJA HRIDROGA	CARDIAC PRESENTATIONS	NON-CARDIAC PRESENTATIONS
Dosha-specific symptoms	bharika / guru – heaviness in chest ashma garbhavat – heaviness like a stone	Angina due to Myocardial ischaemia or MI	Oesophageal pain
	supta– less sensation/emptiness stimita (c-s) – like a wet cloth wrap	Inferior MI	Oesophageal pain
Rasavaha srotas	agni sada - agni mandya- food takes longer time to digest aruchi – reduced appetite		Gastro-intestinal
	praseka – excessive salivation		Gastro-intestinal
	asya madhurya – sweetness in mouth		
	aalasya -anutsaha -laziness- physical/mental		Psychological
	nishthiva – excessive spitting/ cough in mouth/ throat		Oesophageal and GI tract
Pranavaha srotas	kasa – cough shwas – breathlessness / congestion	Angina due to MI	Oesophageal pain Bronco-spasm
Sadnya vaha srotas	nidra – excessive sleep tandra – feeling of sleep/ yawning/ head heaviness		Psychological
Related to food	jeerna arambhe shoola – bhojanante shoola – pain in chest immediately after eating food		Oesophageal pain

Most of the symptoms of *Rasa-vaha* and *Prana-vaha srotas* vitiation of *Hridroga*, are seen in Cardiac Manifestations of heart disease. Those that are distinguished as non-cardiac presentations can also be included in *hridroga* presentations owing to the site and physiology of symptoms and its relation with *Hridaya* defined in Ayurveda.

The factors causing vitiation of *Rasavaha srotas* are *Aaharaj* (dietary) and *Manas* (psychological) in origin as shown in table 6, while those causing *Pranavaha srotas* vitiation are primarily related to *Vihar* (personal habits, lifestyle and external environmental factors) as shown in table 7.

Table 6 Rasa-vaha srotas and type of cause

Type of Cause	Rasavaha Srotas Dushti hetus
Aaharja (Dietary)	Guru (Heavy to digest food items refined wheat flour, non-veg) Sheeta (Cold or refrigerated food) Atisnigdha (Excessive oily, greasy food stuffs like ghee, deep fried food) Atimatra (Excessive eating leading to obesity)
Manasa (Psychological factors)	Chintyanam atichintanat (Excessive worry or stress)

Table 7 Prana-vaha srotas and type of cause.

Type of Cause	Pranavaha srotas Dushti hetus
Viharaja (Related to lifestyle)	Kshaya- Emaciation Sandharan – Supression of Natural urges Raukshya – Extreme dryness Ativyayam – Excessive Exercise Atidarun Kshudhitasya – Exertional activity after a meal



All the dietary factors are in conjunction with those causing obesity, diabetes and hyperlipidaemia; all of them being the major causes of heart disease today. The psychological factor could be related to anxiety and hypertension related to stress which is an alarming cause nowadays in major illnesses especially heart disease.

The factors of *pranavaha srotas dushti*, mentioned in Ayurveda are not considered in modern medicine as a cause of coronary heart disease. Exertion is a cause of unstable angina and myocardial infarction; both being major manifestations of CAD. It may also be the reason for chronic heart failure. They are considered as secondary or provoking, not primary cause of heart disease. Stress test is a major diagnostic tool useful in heart disease, which tests the exercise tolerance of an individual by gradually increasing physical activity which causes less oxygen supply to the heart muscle in case of ischemic or coronary artery disease. But nowhere, the proportion of exercise to be performed by an individual is decided in modern medicine; whereas, Ayurveda has decided a proportion according to individual strength and needs.

CONCLUSION

As we can see, that *Hridaya* according to Ayurveda is a multi-compartmental abode

of *Mana* (Mind), *Chetana* (Consciousness) and the root origin of *Rasa-vaha* and *Prana-vaha srotas*. It lies at the centre and is a connection between all three *roga-marga's* (routes of diseases), viz *Bahya*(externa), *Madhyama*(Middle) and *Abhyantar* (Internal); as shown in table 8.

Table 8 Hridaya- Connection between all Roga Marga's

Hriday termed as	Placement	Relation
<i>Koshtanga (Abhyantar)</i>	<i>Koshta Madhya</i>	With GI tract
<i>Marma sthana (Madhyam)</i>	<i>Ura Madhya</i>	With trachea, bronchioles, lungs
<i>Rasa sthana (Bahya)</i>	<i>Stana Madhya</i>	With skin, sweat-glands

Physiologically also, it covers all three routes through circulation of *rasa* in the entire body.

Hridroga presentations described in Ayurveda include the symptoms related to the organs in *Vaksha*(Chest region). *Rasa-viddhi* (abnormal increase) are seen in *Pittaja* and *Kaphaja Hridroga*, while that of *Rasa-kshaya*(abnormal decrease) are seen in *Vataja Hridroga*; as *Hridroga* is a *Rasa pradoshaja* disease (disease formed due to *rasa dhatu* vitiation).

Prana-vaha srotas also being the root origin of *Hridaya*, some symptoms are as well related to *Hridroga*. Similarly, some symptoms of *Mano-vaha*, *Sadnya-vaha*(*Chetana-vaha*) are included as *Hridaya* is an abode of *Mana* (Mind) and



Chetana (Consciousness). As *Hridaya* is an opening of *aamashaya*, symptoms of *maha-srotas* (Gastro-intestinal tract) are also included.

Though, the signs and symptoms of pain, dyspnoea etc are well considered Cardiac and Non-cardiac causes according to anatomy of Modern science, all these presentations do get included under *Hridroga* described by Ayurveda. Though they could also be a presentation of some other disease, but they could not be termed as non-*Hridroga* presentations.

Rasa-vaha srotas vitiation occurs mostly due to improper diet as *Rasa* is the first *dhatu* developed from it. It leads to obesity, hyperlipidaemia, diabetes; which are leading causes of coronary heart disease today. *Ati-chintan* (Stress) is also a cause of *Rasa* vitiation as also of stress induced hypertension and diabetes mellites, which lead to cardio-vascular disorders ultimately.

Prana-vaha srotas vitiation occurs mostly due to exertional and environmental factors, which vitiate *Vata dosha*, specifically. Thus, exertion which provokes stable and non-stable angina, Myocardial ischemia, acute or chronic heart failure is due to vitiation of *vata dosha*. So, it is urged to save heart from vitiation of *vata dosha* as it consequently leads to MI like acute conditions. Other causes like emaciation, extreme dryness should be avoided by

following proper daily and lifestyle regimen. Similarly, natural urges should not be suppressed and exertion immediately after a meal should be avoided. All these rules are a part of *Marma Pari-palan* (saving heart and sustaining life).



REFERENCES

1. Tripathy Brahmananda, editor. Charaka Samhita of Agnivesha, Sootra Sthana: DashaPranayataneeya: Chapter 29, Verse 3, Varanasi: Chaukhamba Surabharati Prakashan, 2002; 553.
2. Tripathy Brahmananda, editor. Ashtanga Hridaya of Vagbhata, Sharira Sthana: Marma Vibhaga: Chapter 4, Verse 52, Delhi: Chaukhamba Sanskrit Pratishtan, 2007; 397.
3. Tripathy Brahmananda, editor. Charaka Samhita of Agnivesha, Siddhi Sthana: Trimarmeeya: Chapter 9, Verse 5, 2004; 1271.
4. Gulhane Chetan, Prasanth D, Gulhane Deepali, Thakar Anup- Systemic Review of the concept of Hridroga in Ayurveda w.s.r to Ischemic Heart Diseases(IHD)- International Journal Pharmaceutical and biological Archives 2013; 4(6):1094-1099.
5. Fuster V, Kelly BB- Promoting Cardiovascular Health in the Developing World: A Critical Challenge to achieve Global Health- Pubmed- Washington (DC); National Academies –ress(U.S); 2010. ISBN-13: 978-0-309-14774-3 ISBN-10; 0-309-14774-3.
6. Anand et al.,2008; Clarke et al.,2009; Critchley et al.,2004; Lopez-Jaramillo et al.,2008; Mayosi et al.,2009; Rosengren et al.,2004; Stein et al.,2005; Yusuf et al., 2004.
7. Website- National Institute of health, Department of Health and human services and American Heart Association, USA gov
8. Tripathy Brahmananda, editor. Charaka Samhita of Agnivesha, Sootra Sthana: Deerghajeevatiya, Chapter 1, Verse 24, Varanasi: Chaukhamba Surabharati Prakashan, 2002;9.
9. Tripathy Brahmananda, editor. Charaka Samhita of Agnivesha, Siddhi Sthana: Trimarmeeya: Chapter 9, Verse 7, Varanasi: Chaukhamba Surabharati Prakashan, 2004; 1273.
10. Shastri Ambikadutta, editor. Sushruta Samhita of Sushruta, Uttarantra: Aupadravika: Chapter 1, Verse 25, Varanasi: Chaukhamba Sanskrit Sansthan, 2005; 11.
11. Tripathy Brahananda, editor. Ashtanga Hridaya of Vagbhata, Sootra Sthana: Matraashitiya: Chapter 8, Verse 22-23, Delhi: Chaukhamba Sanskrit Pratishtan, 2007; 139.
12. Shastri Ambikadutta, editor. Sushruta Samhita of Sushruta, Sharira Sthana: Garbhavakranti: Chapter 4, Verse 30, Varanasi: Chaukhamba Sanskrit Sansthan, 2005; 32.



13. Tripathy Brahmananda, editor. Ashtanga Hridaya of Vagbhata, Sharira Sthana: Marma Vibhaga: Chapter 4, Verse 13, Delhi: Chaukhamba Sanskrit Pratishthan, 2007; 390.
14. Tripathy Brahananda, editor. Charaka Samhita of Agnivesha, Vimana Sthana: Srotovimana: Chapter 5, Verse 7-8, Varanasi: Chaukhamba Surabharati Prakashan, 2002; 697.
15. Shastri Ambikadutta, editor. Sushruta Samhita of Sushruta, Sootra Sthana: Vyadhi Samuddeshiya: Chapter 25, Verse 10, Varanasi: Chaukhamba Sanskrit Sansthan, 2005; 102.
16. Shastri Ambikadutta, editor. Sushruta Samhita of Sushruta, Sharira Sthana: Garbha Vyakarana: Chapter 4, Verse 30, Varanasi: Chaukhamba Sanskrit Sansthan, 2005; 32.
17. Shastri Ambikadutta, editor. Sushruta Samhita of Sushruta, Uttarantra; Hridroga Pratishedham: Chapter 43, Verse 4, Varanasi: Chaukhamba Sanskrit Sansthan, 2005; 280.
18. Upadhyaya Yadunandana, editor(32th ed). Commentary Madhukosha of Vijayrakshita and Srikanthadutta on Madhava Nidana of Madhavkara, Hridroga nidana: Chapter 29, Verse 2, Varanasi: Chaukhamba Sanskrit bhawan, 2002; 545
19. Shastri Ambikadutta, editor. Sushruta Samhita of Sushruta, Uttarantra; Hridroga Pratishedham: Chapter 43, Verse 3, Varanasi: Chaukhamba Sanskrit Sansthan, 2005; 280.
20. Tripathy Brahmananda, editor. Ashtanga Hridaya of Vagbhata, Nidana Sthana: Rajayakshmedi Nidan: Chapter 5, Verse 40-41-42, Delhi: Chaukhamba Sanskrit Pratishthan, 2007; 390.
21. Tripathy Brahmananda, editor. Charaka Samhita of Agnivesha, Sootra Sthana: Kiyantashirasiya, Chapter 17, Verse 30-32, Varanasi: Chaukhamba Surabharati Prakashan, 2002; 331.
22. Tripathy Brahmananda, editor. Charaka Samhita of Agnivesha, Chikitsa Sthana: Deerghajeevatiya, Chapter 26, Verse 78-80, Varanasi: Chaukhamba Surabharati Prakashan, 2002; 879.
23. Tripathy Brahmananda, editor. Charaka Samhita of Agnivesha, Sootra Sthana: Arthe dashamahamooliya, Chapter 30, Verse 30-32, Varanasi: Chaukhamba Surabharati Prakashan, 2002; 559.
24. Shastri Ambikadutta, editor. Sushruta Samhita of Sushruta, Sharira Sthana: Pratyeka Marma nirdesham: Chapter 6, Verse 26, Varanasi: Chaukhamba Sanskrit Sansthan, 2005; 55.
25. Tripathy Brahmananda, editor. Charaka Samhita of Agnivesha, Siddhi



Sthana: Trimarmeeya, Chapter 9, Verse 5,
Varanasi: Chaukhamba Surabharati
Prakashan, 2002; 1271.