

A Review on Management of Hridroga w.s.r. to Ayurveda

Tripathi Arun Kumar¹, Singh Deshraj², Tiwari Akanksha^{3*}

^{1, 2, 3} Dept. of Kayachikitsa, Rishikul State Ayurvedic College, Haridwar, Uttarakhand, India

Abstract

Cardiovascular diseases (CVD) comprises of the group of heart disease and the vascular system. The major conditions are Coronary heart disease (CHD), Hypertension and Congenital heart disease. The WHO has drawn attention to the fact that CHD is our modern “epidemic” i.e., a disease that affects population, not an unavoidable attribute of ageing. India is currently leading towards becoming a heart disease capital of the world. This puts a tremendous pressure on available resources of medical and surgical management. Treatment of cardiovascular diseases in elderly is not easy and there is a need for the development of drugs which can be used safely for a longer period. Many of the clinical features of “*Hridroga*” described in Ayurvedic classics are similar to that of cardiovascular diseases and can be adequately managed by classical herbs. This article aims at what are the risk factors and causes of cardiovascular diseases, their prevalence and with its possible prevention in Ayurveda.

Keywords

Cardiovascular disease, *Hridroga*



Greentree Group

Received 21/06/15 Accepted 30/7/15 Published 10/09/15

INTRODUCTION

Aim

To review on *Hridroga* described in different classics.

Objective

1. To study *hetus* (causes) of *Hridroga* both in Ayurvedic and modern medicine aspect.
2. Find out different cardioprotective herbs

Etiology

The etiology of CHD includes increasing age and male sex; on the basis of several studies we have identified several important “risk” factors. Some of the risk factors can be modified but others are immutable. Presence of any one of the risk factors places an individual in a high-risk category for developing CHD. As the number of risk factors increase there is also increasing chance of developing CHD. The principal risk factors are discussed in Table 1.

Smoking

Smoking has been identified as a major CHD risk factor^{3,4}.

It has been calculated that in countries where smoking has been a widespread habit, it is responsible for 25% of CHD deaths under 65 years of age in men. Cigarettes seem to be particularly dangerous factor in

causing death from CHD especially in men below 50 years of age. For those who have had Myocardial infarction, the risk of a fatal recurrence may be reduced by 50% after giving up smoking⁵.

Hypertension

The blood pressure is the single test used for identifying individuals at a high risk of developing CHD. Hypertension accelerates the atherosclerotic process, especially if Hyperlipidemia is also present and contributes importantly to CHD. Many investigators feel that systolic blood pressure is a better predictor of CHD than is the diastolic. However, both components are significant risk factors. The risk role of “mild” hypertension is generally accepted⁶.

The symptoms of primary hypertension include a sudden rise and fall of blood pressure with nervous tension, irregular or erratic pulse both in rhythm and strength, and possibly vasospasm. It can also be relocated to the mind causing anxiety and worry. These symptoms can be correlate with vata and treatment may include the use of hawthorn berry, garlic, and arjuna. For mind Ashwagandha, and Jatamansi may be

used in equal parts taken 1-3g of the powdered herbs with warm water or ghee.

Serum cholesterol

Risk of cardiovascular diseases is proportional to the degree of LDL-C elevation, together with other major risk factors. While very low-density lipoprotein (VLDL) has also been shown to be associated with premature atherosclerosis, it is more strongly associated with peripheral vascular disease (e.g., intermittent claudication) than with CHD.

To further refine CHD risk prediction based on serum lipid levels, a total "cholesterol/HDL ratio" has been developed. A ratio less than 3.5 has been recommended as a clinical goal for CHD prevention⁷.

With newer techniques, high-density and low density lipoproteins have been further subdivided into sub-fractions. Recent evidence indicates that levels of plasma apolipoprotein-A-1 (the major HDL protein) and apolipoprotein-B (the major LDL protein) are better predictors of CHD than HDL cholesterol or LDL cholesterol respectively. Therefore, measurement of apolipoproteins may replace lipoprotein

cholesterol determinations in assessing the risk of CHD⁸.

Diabetes mellitus, obesity and sedentary life style

Diabetes mellitus, obesity and sedentary life style are interrelated conditions. One condition may invite to development of other condition and collectively called as metabolic syndrome.

Stress^{9,10}

Stress also plays a major role in etiology of cardiovascular diseases in various ways.

1. Some people may choose to drink too much alcohol or smoke cigarettes to overcome their stress.
2. Stressful conditions produces a chain of events by releasing adrenaline hormone. This hormone temporarily increases breathing rate and heart rate, hence blood pressure is also increased (fight or flight response).
3. Oxidative stress in cardiac and vascular myocytes describes the injury caused to cells resulting from increased formation of reactive oxygen species (ROS) and/or decreased antioxidant reserve. Antioxidant

therapy may prove beneficial in combating this problem.

In Ayurvedic Classics stress is also considered as *Nidan* (causative factor) for heart diseases. *Acharya charak*¹¹ has told (C.S.ci.26/70) causes of *hridroga* are physical exertion, anxiety, fear, terror.

In Ayurveda, *Hridroga* has classified into five types i.e. *vataja*, *pittaja*, *kaphaja*, *sannipataja* and *krimija*. Out of this on the basis of symptoms Vascular Heart disease, cardiac arrhythmias, angina pectoris,

constructive pericarditis, aneurysm and dilatation of heart and aorta can be correlated with *vataja Hridroga*. Endocarditis, Valvulitis, Myocarditis and Pericarditis can be considered as *pittaja Hridroga*. Metabolic syndrome disease of Heart, Tumour of heart and thrombosis can be considered as *kaphaja Hridroga* and infectious cardiac disorder as *krimija hridroga*¹².

Different type of Hridroga described in Ayurvedic classics are discussed in Table 2, 3, 4, 5, and 6.

Table 1 The principal risk factors are discussed below

Not modifiable	Modifiable
Age	Cigarette smoking
Sex	High blood pressure
Family history	Elevated serum cholesterol
Genetic factors	Diabetes
Personality	Obesity
	Sedentary life style
	Stress

Table 2

VATAJA HRIDROGA	
Causes ¹³	emotional grief, excessive fasting, excessive exercise, high intake of dry and light foods.(C.S.su17/30)
Sign and symptoms ¹⁴	Feeling of a “heart that feels torn” or describe a ‘tearing’ type of chest pain. Patient may present with trembling, cramping, syncope, or describe feeling of emotional emptiness. The pulse may be weak, rapid, and irregularly irregular.(C.S.su.17/31)
Management ¹⁵	Warm, moist and oily treatment both internally and externally. oleation followed by

	fomentation.(<i>A.H.ci.6/35</i>)
Herbs ¹⁶	Bala (sida cordifolia) and arjuna (terminalia arjuna). Herbs may be mixed with medicated oils or ghee(clarified butter),haritaki, pushkarmool, trikatu.(<i>C.S.ci.26/74-82</i>)
Life style modification	vata disorder may reflect a lifestyle of constant change with a variable pattern in the routine. Balancing through consistent daily routines sound sleep, self observation, practicing self nourishing behaviours.

Table 3

PITTAJA HRIDROGA	
Causes ¹⁷	high intake of hot, sour, salty, strongly alkaline or acidic, and heavy foods. Excessive intake of alcohol,regular, and an intense and stressful lifestyle.(<i>C.S.su.17/32</i>)
Sign and symptoms ¹⁸	Patient will often complain of a bitter taste in mouth, excessive thirst, feeling of exhaustion, burning chest pains, and excessive perspiration.(<i>C.S.su.17/33</i>)
Management ¹⁹	ingestion and application of cool substances, such as medicated ghee with arjuna.(<i>C.S.ci.26/83</i>)
Herbs ^{20,21}	Utpala, madhuka , pundarika,katuki, draksha, . Herbs to reduce irritability and critical emotions that may be part of pittaja hridya roga include mandukaparni(Centella asiatica) and Brahmi (Bacopa monneri). (<i>C.S.ci.26/84-88</i>),(<i>A.H.ci6/46-48</i>)
Life style modification	Self observation and reflection of pitta will include the contemplation“why am I angry, and, what am I striving for”. In addition, working on forgiveness, and surrender to psycho-spiritual issues.

Table 4

KAPHAJA HRIDROGA	
Causes ²²	Excessive intake of heavy and unctuous substances. Little mental and physical work, indulgence in sleep, and inadequate mental stimulation.(<i>C.S.su.17/34</i>)
Sign & Symptoms ²³	Feeling of heaviness in the chest and sluggishness. Patient may present with bradycardia and complain of stiffnesss, drowsiness, and anorexia.(<i>C.S.su.17/35</i>)
Management ²⁴	Using dry, light and warm substances.(<i>A.H.ci.6/43</i>)
Herbs ^{25,26}	herbs may include hing (asafeotida), lavana (salt), ela (cardamom), and nagara (ginger), katphala, udumber, shilajeet.(<i>C.S.ci.26/89-92</i>),(<i>A.H.ci.6/49-54</i>)
Life style modifications	Adequate exercise, decreasing in amount of time spent sleeping and/or sedentary lifestyle, dry massage.

Table 5

SANNIPATAJA HRIDROGA	
Causes ²⁷	All the above causes cumulatively cause <i>sannipataja Hridroga</i> .(C.S.su.17/36)
Sign and symptoms	Combination of all the three types hridroga.
Management ²⁸	This heart disease is troublesome and hardly curable.first mild fasting and diet useful in all types should be advised. Treatment of three doshas should be done after examining the relative degree of their predominance.(C.S.ci26/93)

Table 6

KRIMIJA HRIDYA ROGA	
Causes ²⁹	Intake of Ghee, milk, Jaggery etc. in <i>Tridoshaj Hridroga</i> . Affliction with disease causing organism.(C.S.su17/37)
Sign and symptoms ³⁰	pricking pain, cutting by sharp weapons, spitting, excessive salivation, nausea, itching, anorexia, white eyes, (cachexic body, black out.(C.S.su.17/39)
Management ^{31,32}	One should take immediate steps to management of this disorder which is so severe.All the wormicidal(krimighan) measure should be applied.(C.S.su.17/40),(C.S.ci26/96)

The word “mahat”, “artha”, and “hradya” are synonyms. Heart is substratum of intellect, sense organs, and five sense objects. It is also the seat of the excellent *ojas* and reservoir of consciousness. That’s why the heart has been said as ‘mahat’(great) and ‘artha’(serving all purposes) by the *Acharya charak*. One gets *murchha* (fainting) or even death on its injury³³.

The Ojas, maintains the living beings by its saturation; without which no life of creatures

exists. It is the initial essence of embryo and also the essence of its nourishing material, which when destroyed leads to death³⁴.

One who wants to protect the heart, and the *ojas*, should avoid particularly the causes of the affliction of mind. He should regularly take the measures which are conductive to heart and *ojas*³⁵.

Ayurveda Classics is rich in both *dravya bhuta* and *adravya bhuta* therapy for diseases. There is also described a number of drugs in heart roga in preventive as well

as curative point of view. Some drugs for heart are described here:

ARJUNA-

The bark of *Terminalia arjuna* contains several alkaloid constituents, and has been used in India for more than 3000 years, primarily as a heart remedy. *Acharya charaka* has not mentioned arjuna as cardiogenic but he described it as *udardaprashman* (anti-urticarial property)³⁶. But other Ayurvedic classics have described that in cardiac disorders milk processed with Arjuna bark should be used. In the same way, milk processed with *sarkara* or *Panchamula* or *bala* or *madhuka* may be used³⁷.

Those who take Arjuna bark with ghee, milk or jiggery water are relieved by heart disease, chronic fever, Intrinsic haemorrhage and attain longevity³⁸.

One who takes powder of wheat and Arjuna bark cooked with oil, ghee, and jiggery with milk overcomes all the cardiac disorders³⁹.

It has been shown in mammalian studies and clinical trials to have cardiogenic, antihypertensive, anti-hyperlipidemic, and anticoagulant properties. In addition, positive effect to LV function, positive

effects on ST changes and T-wave depressions in Ischemic heart disease (IHD) have been observed. A 1-week, double-blind, placebo-controlled crossover trial of approximately 60 people, evaluated the effectiveness of an extract of *T. arjuna* at 500 mg TID in patients with stable angina and provokable ischemia. *T. arjuna* was compared with placebo and Isosorbide mononitrate (40 mg/day). Significant improvement in clinical and treadmill exercise parameters was observed indicating that *T. arjuna* is more effective than placebo, with benefits similar to those observed with Isosorbide mononitrate therapy⁴⁰⁻⁴².

T. arjuna is useful in *hridroga*, *ksataksaya*, *medoroga*, *prameha*⁴³.

A double-blind, randomized, placebo-controlled study examined the efficacy of a bark extract of *Terminalia arjuna* in males with chronic stable angina with evidence of provokable ischemia on treadmill exercise test. Patient received a *Terminalia arjuna* extract 500mg 8 hourly, Isosorbide mononitrate 40 mg/daily or a matching placebo for one week each. The result was a significant decrease in the frequency of angina and need for Isosorbide dinitrate,

with significant improvements in treadmill exercise test parameters compared to those with placebo, similar to Isosorbide mononitrate therapy⁴⁴.

TRIPHALA-

Combination of *Emblica officinalis*, *Terminalia chebula*, *Terminalia bellirica*. *E. officinalis* (Indian gooseberry), *Acharya susruta* has also provoked that *Triphala* should take in heart disease caused by kapha⁴⁵.

Triphala is used for lowering cholesterol, treating atherosclerosis, and diabetes. Preliminary evidence suggests it may lower total serum cholesterol, LDL, triglycerides, without affecting HDL levels. It may have positive effects on atherosclerosis. *T. chebula* *T. bellirica* are in the same family as *T. arjuna*⁴⁶.

CINNAMON-

Preliminary research suggests that cinnamon bark constituent methyl-hydroxychalcone polymer (MHCP), might improve insulin sensitivity⁴⁷.

Cinnamon has been shown to decrease blood glucose levels. A study in people with type II diabetes demonstrated that intake of 1, 3,

or 6 g of cinnamon daily reduced serum glucose, triglyceride, LDL cholesterol, and total cholesterol⁴⁸.

This suggest that the inclusion of cinnamon in diet, or frank supplementation for people with type II diabetes, may reduce risk factors associated with diabetes and subsequent cardiovascular disease.

GUGGUL-

Guggul (*commiphora mukul*) reduced cholesterol level including reduction in total cholesterol, LDL, and triglycerides with improved total cholesterol : HDL ratios. Combined changes of Guggul and diet equaled effects of major statins. Of possibly more significance, measurements of lipid peroxides (an index of oxidative stress) decreased with Guggul⁴⁹⁻⁵¹.

PUNARNAVA:

Root and whole plant of *Boerhavia diffusa* are used in traditional medicine for the treatment of diabetes, stress, dyspepsia, abdominal pain, inflammation, Jaundice, enlargement of spleen, heart disease and bacterial infections⁵².

Punarnava is potential rich source of natural antioxidant. *Acharya Vagbhata* has also

noticed antioxidant properties of Punarnava and described Punarnava as a *rasayana*. One who takes paste of fresh Punarnava 20 gm with milk for a fortnight, two months, six months or a year is rejuvenated⁵³.

Some Phytochemical screening and in vitro bioactivities of the extracts of aerial part of *Boerhavia diffusa* is also done by researchers. The plant extracts were a rich source of phytoconstituents. Methanol extract showed higher antioxidant, thrombolytic activity and less cytotoxic activity than those of n-hexane and ethyl acetate extract of *B.diffusa*. Among the bioactivities, antioxidant activity was the most notable⁵⁴.

Boerhavia diffusa also possess cardioprotective properties⁵⁵.

TRIKATU:

Trikatu is herbal combination containing *Piper longum* (fruit), *Piper nigrum*(fruit) and *Zingiber officinale*(rhizome). Its effects on body weight, blood and tissue (aortic, cardiac and hepatic) lipids-total, free and esterified cholesterol, low density lipoprotein(LDL) and high density lipoprotein(HDL) cholesterol, triglycerides and phospholipids-and the atherogenic index

were measured. It was found that *Trikatu* by virtue of its ability to reduce triglycerides and LDL cholesterol and to increase HDL cholesterol can reduce the risk of Hyperlipidemia and atherosclerosis. Hence *Trikatu* can be used as a potent hypolipidaemic agent and it can reduce the atherosclerosis associated with a high fat diet⁵⁶.

BADI ELAICHI-

Greater cardamom (*Amomum subulatum Roxb.*) fruit powder (seeds with pericarp) was evaluated for its effect on some of the cardiovascular risk factors in patients with ischemic heart disease. Dietary supplementation of greater cardamom favorably modifies lipid profile and significantly enhances Fibrinolytic activity and total antioxidant status in patients with ischemic heart disease^{57, 58}.

PATHAR PHOOL-(*Parmelia perlata*)

The herb *Parmelia perlata* used in *Hridroga*, *Rakta vikara*, *Swasa*, *vrana*, etc⁵⁹.

OTHER DRUGS FOR MANAGEMENT OF HRIDROGA MENTIONED IN DIFFERENT CLASSICS-

VIDANGA (*Embelia ribes*)-

In heart disease caused by *Krimi* (like bacterial endocarditis), one should take *Gomutra* mixed with *Vidanga* and *Kustha*. It expels warms⁶⁰.

KATUKI (*Picrorhiza kurroa*)-

In heart disease caused by *pitta* one should take paste of *katuki* and *Madhuka* with sugar water^{61,62}.

ELA (*Elettaria cardamomum*)-

Ela and *Pippalimula* taken with ghee alleviate heart disease and *gulm*⁶³.

SUNTHI –

Hot *decoction of Sunthi* should be taken. It promotes digestion and alleviates cough asthma, *vata*, colic and heart disease⁶⁴.

ERANDA (*Ricinus communis*)-

Eranda root 80 gm should be boiled in water and made the decoction. This *decoction with Yava ksara* alleviates pain in chest, heart and stomach⁶⁵.

VACA (*Acorus calomus*)-

Patient of *kaphaja hridroga* should be vomited with *decoction of vaca* and *nimb*⁶⁶.

AMALAKI (*Emblica officinalis*)-

Cyavanprasa, *Agastyaleha* and *Brahma rasayana* is made of *Amalaki* is useful in diseases of heart⁶⁷.

KULATTHA (*Dolichos biflorus*)

Diet of Barley with soup of *kulattha* and also other pungent drinks are wholesome in heart diseases⁶⁸.

DASHMOOLA –

Decoction of Dashmoola added with rocksalt and *yavaksara* destroys heart disease. It is also effective in asthma, cough and colic^{69,70}.

BIBHITAKA (*Terminalia bellirica*)-

Bibhitaka and *Asvagandha* pounded together and mixed with jiggery is taken with hot water. It alleviates *vata* located in heart⁷¹.

CONCLUSION

Ayurveda harmonizes body, mind and consciousness of an individual with the environment using five element theory (*pancha mahabhuta*) and provides a complementary approach to Cardiovascular Diseases. In the present era of modernization and civilization, rising trend

of Cardiovascular Diseases became a major health problem which affects economical status of individual and society also. Disability caused by cardiovascular diseases cannot be avoided as it affects the whole family not only the individual. The core Principle of Ayurvedic Medicine emphasized and Support the optimization of

all aspects of the patient's health, and can be applicable in both prevention and treatment of Cardiovascular Disease. By providing a complete system of care, Ayurveda can forms a solid bridge, bringing a traditional medical paradigm into the cardiovascular prescription of the future.

REFERENCES

1. K. Park, Parks Textbook of Preventive and Social Medicine, 18th edition, p.286

2. http://www.who.int/cardiovascular_disease/en/ date-6/10/ 2014.

3. Slone, D. et al (1978). *N. Eng. J. Med.* 298:1273
4. Shaper A.G. et al (1981). *Brit. Med. J.* 283:179
5. WHO (1979). *Tech. Rep. Ser.*, No.636
6. WHO (1985) Primary Prevention of CHD EURO Rep and Studies 98. Copenhagen
7. Superko, H.R. et al (1985). *Am.J.Med.*, 78:826
8. Schaefer, E.J. (1985). *N. Eng. J. Med.*, 312:13
9. Stress and Heart Health-American Heart Association. www.heart.org.
10. Role of oxidative stress in cardiovascular diseases, *J Hypertens.* www.ncbi.nlm.nih.gov. 2000 Jun; 18(6):655-73.
11. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. II, edition: seventh 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.) (C.S.ci.26/70), p.429.
12. Prof. Ajay kumar Sharma, Heart disorders & their care in Ayurveda, Sri Satguru Publications Delhi India, edition 1st 2005, chapter 1, p.2
13. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.), C.S.su.17/30, p.116.
14. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.), C.S.su.17/31, p.116
15. Astanghrdaya of Vagbhata, "Vidyotini" hindi commentary by Kaviraja Atrideva Gupta, edited by Vaidya Yadunandana Upadhyaya, edition : reprint, 2011, chaukhambha Prakashan, Varanasi-221001, A.H.ci.6/35, p.448.
16. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. II, edition: seventh 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.) C.S.ci.26/74-82, p.430-431.
17. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.), C.S.su.17/32, p.117
18. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.), C.S.su.17/33, p.117

19. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. II, edition: seventh 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.) C.S.ci26/83,p.431.
20. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. II, edition: seventh 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.) C.S.ci26/84-88,p.431-432.
21. Astanghrdaya of Vagbhata, "Vidyotini" hindi commentary by Kaviraja Atrideva gupta, edited by Vaidya Yadunandana Upadhyaya, edition : reprint, 2011, chaukhambha Prakashan, Varanasi-221001,A.H.ci.6/46-48,p.449.
22. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.), C.S.su.17/34,p.117
23. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.),C.S.su.17/35,p.117
24. Astanghrdaya of Vagbhata, "Vidyotini" hindi commentary by Kaviraja Atrideva gupta, edited by Vaidya Yadunandana Upadhyaya, edition : reprint, 2011, chaukhambha Prakashan, Varanasi-221001,A.H.ci.6/43,p.449
25. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. II, edition: seventh 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.) C.S.ci26/89-92,p.432
26. Astanghrdaya of Vagbhata, "Vidyotini" hindi commentary by Kaviraja Atrideva gupta, edited by Vaidya Yadunandana Upadhyaya, edition : reprint, 2011, chaukhambha Prakashan, Varanasi-221001,A.H.ci6/49-54,p.450.
27. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.). C.S.su.17/36,p.117.
28. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. II, edition: seventh 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.) C.S.ci26/93,p.433
29. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.),C.S.su.17/37,p.117

30. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.),C.S.su.17/39,p.117
31. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.), C.S.su.17/40,p.117
32. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. II, edition: seventh 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.) C.S.ci26/96,p.434
33. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.),C.S.su30/3-7,p.237
34. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.),C.S.su30/9-11,p.237
35. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.),C.S.su30/13-14,p.237
36. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. I, edition: ninth 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.), C.S.su.4/43,p.29.
37. Vrndamadhava or siddha yoga,part I, edited & translated by dr. Premvati Tewari & dr. Asha kumari, First Edition : 2006, chaukhambha Visvabharati, Varanasi-221001 (india),Vrndamadhava31/8, p.464
38. Vrndamadhava or siddha yoga, part I, edited & translated by dr. Premvati Tewari & dr. Asha kumari, First Edition : 2006, chaukhambha Visvabharati, Varanasi-221001 (India),Vrnda madhava 31/9, p.464
39. Gadanigrah of sri vaidya sodhala, the “Vidyotini” hindi commentary by sri Indradeva Tripathi, edited by sri Ganga sahaya Pandeya, part-II(kayachikitsa khanda), second edition : 1991, chaukhamba visvabharati publication, Varanasi-221001, Gadanigrah 2,26/21,p.621
40. Bharani A. Ganguli A, Mathur LK, Jamra Y, Raman PG. Efficacy of Terminalia arjuna in chronic stable angina : a double blind placebo-controlled, crossover study comparing Terminalia arjuna with isosorbide mononitrate. Indian heart J, 2002 Mar-

- Apr;54(2):170-5. [PMID: 12086380, PubMed-indexed for MEDICINE].
41. Effect of withania somnifera(Ashwagandha) and terminalia arjuna, www.ncbi.nlm.nih.gov>PMC2996571
42. International journal of pharmacy. Research article, www.ijpps journal.com
43. The Ayurvedic pharmacopeia of india (API) part-1, vol:II, page 17
44. Bharani anil et al 2002. , Indian heart general 2002
45. Susruta Samhita, Ayurveda-taytva-sandipika-Hindi commentary, Kaviraja AmbikaDutta Shastri, part II (Uttaratantra), edition : reprint, 2009 Chaukhambha sanskrit sansthan, Varanasi 221001(India), S.S.U..43/18, P.362
46. Anila L, Vijayalakshmi NR. Beneficial effects of flavonoids from Sesamum indicum, Emblica officinalis and Momordica charantia. Phytother Res. 2000;14:592-5. [PMID: 11113993, PubMed-indexed for MEDICINE].
47. Cinnamon: potential role in the prevention of insulin www.ncbi.nlm.nih.gov>PMC2901047:2010
48. Khan A, Safdar M, Ali Khan M, et al. cinnamon improves glucose and lipids of people with type II diabetes. Diabetes care. 2003; 26:3215-8 [PMID: 14633804, PubMed-indexed for MEDICINE].
49. Wang X et al. The hypolipidemic natural product commiphora mukul and its component guggulsterone inhibit oxidative modification of LDL. Atherosclerosis. 2004 feb;172(2):239-46. [PMID: 15019533, PubMed-indexed for MEDICINE].
50. Guggul for Hyperlipidemia: a review by the natural standard...www.ncbi.nih.gov>pubmed 2005
51. Review article: www.ijrap.net>php>uploads>736_pdf
52. Baskaran c, sivamani p, bai vr. Evaluation of phytochemical and antimicrobial activities of boerhavia diffusa. J pharm res. 2011; 4(2):434-436
53. Astanghrdaya of Vagbhata, "Vidyotini" hindi commentary by Kaviraja Atrideva gupta, edited by Vaidya Yadunandana Upadhyaya, edition : reprint, 2011, chaukhambha Prakashan, Varanasi-221001,A.H.U.39/154, p.825
54. Asian pac j trop biomed. 2012 september;2(9):673-678
55. The British Journal of Nutrition 110(7):1201-10
56. Phytother Res. 2004 Dec;18(2):976-81 for effect of an indigenous herbal compound preparation trikatu on the lipid profiles of

atherogenic diet and standard diet fed *Rattus norvegicus* by sivakumar V, Sivakumar S. at Department of Zoology, Annamalai university, Annamalai nagar, 608002 Tamil Nadu, India.

57. Effect of greater cardamom (*Amomum subulatum* Roxb.) on blood lipids, fibrinolysis and total antioxidant status in patients with Ischaemic heart disease. Surendra kuimar verma¹, Vartika jain², Dharm pal singh. Department of medicine, RNT medical college, Udaipur-313001, Rajasthan, India

58. Department of botany, mohanlal sukhadia university, Udaipur-313001, Rajasthan, India.

59. The Ayurvedic pharmacopeia of india (API) part I vol. III

60. Vrndamadhava or siddha yoga, part I, edited & translated by dr. Premvati Tewari & dr. Asha kumari, First Edition : 2006, chaukhambha Visvabharati, Varanasi-221001 (India), Vrndamadhav 31/21-26, p.467

61. Caraka Samhita, text with English translation, editor-Translator Prof. Priyavrat Sharma, Vol. II, edition: seventh 2005, chaukhambha orientalia publication, Varanasi-221001(U.P.) C.S.ci.26/84,p.431

62. Astanghrdayam of Vagbhata, "Vidyotini" Hindi commentary by Kaviraja Atrideva gupta, edited by Vaidya Yadunandana Upadhyaya, Edition: reprint, 2011, chaukhambha Prakashan, Varanasi-221001,A.H.CI.6/45, p. 449

63. Bangasen Samhita, Hindi commentary, Kavivar shree shaligram vaishya, Sanshodhan Karta shee vaidya shree Shankar Lal ji Jain, khemraj shree krisnadas publication, Mumbai-400004, edition December 2003, Bangasen samhita hridroga 28, p.457

64. Vrndamadhava or siddha yoga, part I, edited & translated by dr. Premvati Tewari & dr. Asha kumari, First Edition : 2006, chaukhambha Visvabharati, Varanasi-221001 (India), Vrndamadhav 31/4, p.463

65. Sarngadhara Samhita of Acharya Sharngadhar, "jiwanprada" hindi commentary by dr. smt. Shailaja srivastava, chaukhambha orientalia publication, Varanasi-221001(U.P.), Sarngadhara Samhita, purva khanda 2/101,p. 151

66. Bangasen Samhita, Hindi commentary, Kavivar shree shaligram vaishya, Sanshodhan Karta shee vaidya shree Shankar Lal ji Jain, khemraj shree krisnadas publication, Mumbai-400004, edition

December 2003, Bangasen samhita hridroga
26, p. 457

67. Caraka Samhita, text with English
translation, editor-Translator Prof. Priyavrat
Sharma, Vol. II, edition: seventh 2005,
chaukhambha orientalia publication,
Varanasi-221001(U.P.) C.S.ci.26/92, p.432

68. Caraka Samhita, text with English
translation, editor-Translator Prof. Priyavrat
Sharma, Vol. II, edition: seventh 2005,
chaukhambha orientalia publication,
Varanasi-221001(U.P.) C.S.ci.26/89,p. 432

69.Vrindamadhava or siddha yoga, part I,
edited & translated by dr. Premvati Tewari
& dr. Asha kumari, First Edition : 2006,

chaukhambha Visvabharati, Varanasi-
221001 (india), Vrindamadhava,31/18,p. 466

70. Sarngadhara Samhita of Acharya
Sharngadhar, "jiwanprada" Hindi
commentary by dr. smt. Shailaja srivastava,
chaukhambha orientalia publication,
Varanasi-221001(U.P.), Sarngadhara
Samhita, purva khanda 2/102, p.151

71. Bangasen Samhita, Hindi commentary,
Kavivar shree shaligram vaishya,
Sanshodhan Karta shee vaidya shree
Shankar Lal ji Jain, khemraj shree krishnadas
publication, Mumbai-400004, edition
December 2003, Vatavyadhi 60, p.327