

**RASVAHA SROTAS WSR TO CARDIOVASCULAR DISEASES****Dr. Brij Kishor*¹, Dr. Akhilesh K. Shrivastva², Prof. Dalip Sharma³**P.G. Scholar¹, Sr. Lecturer², Prof. & H.O.D.³

P.G. Deptt. of Rog Nidana, R.G.G.P.G. Ayurvedic. College, Paprola Distt- Kangra (H.P.).

Article Received on
20 November 2018,Revised on 10 Dec. 2018,
Accepted on 31 Dec. 2018,

DOI: 10.20959/wjpps20191-13029

Corresponding Author*Dr. Brij Kishor**P.G. Scholar, P.G. Deptt. of
Rog Nidana, R.G.G.P.G.Ayurvedic. College, Paprola
Distt- Kangra (H.P.).**ABSTRACT**

Various glandular secretion and transportation takes place through the *srotas*. So generally we may compare various *srotas* with Ducts, Tubular structures, minute channels etc. In some places *srotas* is taken as Blood vessels and capillaries. *Srotamsi* stands for the inner delivery system of the body incorporation to that of circulatory system. It indicates all level of exchanging and transportation of *Posahya Rasa* from *Ahara Rasa* at micro to macro level of cells and tissue. Various glandular secretion and transportation takes place through the *srotas*. So generally we may compare various *srotas* with Ducts, Tubular structures, minute channels etc. In some places *srotas* is taken as Blood vessels and capillaries. *Srotas* carry all like *Posahya Rasa* to *Poshaka Rasa*, specific materials, hormones, enzymes, thought process, stimulus. It is such a minute supply that is not seen but visible by their action or by functioning that occurs. As in texts *Dhamni* and *Sira* are more resembled with *Srotas* by functioning level as of transportation but these three are different from each other. In this article I try to opt on *Rasavaha Srtoas* in detail view and resemblance with cardiovascular system.

KEYWORDS: *Srotas*, *Rasavaha Srotas*, *Samvahana*, *Hradya*, Cardio vascular system, Circulation etc.

INTRODUCTION

Ahara Rasa is the extract juice of *Vijatiya Aana* (foreign diet). *Rasa Dhatu* is the first *Dhatu* which gets formed from the *Ahara Rasa* i.e. nutrient portion of food after proper digestion of food by the *Kosthagni* (digestive fire in *Kostha*). It circulates throughout the body carrying *Posakamsas* (nourishment part) to the remaining *Dhatus*. The organs and channels through

which this *Rasa Samvahana* (circulation) takes place are collectively termed as *Rasavaha Srotas* and include the following

Hridaya (heart), *Sira –Jala* (net work of veins), *Dhamani Jala* (net works of arteries), *Rasayni Jala* including the *Lasika Granthis* (net work of lymphatics).

Acharya Charaka mentions *Hridaya* and the ten *Mula Dhamanis* (great vessels) as the *Mula* (chief organs) of this *Srotas*.^[1] In text these mentioned as under *Marma* i.e. vital supplier or organ for body.

Contextual Part

Related with *Rachana Sharira*

Hridaya

It is an organ made up of *Mamsadhatu*, having the shape of a lotus bud held upside down, located in between the two *Puppusas*/lungs inside the chest just beneath the *Urasthi*/sternum slightly to the left of the middle line, its lower tips/ apex about 1” below the left nipple. The entire organ is covered with two layers of *Snayujakalas*-the *Hridayavarana Kala*/pericardium. In between the two layers, there is a small amount of thin fluid to help its free movement.

With its bag, the heart measures 6” in length, 4” in breadth, 3” in thickness and weighs about 200-300 gms, in an adult. *Hridaya* is a hollow organ having 4 compartment viz, the two *Hrtkarnas*/ right and left auricles and two *Hrtkukis*/ right and left ventricles- *Hrtkarnas* being the upper cavities and *Harkuksis* the lower one each on either side. The two halves /right and left of the *Hridaya* are separated by a thick band of *Mamsa* while, in between *Hrtkarnas* and *Hrtkukis*, there are *Kapatas* / Valves with two *Patras*/ cusps on the left side and with the three on the right. These *Kapatas*/ valves allow anything from above downwards only, but not in the reverse direction.

Hridaya is connected with the main trunks of *Dhamanis* and *Siras / Mula*. The *Uttara* and *Adhara Mula Siras / Mula*. The *Uttara* and *Adhara Mula Siras / SVC* and *IVC* join the right *Hrtkarna* / right auricle and empty their connects- *Rasa-Rakta* brought from all over the body. The two *Mahasiras* from the *Puppusas*/ pulmonary veins bringing blood from the lungs into the heart join the left *Hrtkarna* / left auricle and empty their contents into it. From the right *Hrtkuksi* / right ventricle arises the main *Puppusabhi Sira /* pulmonary artery which,

dividing itself into two, carries *Rasa-Rakta* to the two *Puppusas*. From the *Vama Hrtkuksi* / left ventricle arises the main trunk of *Mahadhamani* /Aorta, which arises upwards, takes a curve above the *Hrdaya* and descends down into the abdomen. At the root of this *Muladhamani*, two branches arise from it at the level of its bend on either side of its neck, which supply *Rasa-Rakta* to the *Hrdaya* itself known as *Hrtposini Dhamani* / coronary arteries. All along their length, the *Dhamanis* go on giving out small branches, the terminal branches / arterioles being as small as cannot be seen by the naked eye. These terminal branches of *Dhamanis* / arterioles fuse with similar terminal branches of the *Siras* / venules at the level of the *Dhatus*/ tissue. These terminal *Siras*, in their turn, join bigger *Sira* / veins. Thus two *Jalas* / net work, one each of *Dhamanis* and *Sira* are spread out all over the body.

In addition to these two, there is still one more the *Rasyani Jala*/ lymphatic network innumerable minute tubes of varying lengths, white in color, spread out all over the body, they are connected with small *Granthis*/ lymph Glands in between and finally join the main trunk of veins inside the chest, at the level of the neck and empty their contents into them. These, *Granthis*, called *Lasika Granthis*/ lymph gland are smooth, soft and are of the size of grapes. Even though present all over the body they are found in bunches in the *Griva*/ neck, *Karnamula*/ back of the ears, *Kaksa*/ axilla, *Uras*/inside the chest, *Udara*/ inside the abdomen, *Vankshana*/groin, etc. The *Rasyani Jala* is again of two kinds- lacteals/ *Payaswini Jala* comprising of *Rasayanis* arising from the walls of the *Antras*/ intestines which fuse into two medium sized channels, the right and left *Rasakula*/ lymphatic ducts, the left one being bigger, Called as *Mukhya* or *Pradhana Rasakula*/ thoracic duct. *Payaswinis* are so called, because they collect from the intestines the *Payasa Rasa* /chyle which is a portion of *Ahara Rasa*, they purvey half of this fluid to the *Yakrit* / liver, to be converted into *Rakta* blood formation, the other half is poured directly into the *Sira*. And other on is *Laskia Jala* / lymphatic vessels is the net work of channels situated beneath the *Twaka*/ skin, connected in between with *Granthis* called /more appropriately as *Laskia Granthis*. This net work also joins the main veins inside the chest and pours contents into it. The *Dhamani jala* appears red in color the *Sira Jala* blue and *Rasayani Jala* /lymphatic is white. That is the major difference in this three s.^[2]

Related with Kriya Sharira

Ahara Rasa or the nutrient portion of properly digested food,^[3] after being absorbed from the intestines by the *Payaswini*/lacteals gets divided into two portions, one portion reaching

Hrdaya by way of the vein at the root of the neck; the other portion being conveyed to the *Yakrit*/liver where it is acted upon by *Ranjaka Pitta*, gets converted into *Rakta* and reaches the *Hrdaya* later on to join the *Rasa*.^[4] So *Rasa* and *Rakta* Dhatus are always found to be circulating together, the *Rasa* portion being watery carries with it the *Rakta* which is slightly thicker. In modern parlance, the fluid portion of blood called the plasma is comparable to *Rasa Dhatu* & the formed element portion to *Rakta Dhatu*. So, this *Rasa cum Rakta* has the *Posakamsa*/ nutritive elements required for all the *Dhatus* of the body & supply them during its circulation / *Rasa Samvahana*. *Hrdaya* plays the most important role in circulation-the *Sankocha* /contraction & *Vikasa* / expansion of the four compartments of it providing the propelling force. The nature of heart's action or *Hrtarya Chakra*/ cardiac cycle can be described as like- *Rasa –Rakta* from all over the body is poured into the *Dakshina Hrtkarna* / right auricle by the two *Mula Siras* /SVC & IVC while at the same time the *Vama Hrtkarna* /left auricle also gets filled with *Rasa – Rakta* coming from the two *Puppusas*. When both *Hrtkarnas* are thus filled with *Rasa cum Rakta*, they undergo *Sankocha* /contraction forcing the fluid into the two lower *Hrtkukis* /ventricles through the *Kapatat*/valves present in between. When the *Hrtkukis* get filled up, they also undergo *Sankocha*, forcing out the fluid present in them; the *Dakshina Hrtkuksi* /right ventricle into the *Dhamani*/pulmonary artery which takes the *Rasa cum Rakta* to both the *Puppusas* while the *Vama Hrtkukis* /left ventricle forces its contents into the *Arohima Dhamani* Ascending Aorta, to be circulated all over the body.

Sankocha / contraction = systole of the chambers of the heart is followed by their *Viaksa* / expansion = diastole; in between them there is a very short period of rest to the heart. The wave set up by the powerful contraction of the *Hrtkuksi* is conveyed even to the minute branches of the *Dhamanis*/ arteries and can be felt by placing the fingers over them. This is called *Dhamana* or *Spandana* /pulsation & its examination is called *Nadipariksha* / examination of the pulse and will be described in detail under *Astasthan Pariksha* in Charaka.

Hrdaya Kriya starts by about the middle of the fourth month of foetal life and continues without break till death. So long as there is heart's action there is life, and life becomes extinct when the heart stops. Hence *Hrdaya* is described as the chief *Pranayatana*/ seat of life & any deformity in its function is sure to give rise to alarming distress. It is also described as *Marma* / vital spot belonging to the group of *Sira Marma* /vital spot belonging to the group of

Sira Marmas. The *Hrta Vega* / heart rate varies greatly according to the age, being more in childhood, less in old age and average 72 /minute during adult life. With the contraction /systole of the left ventricle about 60-70 cc of blood is forced in the Aorta. The resulting pressure travels as a wave throughout the arterial system & is called the Blood Pressure. The function of *Sankocha* and *Vikasa* of the heart is attributed to *Pranavata* whereas the function of *Rasa Samvahana*/ circulation of *RasaRakta* all over the body are considered as due to *Vyanavata*.^[5,6]

The *Rasa cum Rakta* after being forced into the *Dhamanis* circulates through all the *Dhatus*. At the level of its terminal branches much of the watery portion oozes out & the *Sukshma Srotas* of *Dhatus* take them up as nutrition for the *Dhatus*. The *Dhatuvaha Srotas* transforms this *Rasa*, by the action of their specific *Dhatwagnis* and make the nutrient material suitable for them. During this process of transformation / *Dhatwagni Paka* metabolism certain waste products /*Malas* are also produced. The terminal branches of the *Siras* /venules & the *Rasayanis*/ lymphatics absorb or collect the fluid thus oozed out from the terminal *Dhamanis*, which is now devoid of *Sara* / Nutrient materials but mixed with *Dhatu Malas*, tissue wastes and carry them to the *Hridaya*. *Hridaya* is also the seat of *Para Ojas* which, in spite of its small quantity / only about 8 drops, exercises great influence upon the action of the heart; its decrease in quantity bringing about signs of s /heart failure, while its increase is considered to promote good health and happiness.^[7]

Sroto Dusti Karana

<i>Ahara</i>	<i>Vihar</i>	<i>Mansik</i>
Food which are - <i>Snigdha, Atisita, Swadu, Amla, katu, Madura, Guru, Adhyasana, Visamasana, Anasana</i> / Malnutrition.	<i>Atimadyapana, Tamabaku</i> Sevana, frequent hot drinks like coffee & tea, <i>Avyayama</i> , sweet & fatty foods, over eating, lack of exercise, use of tobacco and alcohol, mental emotions have been the most important causes in the present day. Heart diseases are seen more in civilized societies and advanced countries. use of white sugar, meat, marrow, animal fats, ice-cream etc. have proved to be causes of heart attacks.	<i>Udwegas</i> /mental emotions like <i>Krodha/anger, Irsya/ jealousy, Bhaya /fear, chinta/ worry, disappointment, frustration, social ill-adjustment</i> etc. Visista Vyadhis Of Other Organs <i>Puppusa Roga, Vrka Rogas, Amavata, high BP, Surgical operations and oushadha. Sahaja Vikritis</i>

Dosha Vriddhi Lakshanas

Vata	Pitta	Kapha
<i>Hridaya- Hrddrava</i> –increased rate	<i>Hrddrava</i>	<i>Hrddrava</i>
<i>Hrd Stambha</i>	<i>Hrd Sopha</i>	<i>Hrd Ayama</i>
<i>Hrt sula</i>	<i>Hrd Avadarpana</i>	<i>Hrd Gourvta</i>
<i>Hrt Sunyata</i>		<i>Hridayotklela</i>
		<i>Hrd Stambha/ congestive failure</i>
<i>Kapata Vikrtis/valvular dislocations</i>		
<i>Sahasa Marana/quick death</i>		
<i>Dhamanis and Siras</i>		
<i>Kathinya/hardness inside</i>	<i>Ati Mardava/ increased softness</i>	<i>Marga Sankocha</i>
<i>Twaka & other Dhatus, Ruksata</i>	<i>RaktaSrava</i>	<i>Ati Snigdha</i>
<i>Karsya</i>	<i>Daha</i>	<i>Sotha</i>
<i>Duschaya</i>	<i>Trsa</i>	<i>Saitya</i>
<i>Manasika Lakshans</i>	<i>Usma Vrddhi</i>	<i>Gurutwa</i>
<i>Marana Bhaya</i>	<i>Pralapa</i>	<i>Praseka</i>
<i>Sabda Ashahisnuta, Moha, Murcha, Nasa/ unconsciousness.</i>	<i>Moha, Murcha/ convulsions.</i>	<i>Kasa, Swasa, Tama, Ati-nidra, Alasya, Tripti</i>

Vridhi/Kshaya Lakshana of Rasa Dhatu

Rasavrddhi	Rasakshya	Ojaskshaya
<i>Hridaya Hrd Ayama/ dilatation</i>	<i>Hrd Sankocha/atrophy</i>	<i>Kriya Nirodha</i>
<i>Hrd Gaurava</i>	<i>Hrd Sunyata</i>	<i>Hrd Stambha</i>
<i>Hrd Drava</i>	<i>Hrd Tama, Hrd Kampa, Hrd Drava, Hrt Sula</i>	<i>Vegakshya</i>
Twak & Dhatus		
<i>SwetaVarna</i>	<i>Ruksata</i>	<i>Duchchaya, Gatra Sada</i>
<i>Saitya</i>		<i>Gurugatrata</i>
<i>Sotha</i>		<i>Mamsaksaya</i>
<i>Gurugatrata</i>		
<i>Siras and Dhamanis</i>	<i>Riktata, Saithilya</i>	
<i>Kathinya, Ayama, Granthi, Vidirna</i>		
<i>Manasika Lakshana</i>		
<i>Alasya,Atinidra</i>	<i>Tama, Nidranasha, Sabda Asahisnuta</i>	<i>Bhaya, Adhyana, Tandra, Nidranasha, Murcha, Moha, Pralapa, Samjna Nasa</i>
<i>Anya Lakshana</i>		
<i>Praseka</i>	<i>Trsna</i>	<i>Ati Dourbalya,</i>
<i>Kasa, Swasa</i>		<i>Maran.</i>

Rasavaha Srotas Pariksha

The organ to be examined are- the *Hridaya*, *Dhamanis* and *Granthis* and *Lasika*, *Lasika Siras Vahinis*. Of these examination of the *Hridaya* is the most important.

Hrdaya Pariksha is to be carried out in respect of its-*Sthana and Akrti, Vega and Spanada, Sabda.*

Examination of *Lasika Granthis* and *Lasika Vahinis*

Production of *Ahara Rasa* which is normal both in its quantity & quality depends upon the normalcy of *Kostagni*. If the *Kostagni* is abnormal, the *Ahara Rasa* & *Rasa Dhatu* will both be produced in a bad state as follows: the *Kostagni* if *Tikshna* /hyper active the food undergoes *Dagdha Paka*/charring, all the nutritive materials are overburnt leading to production of *Ahara –Rasa* which is poor both in quantity & quality. The *Rasa Dhatu* that gets formed from such an *Ahara Rasa* will also be naturally poor. This condition is called *Rasa Kshaya*. If, on the other hand. The *Kostagni* is *Manda* /inactive the food does not get the required digestion leading to accumulation of *Ama* or undigested food/materials; these undigested materials tend to accumulate in the *Ahara Rasa* produced at the end of digestion. The *Rasa-Agni* will be unable to transform these unprocessed *Amadravyas*, thereby leading to the production of *Rasa Dhatu* which contains large amount of *Ama/ Sama Rasa*, making it to increase in its quantity / *Rasa-vridhi* only, but remaining poor in quality. This *Sama-Rasa* begins to circulate all over the body through *Dhamani, Sira and Rasayini Jalas*/ arterial, venous and lymphatic networks, as well as the *Dhatuvaha Srotas*/ tissue poses.^[8]

Other Vikriti of *Rasa Vaha Srotas*

As mentioned *Vridhhi & Kshaya* other disorders of plasma circulation are

-Increase in its water content- *Jaladhikya Rasa* – hydraemia, hydropsy.

-Decrease in its water content- *Jala Ksayya*- anhydraemia, dehydration.

Increase in its alkaline/salts- *Lavanadhikya Rasa* /alkalemia, alkalosis.

Increase in its acids- *Amladhikya Rasa*/ academia, acidosis.

Increase in its calcium contest- *Sudhaadhikya Rasa* /hyper-calcemia

Decrease in its calcium content- *Sudhalpa Rasa*/hypocalcemia.

Increase in its sugar content- *Madhuradhikya Rasa*/ hyper-glycemia

Decrease in its sugar content-*Madhuralpa Rasa*/ Hypoglycemia

Decrease in its protein content- *Madhuralpa Rasa* / Hypoprotinaemia

Increase in its fats content- *Medasadhikya Rasa* lipaemia.

Accumulation of cholesterol- *Snehadhika Rasa*/Hyper-cholesteromia

Accumulation of bile pigment- *Pittayukta Rasa Dhatu*/bilirubinaemia

Accumulation of Haemoglobin-*Raktamisrita Rasa*/ureamia

Accumulation of urea, uric acid etc- *Mutramisrita Rasa/ ureameia*

Accumulation of Melanin and other pigments- *Varnadravyayuktarasa/ Melanaemia*

Accumulation of living organisms-*Krimiyukta Rasa / bacteriacmia, septicemia*

Accumulation of pus - *PuyayuktaRasa/Pyemea*

Accumulation of bacterial toxicants –endogenous or exogenous *Ama- Visayuktha Rasa/ Toxemia.*

Each one of the above produces many signs and symptoms and is seen in many diseases. Recognition of these is possible by observing the symptoms or by laboratory tests or both.^[9]

DISCUSSION

The *Rasavaha Srotas* is the main *Srotas* or called as First *Srotas* that supply major to minor Nutrients to all parts of the body circulation. *Rasavaha Srotas* mainly give *Poshana* to *Rasa Dhatu* as well as *Rakta Dhatu* under this *Srotas Hrdiya* and *Yakrit* are come because *Ahara-Rasa Poshanta* first goes to *Yakrit* and then to *Hrdiya* and then it will circulate all to body parts with lungs, it is proved in this above article. *Ojus* or final product of *Dhatu*s are indirectly ponders on *Rasavaha Srotas* or *Ahara Rasa* that it circulates its quantity decrease or *Ksaya* due to many causes.

The more important ones being

- 1- *Abhighata/injury* to *Hrdaya*,
 - 2- *Dhatu Ksaya* due to any cause,
 - 3- *Atishrama*-Physical exertion,
 - 4- *Ksudha*- starvation over long periods,
 - 5- *Visa Sevana* – ingestion of toxic substances like coffee, tea, opium, arsenic, alcoholic drinks and other poisonous drugs, animals poisons etc.
 - 6- *Manasika Vikrtis* like *Ati Krodha/anger*, *Soka/grief*, *Dhyana/ worry*, etc.
 - 7- *Bhutabhisanga* bacterial infection and infestation by demons and evil spirits etc.^[10]
- Ojaksaya* are linked with its abnormal supply that leads to *Oja Visramsas, Vyapti, Ksaya*.

CONCLUSION

Rasa Dhatu is one of the important *Dhatu* and that of *Rasavaha Srotas* is important circulation. This concept in Ayurveda exactly resembled with modern functions of heart and somewhat of liver. Ayurveda describes scientifically the concept of *Rasadhatu* in precursor

of *Rakt dhātu*. Blood circulation depends upon fluid level in the blood. Fluid level, osmotic pressure is influenced by blood plasma protein level. The *Mulasthana* of *Rasavaha Srotas* is 10 *Dhamani* and *Hridaya* and that of modern to main artery and heart.

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