



AN IMPERATIVE APPRAISAL ON ANATOMICAL CONSIDERATION OF SROTAS IN PRESENT ERA AND ITS SIGNIFICANCE IN CLINICAL PRACTICE

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ABSTRACT

Ayurveda is the science of life which not only deals with the structural and functional study of human body but also deals with its assorted pathological conditions and their appropriate management. According to Ayurvedic literature entire body is made up of Srotas (micro and macro channels) which transports all types of materials in the body. For normal functioning of the body it is essential that these channels, both micro and macro remains intact. We found detail description of Srotas is present in samhita. Srotas are related with each-other, when one Srotas is vitiated other Srotas are also get affected. Srotas is the systems that carry or circulate the Doshas and tissues (Dhatu) or their elements to the various organs. During this process of circulation the Dhatu are transformed from the first to the last tissue layer (rasa through Shukra). Each Dhatu has two aspects: nutrition for its own tissue layer, and sustenance for the next developing Dhatu.

Srotas (micro channels) are not only responsible for the dispensing of the food to different tissues and cellular systems of the body but also involved in removal of the waste products. The core of Ayurvedic medicine is the Srotas, an interconnected web of bodily functions said to conduct a healing, sacred energy from head to toe. The Srotas which means channels or path are often through to be different part of the body's transportation system. The utility of the knowledge of the Srotas (channels) is not directly described in Samhita. So there is a need to elaborate the concept of the Srotas in scientific way to realize its importance in clinical practice.

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INTRODUCTION

Ayurveda is the most ancient of all medical sciences. It is the only medical science which has withstood the ravages of time and still blooming steadily and gloriously even though the modern medical sciences of the west. According to Ayurveda entire body is made up of Srotas (micro and macro channels) which transports all types of materials in the body. For normal functioning of the body it is essential that these channels, both micro and macro remains intact. The term Srotas is derived from the root 'Sru' (Gatyarthak) Dhatu and 'Asrun' suffix to make the term. According to Charaka the channels of circulation, carrying the Dhatu (tissue elements or their constituents), undergoing transformation, to their destination are called as Srotas. Srotas are pathway of Rasadi Dhatus. To elaborate the concept, Charaka has used the term 'Parinamapadyamananam' (meaning undergoing alteration), which is suggestive to the fact, that the channels carry such of the tissue elements as are undergoing alteration from their previous state, like Rasa to its following state Rakta, Rakta to Mamsa and Mamsa to Meda etc. Chakrapanidatta in his commentary explain the Srawan Karm. It is that by which Poshak Rasa is taken to the Poshya Dhatu.

He has observed that Srawana Karma conveyance rasa and Poshya Dhatu (nutrient precursors of tissue) in the body. He observes that 'Srotas' do not transport Sthira Dhatus, but only to the Dhatus which are undergoing metabolic transformations. The Dhatus which are formed consecutively from the Poshaka Dhatus are permanent Dhatus. The nutrient materials of a particular Dhatu does not nourish it through a Srotas other than its own, because of the location of Poshya Dhatu in different parts of the body. Thus, nutrients meant Asthi Dhatu, while being transported by Rasa through Meda (indirectly by Mamsa Dhatu as being precursor of Meda), may be; allowed to run through the Ayanamukhas of Medovaha Srotas. There may also be an affinity between Asthi Dhatu and Mamsa Dhatu for nourishment. Chakrapanidatta, in his commentary has presented two aspects of Srotas

- Structures through which the Srawana (to ooze, to exude, to filter and to permeate through) of fluids takes place.
- Channels through which body fluids are transported from one place to another place.

This view is supported by the root meaning of Ayana i.e. En-Gatau means as to move or to go, and i.e. 'Mukha', 'Mukha-Moksane' to leave or to let free. Acharya Charaka's definition

of *Srotas* as '*Srawanat Srotansi*' is also similar to the above. In this way in *Charaka Samhita* the word '*Srotas*' has an extensive meaning. In the course of clarifying this fact, he has stated that the specific varieties of channels of circulation in the human body are the same in number as the structural entities in it. *Acharya Sushruta* has clear the *Srotas* as the hollow channel except *Sira* and *Dhamani* which originating from root space spreads in the body and circulate and exude of the specific entities. *Dalhan* commentator of *Sushruta Samhita*, accepted in his commentary that all the structures through which *Prana*, *Anna*, *Jala*, *Rasa* etc *Dhatus* and *Malas* circulate are called as *Srotas*. *Acharya Vagbhatta* maintain the *Srotas* as to the extremely fine passages and pores present in the lotus stem. He observed that *Dhatus* separate throughout the body through very fine *Dwar* of *Srotas* which are scattered extensively in the body.

According to *Charak* the specific varieties of the channels of circulation in the human body are the same in number as the structural entities of it. Therefore the *Srotas* are innumerable, but the thirteen main *Srotas* (*Pranavaha*, *Udakavaha*, *Annavaha*, *sapta dhatu*, *trimala*) describing their site of origin and causes of vitiation. Instead of these *Srotas*, *Charaka* described *Artavavaha Srotas* in the context of *Garbha Prakaran*. *Acharya sushruta* has furnished eleven pairs of *Srotas* especially in the context of injury and has mentioned symptoms of piercing at its root.

Sushruta has omitted the *Asthi*, *Majja* and *Swedavaha Srotas* in his counting. Clarifying the different modes of approach made to *Srotas*, by *Shalya Tantra* and *Kayachikitsa*. *Dalhan* has observed the special kind of pain (*Vedana Vishesh*) exhibited in case of *Srotodushhti* (pathological involvement of *Srotas*). *Srotas* is being spread throughout the body are important from the *Kayachikitsa* point of view, on other hand. Special kinds of pain which may manifest on account of either the piercing of or injury to *Srotas* present in certain special parts of the body. They are important to gain knowledge of the prognosis of such conditions. On the contrary *Kayachikitsa* recognizes *Srotas* which are spread throughout the body and which include extremely fine one. Any pathological involvement of them may manifest subtle kinds of pain which may not be recognized or to be help in assessment of prognosis in such involvement.

Anatomical consideration of Srotas

According to *Acharya Sushruta* "The channels, which are widely spread in all the spaces (Intra, Inter and Extra- cellular spaces) of the body, where circulation (Transportation) of the fluid occurs irresistibly and continuously are known as *Srotas*. These are different from the arteries and veins." From this definition it is clear that *Srotas* are different from veins and arteries and are widely spread all over the body.

Srotas are the systems that carry or circulate the *Doshas* and tissues (*Dhatu*) or their elements to the various organs. During this process of circulation the *Dhatu* are transformed from the first to the last tissue layer (*rasa* through *Shukra*). Each *Dhatu* has two aspects: nutrition for its own tissue layer, and sustenance for the next developing *Dhatu*. *Srotas* micro channels are not only responsible for the dispensing of the food to different tissues and cellular systems of the body but also involved in removal of the waste products. According to *Acharya Charaka*, *Srotas* have their color similar to that of the *Dhatu* or *Bhava Padarth* they transport; they may be

Vrintta(cylindrical), *Sthool* (Gross/Macroscopic) or *Anu* (Atomic in Size/Microscopic), *Dirgha* (Large) or *Pratana* (Reticulated) in shape. According to *Sushruta*, *Dhamni* have pores in their walls very much like the minute passages present in the stem of a Lotus, through which they supply *Rasa* to all parts of the body.

Acharya Chakrapanidatta has made a direct mention of the Specificity of *Srotansi*. He observes '*Srotansi*' do not transport *Sthira Dhatu*, but only to the *Dhatu* which are undergoing metabolic transformation. The *Dhatu* which are formed consecutively from the *Poshaka Dhatu* are permanent *Dhatu*. The nutrient materials of a particular *Dhatu* does not nourish it through a *Srotasa* other than its own, because of the location of *Poshya Dhatu* in different parts of the body. Thus nutrients meant *Asthi Dhatu*, while being transported by *Rasa* through *Meda* (indirectly by *Mamsa Dhatu* as being precursor of *Meda*), may be allowed to run through the *Ayanamukhas* of *Medovaha Srotasa*. There may also be an affinity between *Asthi Dhatu* and *Mamsa Dhatu* for nourishment. According to *Ayurvedic* views, the *Mamsa Dhatu* needs a particular type of *Parthiva* substance, since the same is required for *Asthi Dhatu*, i.e. calcium. The concerned *Srotasa* deals with the supply of the calcium as to nourish the *Asthi Dhatu*. It apparently decides as the particular type of *Parthiva* substance is allowed in which pattern and quantity through their *Ayanamukhas*, on their way to *Mamsa* or *Asthi Dhatu* as the case may be. The term *Srotasa* refers, in particular, to microscopic channels of transport, as seen from *Acharya Charaka's* observation that *Malas* (waste products) are removed from *Dhatu* (tissues) with appropriate nutrition to the extent as required' *Acharya Chakrapanidatta*, in his commentary on the above, has presented two aspects of *Srotansi*-

1. These are structures in which the *Sravana* (to ooze, to exude, to filter and to permeate through) of fluids takes place.
2. These are channels through which body fluids are transported from one place to other place.

This view is supported by the root meaning of *Ayana* i.e. *En-Gatau* means as to move or to go, and i.e. '*Mukha*', '*Mukha-Moksane*' to leave or to let free. *Acharya Charaka's* definition of *Srotasa* as '*Srawanat Srotansi*' is also similar to the above. In this way in *Charaka Samhita* the word '*Srotasa*' has an extensive meaning. In the course of clarifying this fact, he has stated that the specific varieties of channels of circulation in the human body are the same in number as the structural entities in it. The body channels constitute the means of passage. These channels feed the various body elements in the requisite measure and with the appropriate constituents

The term *Ayanamukhani* is important and significant and it furnishes an idea of the morphological and functional features of *Srotansi*. It will be seen that this term is composed of two words- *Ayana* and *Mukha*, meaning channel and openings or pores respectively. The term *Ayanani*, has observed that this term refers to the channels through which materials travel and *Mukhani* to the openings present in the former through which materials enter or make an exit. Hence the channels and openings are not different entities and the same channels serves as a common conduit for the transport of both *Prasada* (nutrients) and *Mala* (waste products). The channels of circulation carry the *Dhatu* (tissue elements or their constituents undergoing transformation) to their destination. *Acharya Sushruta* has excluded *Sira* (veins) and *Dhamani*

(arteries) from the scope of *Srotasa* and compared the *Srotasa* with the fine channels present in the lotus stem through which fluids circulate and exude. According to *Dalhana*, *Srotasa* have vacant space in *Moola* (origin) region, jointed to *Hridayadi Chhidra* (pores) having *Abhivahana* property and are hollow structure. He also accepted in his commentary that all the structures through which *Prana*, *Anna*, *Jala*, *Rasa*, *Rakta* etc. circulate are *Srotasa*.

Vagbhata has followed the view of *Sushruta* and he has compared *Srotas* as fine passages and pores present in the lotus stem. He observes *Rasa* spreads throughout the body through the *Dwara* (pores) of *Srotas*, which are distributed extensively in the body, very much like the minute channels present in the stem of a Lotus flower. *Sushruta* has further stated that the *Pratana* (Reticulate or ramified) *Srotas* are found in *Mamsdhara Kala*.

Moolasthan of Srotas

The *Moolasthan* or the source is so considered that without which the origin, maintenance and destruction of the specific carrier of the body nutrient cannot be possible and the place which controls the entire functional dealings and processes of that specific carrier. These data lend support to the observation made by *Punarvasu Atreya* that no structure in the body can grow, develop, waste or atrophy, independent of *Srotansi* that transports *Dhatu* which later on, are constantly subjected to transformation. The *Srotansi* sub serve the needs of transportation.

Synonyms Of Srotasa

Synonyms of *Srotasa* given by *Acharya Charaka* are *Srotasa* (channels), *Sira* (vein), (*Dhamani* (artery), *Rasayani* (lymphatic channels), *Rasavahini* (capillary), *Nadi* (duct), *Pantha* (passage), *Marga* (track), *Sharira Chhidra* (spaces inside the body), *Samvrtasamvrata* (open or blind passage), *Sthana* (site, locus), *Ashaya* (container), *Niketa* (resorts). *Srotasa* are also described as *Nadinam*, *Vibaddha Sira*, *Chhidram*, *Marga*, *Khani*, *Sira*, *Rasayani*, *Patha*, *Nadi*, *Randhra*, and *Mukha*.

Types Of Srotasa

According to *Acharya Charaka* many types of *Srotasa* are present in the body. The meaning of "*Murtimaan Bhava*" is the matter or a substance which has definite shape or limits existed in the body. We notice that number of *Srotasa* as per *Acharya Charaka* are been considered as 13, but in the above *Shloka* he was very clear about the number of *Srotasa*. Further *Sushruta* also mentioned about the number of *Srotasa*.

Function of Srotasa

It means that all *Bhava* in *Purusha* ever neither appear nor degenerate without *Srotasa* because *Srotasa* transfer the *Dhatu* from one place to another. *Srotasa* gives nutrition to all over body. If *Srotasa* are in *Prakritavastha* (healthy) state then our body would also be healthy. They do excrete *Mala* from body. They do *Vahana Karma* (transfer) of *Prana*, *Vega* of *Vishaya* (subject) and *Vega* of *Chesta* (activities) in all over body.

Function of *Srotasa* is *Abhivahana* means taking from one place to another place. It is necessary for entry of one substance, shifting of that substance and exit of that substance in *Abhivahana*. The process between entries to exit is called *Abhivahana*. It is a common symptom of each *Srotasa* but they have different functions too. Function of *Srotasa* is also similar

to functions of *Vayu* described in *Ayurveda* like *Spandana*, *Udvarana*, *Dharana*, *Purana* and *Viveka*. Entry of any substance is *Purana* like intake of *Prana* (oxygen), *Udaka* (water), and *Anna* (food). Transferring or shifting of substance is called *Udvahana*. *Dharana* of external substance also occur in *Srotasa* as blood in *Raktavaha Srotasa*, *Rasa* in *Rasavaha Srotasa*, *Mutra* in *Mutravaha Srotasa*, *Purisha* in *Purishavaha Srotasa*, *Anna* in *Annavaha Srotasa* and *Prana* in *Pranavaha Srotasa*. *Viveka* means separation like excretion of urine, faeces and sweat from body. Separation of two things is also *Viveka*. This process also occurs in *Sukshma Srotasa* like *Sara-Kitta Vibhajana* in *Annavaha Srotasa*, *Malasara Vibhajana* in *Unduka*, *Sweda* in *Swedavaha Srotasa* and *Mutra* in *Mutravaha Srotasa*.

Significance of Srotas in clinical practice

If *Srotas* are in healthy state the formation of *Dosha*, *Dhatu*, and *Mala* are good, but when these *Srotas* are vitiated due to any reason then *Dosha*, *Dhatu* and *Mala* also become vitiated and body becomes diseased. *Srotas* act as the transportation system of our body. The *Dhatu* transported through *Srotas* are constantly subjected to metabolism. Without *Srotas* no body part can grow and develop or degenerate. *Srotovaigunya* plays vital role for the *Sammurchhana* of *Dosha* & *Dushya* at a particular site as a result disease manifest inside the body. The role of *Khavaigunya* in the manifestation of the disease is well discussed in all the *Ayurvedic* texts. Due to *Khavaigunya*, *Dosha* & *Dushya* *Sammurchhana* takes place to form the *Samprapti* of the disease inside the body. *Dosha* and *Dushya* undergo either increase or decrease the abnormal *Dosha* and *Dushya* involve the respective *srotas* and then the abnormality in the *Srotas* is manifested in the form of *Srotodushti*. So the detail knowledge of *Srotodushti* is a must for an every *Ayurvedic* clinician to treat a patient in a holistic way.

Acharya charaka mention the concept of *Srotodushti*. If we take Food and behavior which is similar to *Guna* of *Vatadi* *Dosha* and opposite to *Guna* of *Dhatu* it causes *Srotodushti* like *Srotorodha* are day sleep except in summer, taking cold water after process of *Snehapana*, *Anuvasana*, *Vamana*, *Virechana* *Niruha Vasti* etc. There are four types of manifestation of *srotodushti* occurs viz. *Atipravritti*, *Sanga*, *Siragranthi*, and *Vimarga gamana*. These four types of *srotodushti* may occur either individually or in combined form.

Atipravritti- Increased activity of one or more *srotas*. Increase respiratory rate, heart beats, increase peristalsis movement of intestine in *atisara* etc.

Sanga-Also called *srotorodha*, opposite of the *atipravritti*. Obstruction of pores of sweat in fever, obstruction of *annavahasrotas* causes enlargement of abdomen etc.

Siragranthi- Thickening, new growth or tumors. *Vidradhi*, *Granthi*, *Arbud*, *Shlepada* etc.

Vimarga Gamana- it means leaving its own path and entering into other path e.g. entrance of *mala* into *Mutra Marga* In *Bhagandar*, *Chhardi* (movement of food in upward direction from the stomach).

But *Acharya Sushrut* who described the *Srotas* as surgicoanatomical base, he explained the Symptoms of *Srotoviddha* like *Moha*, *Kampana*, *Adhmana* (flatulence), *Chhardi* (vomiting), *Jwara* (fever), *Pralapa* (delirium), *aand Shula* (pain), obstruction of urine and stool and leading to death. So in the case of *Srotoviddha*, *Vaidhya* should remove

that particular *Shalya* or foreign body and treat like acute wound.

DISCUSSION

In *Ayurveda* detail description of *Srotas* are present. *Acharyas* have mentioned *Sthula Srotas* like-*Pranavaha*, *Udakavaha*, *Annavaha*, *Rasa-Raktadi Dhatusvaha*, *Purishavaha*, *Swedavaha*, *Mutravaha* and *Artavavaha*. These are mention as system in modern as -Respiratory System, Digestive System, Circulatory System, Reproductive System etc. *Srotas* are related with each-other, when one *Srotas* is vitiated other *Srotas* are also get affected. If *Annavaha Srotas* is vitiated it affect other *Srotas* like *Pranavaha*, *Rasavaha* and *Purishavaha Srotas*. Such the effects are also evidently proved in modern medical science that the digestive system is the site which makes availability of a lot of elements, extrinsic factors, vitamins, energy producing molecules etc, useful in the function of other systems as well as eliminate the waste and toxic materials.

To understand the concept of *Srotas* the best example is our house. There are generally (always) two types of ducts in a well planned house- one system is responsible for the carrying of fresh water inside the house and second is to remove the waste products- supply and sanitation system. Think, if any of these systems will occlude to some reasons what will happen. It will only cause disease. The same concept of *Srotas* is mention in *Ayurveda*. As *Ayurveda* is an applied science so this system's proper working indicates towards ease, towards health and when this transport system of the body is not working properly it causes disease. All the synonyms above are indicating towards transport system of the body. But the transport system, we are considering is very subtle in nature basically. This system is responsible for the nutritional exchange and transportation and is deeply associated with the tissues. Number of the ducts and transport system cannot be counted because this is incalculable.

There are so many references of *Srotasa* in *Ayurvedic* texts. After considering these references we can understand that *Srotasa* cannot be correlated to the modern equivalents as there are so many concepts that resemble to *Srotasa*, that create confusion and make it difficult to understand. Some authors think that these are arteries which supply to the particular organs of any system, which can be told as root or *Moola* of any *Srotasa* but according to *Acharya Sushruta Moola* of *Artavavaha Srotasa* are *Garbhashaya* and *Artavavahinidhamani*, so here this concept is not appropriate. If we think about the other concept of some authors according to which *Srotasa* can be represented by capillaries then it justifies the concept of *Acharya Sushruta* "*Sira Dhamani Vivarjitam*" and perfectly explains the *Artavavaha Srotasa*. One more opinion is of intracellular spaces. As the function of *Srotasa* is to supply nutrition to various parts of the body i.e. *Udavahana Karma* and not only capillaries but Intracellular spaces also carries nutrition to cells. So, It also justifies the concept of *Acharya Sushruta* "*Sira Dhamani Vivarjitam*".

Beside this all the cells have their internal circulatory system which is managed by Endoplasmic Reticulum inside the cells. This internal system of cells should also be considered in the same category of the *Srotasa*, if we are considering about the *Poshana Dharma* of the *Srotasa*. So, *Srotasa* are some channels which are capable to carry something which are involved in the transportation. This transportation can be that

much gross as movement of the food in the intestines and can be that much subtle as is-diffusion of some of the nutrients from the extra cellular fluid or even the movement of the nutrients inside a cell.

CONCLUSION

- *Srotas* is the transportation system of the body which carries the important Murtimant *Bhava Padarth* from one place to another place. It includes exchange, transport and excretes not only the materials but also massages, impulses, emotions and thought through macro and micro channels.
- *Srotasa* are channels which are capable to carry something which are involved in the transportation. This transportation can be that much gross as movement of the food in the intestines and can be that much subtle as is – diffusion of some of the nutrients from the extra cellular fluid or even the movement of the nutrients inside a cell.
- The detail knowledge of *srotas* is essential for to understand the role of *srotas* in the manifestation of disease condition.
- The knowledge of *srotas* play important role in pathophysiology of the disease and to take the accurate decision of treatment and prognosis.
- Every ayurvedic clinician must have detail knowledge of concept of *srotas* to treat the patient in holistic way.
- Any disease condition is occurs due to *Srotodushti*. Hence correct the *Srotodushti* quickly.

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