

## A CLINICO- ANATOMICAL APPROACH TO PRANVAHA SROTAS AND ITS MULAS

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### ABSTRACT

*Srotas* are scattered in various hymns of *Vedas* that are *Dwara*, *Hira*, *Khani*, *Panth*, *Srotyaya*, *Pathyaya*, *Katyaya*, *Nipyaya*.<sup>[1]</sup> etc. *Acharya Charak* has said that “*Srotomayam Hi Shariram*. Two terms for *Srotas* ‘*Sarvagatatwat*’ and ‘*Sarvsartawat*’<sup>[2]</sup> it means *Srotas* are distributed in all over the body. According to *Acharya Chakrapanidutta* has said that ‘*Mulamiti Prabhav Sthanam*’<sup>[3]</sup> *Mula* of *Srotas* is the site of origin /or site of birth / site of very beginning of *Srotas*. *avan Karma*. *Acharya Chakrapani* described ‘*Sravana Kriya*’ which is core property of *Srotas*. *acharya charak* mentioned 13 *Srotas* and *acharya Sushrut* stated 11 *yogvahi Srotas* *Pranvaha srotas* is one of them, *Mula* of *Pranvaha Srotas* are *Hridaya* and *Mahasrotas* whereas *Sushrut* has his own opinion about *Mula* of *Pranvaha Srotas* as *Hridaya* and *Rasvahidhamnis*.<sup>[4]</sup> Vitiating of *Pranvayu* results in diseases such as *Hikka*, *Shwasa* etc.<sup>[5]</sup>

**KEYWORDS:** *Srotas*, *Pranvahasrotas*, *Pranvayu*, *Hridaya*, *Rasvahidhamni*, *mahasrotas*.

### INTRODUCTION

*Ayurveda* is one of the most ancient discourses related to medicine and health science. The term *Ayurveda* is made up of two words *Ayu* and *Veda* which imply its meaning of being

*Veda* which imparts the knowledge of *Ayu. Ayurveda* is not only related to medicines but it is a way of life also.

*Sharir* is basic stream of *Ayurveda* classics which deals with structural and functional aspects of body. *Ayurveda* classics proclaim “*Dosh Dhatu Mala Mulam Hi Shariram*”.<sup>[6]</sup> These basic constituents are continuously circulating through different systems or carriers in our body. These transportation systems of body are well known as *Srotas*.<sup>[7]</sup> So, the *Srotas* is important to maintain the homeostasis of the body.

*Ayurvedic* classics signify “*Srotamayam Hi Shariram*” means comprising of path or channels.<sup>[8]</sup> *Srotasas* are innumerable in numbers, and represent as inner transport system of body. Structural and functional integrity of these *Srotasas* is needed in order to maintain physiology of, similarly any impairment in this integrity can lead to pathological state.

In *Ayurvedic* literature *Srotasas* are delineate in many ways like *Antarmukha*, *Bahirmukha*, *Anu*, *Sthul*, *Sankhya*, *Asankhya* etc.<sup>[9]</sup> *Srotas* has the same colour of *Dhatu* they carry. The *Srotas* is related with transportation & transfusion of *Pranvayu* in human body has been named as *Pranvaha Srotas*.<sup>[10]</sup>

Every single *Srotas* has specific *Mula sthan* mentioned in *Samhitas*. *Mula* of *Srotas* is anatomical seat of individual *Srotas*. The vitiation or an injury to the *Srotas* may inflict their *Mulas* and treating the *Mula sthan* of respective *Srotas* the disease will be cured. So, these *Mulas* are the remotes, governing, controlling and reflecting body of the particular *Srotas*.

Description of *Praan* is available in *Vedas*, other literatures and *Ayurvedic Samhitas*. The *Praan* denotes “*Praniti Jeeviti Bahukalmiti*” that means giving brightness and life to the body. *Prana* is a life, sort of energy you can feel it.

*Pranvaha Srotas* is firstly mentioned in *Ayurvedic* classics, the channels where *Praan* dwells and works. *Pranavaha Srotas* is one of the *Bahirmukha Srotas*. *Bahirmukha Srotas* are those *Srotas* which allow the substances outside the body to enter and get transformed to a biological and absorbable state that can be useful for the body. *Pranavaha Srotas* is the channel, which carries the external air in to the body to sustain the life. Thus, the *Pranavaha Srotas* is most important for life and longevity.

According to *Charak*, the *Hridaya* and *Mahasrotas* are the *Mula* of *Pranavaha srotas*. whereas, In *Sushrut Samhita*, the description of *Pranavaha Srotas*, its number, origin and location are somehow different than the description available in the *Charak Samhita*. According to *Acharya Sushrut*, there are one pair of *Pranavaha Srotas* originating from *Hridaya* (heart) and *Rasavahini dhamanis*(vessels). The close association between *Pranvaha Srotas* and its *Srotomula* (*Hridaya*, *Rasvahidhamniya* and *Mahasrotas*) has been mentioned in Ayurvedic classics.

## AIM AND OBJECTIVES

- To Collect, Compile and Analyse the Literature of *Srotas*, *Pranvaha Srotas* and *Pranvaha Srotomula* in modern anatomy and physiology.
- To establish the association between *Pranvaha Srotas* and *Pranvaha Srotomula*.
- *Pranvaha Srotodusthi* and *Srotoviddha lakshanas* are discussed.

## Plan of study

- All the literature regarding *PranvahaSrotas* and *PranvahaSrotomula* will be explored to arrive at a feasible conclusion.
- Collection of the literature finds and attempt to make a correlation between *Ayurveda* classics and modern anatomy.

## DISCUSSION

*Acharya Charak* and *Acharya Vriddha Vagbhatt* both have considered *Dhamni* and *Sira* as the synonyms of *Srotas*<sup>[11]</sup> *Acharya Sushrut* has accepted that '*Siradhamnivarjitam*' it means *Srotas* are tubular or empty space except *Sira* and *Dhamini*, *Acharya Sushrut* has mentioned four features to differentiate them, which are *Vyanjananyatvat* (Different structures and characters), *Mulasaniyamat* (Different *Mulas*), *Karmavaisheshyat* (Different functions), *Agamaat*<sup>[12]</sup> (many Ayurvedic *Vetarans* have used that *Sira*, *Dhamni* and *Srotas* are different structures. In *Purush Sharir*, *Sira* and *Dhamni* are quite similar to *Srotas* due to *Parasparsannikarshat* (These structures are close to each other, *Sadrishagamaat* (due to approximately same structure mentioned in some Ayurvedic classics), *Sadrishakarmatwat* (Similarities in function), *Saukshmyaat*<sup>[13]</sup> (Minute structure). *Acharya Vriddha Vagbhatt*, mentioned that *Srotas* are the only modification of *Sira* and *Dhamni*. *Srotas* are hollow structure or opening entities of the body, through them nutrition and many basic elements like *Pran*, *Anna*, *Jala*, *Dosha*, *Dhatu*, *Updhatu*, *Dhatumala*, *Mutra*, *Purish* etc. are carried all over

the body through the fine passage which has similarity with the fine pores present in the lotus stem.<sup>[14]</sup> The main sign of vitiation (*Srotodushti*) of the *Srotasas* are *Atipravatti* (increased flow of the content), *Sanga* (Obstruction of flow), *Siragranthi* (Nodule in the channel) and *Vimargaman* (Flow of the content in passages other than normal).<sup>[15]</sup>

On the basis of above discussion, it can be easily interpreted that the different passage to define transport system are nothing but *Srotas*. *Srotasas* are anatomical structure in the body like capillary, duct, blood vessels, opening or hollow space in the body which transport *Pran*, *Udak*, *Anna*, *Rasa*, *Raktadi Dhatu* and *Mala*.

*Srotasas*, internal transport system, can be compared with and responsible for homeostasis in the body. Normal healthy living of large organisms including human beings depends upon the constant maintenance of *Srotasas* (Internal environment) within the physiological limits. If the *Srotasas* (Internal environment) deviates beyond the set limits, body suffers from malfunction or dysfunction or vitiated. Therefore, the ultimate goal of an organism is to have a normal healthy living, which is achieved by the maintenance of internal environment within set limits.

Hence, in the view of *Srotas*, *Sravan Kriya* can be compared with material exchange process in between cells, intercellular space and capillaries by different systems of the body.

In *Ayurvedic* texts *Acharyas* have mentioned many *Srotasas* and their specific *Mulasthan*, but they didn't mention the criteria of selecting those particular structure or organs as *Mulasthan* of respective *Srotas*. '*Mula*' means the root, lowest edge, base, cause, end of anything which is joined to something else etc. According to *Acharya Chakrapanidutta* has said that '*Mulamiti Prabhav Sthanam*'<sup>[16]</sup> it means *Mula* of *Srotas* is the site of origin /or site of birth / site of very beginning of *Srotas*. He has compared *Mulas* of *Srotas* to root of tree. If the root of tree is cut or destroyed tree is also injured. In the same way root of the *Srotas* (*Mula* of *Srotas*) leads dysfunction of respective *Srotas*.

- Following the different references and description about *Mula*, *Srotomula* as site of governing, transformation, manifestation and storage, remoting and controlling part of each and every *Srotas*. Along with these peculiarities *Mulasthan* of *Srotas* can also be assessed as-
- *Utpatti Sthan* – Particular *Srotas* from where it originates.
- *Sangraha Sthan* - seat for storage

- *Vahan Sthana* - seat of carrying or flow of bodily elements
- *Naidanik sthana* - *Mulasthan* having diagnostic importance
- *Chikitsatmak sthana* – Many diseases of *Srotas* can be cured only by correcting their place of origin.

*Mula Sthan* of *Srotas* are interdependent; health and wellbeing of one channel has potentially governing or controlling effect on the other channels too. *Mulasthan* of any *Srotas* can be anatomically different than the *Srotas* itself as act as a centre of control or cause or reflection.

Hence, *Mula* of *Srotas* is related to the area of influence. This specific part of *Srotas* regulates and governs the entire *Srotas*. Any vitiation of the *Srotas* affects the physiology of *Srotas* or vice versa. But it can also be main seat of pathology of respective *Srotas* or principal Seat of Manifestation of the diseases of that *Srotas*.

The factor that sustains the life is called *Pran*.<sup>[17]</sup> In the classics there are many words used as synonyms of *Pran* that are *Pranvayu*, *Jeeva*, *Rakta*, *Anil*, *Balam*. *Ayurveda* explains the twelve factors *Agni*, *Soma*, *Vayu*, *Sattva*, *Rajas*, and *Tamas*, *Panchendriya* (five sense organs), and the *Bhutatma* as the preserver of the *Pran* (life).<sup>[18]</sup> *Pranvayu* is mainly located in and around the *Mukhapradesh* existing from the mouth and throat up to the chest. It also controls the process of swallowing of the food and carrying it through the *Annanalika* to the stomach. Vitiation of *Pranvayu* results in diseases such as *Hikka*, *Shwasa* etc.<sup>[19]</sup>

It can be explained that *Pran* is the thing that you can feel it is actually a motion, a motion of breath, motion of heart and blood. *Pran* is a life, short of energy you can feel it.

*Pranvaha Srotas*, according to classics, carries life which may be interpreted as *Pranvayu*. The transport of oxygen from the alveolar - vascular complex through major respective vessels, is further diverted into systemic circulation with help of pumping action of heart.

According to *Ayurvedic* texts *Pranvayu* is carried through *Pranvaha Srotas* and this *Pranvayu* is mentioned as life by all *Acharyas*. This *Pranvayu* or oxygen enters in the lungs alveoli through breathing and absorbed by the capillaries around the alveolar sac and further pushed into the systemic circulation with the help of heart.

The *Pranvaha Srotas* which is correlated with respiratory system of our body is in very course form at the beginning and it is very fine and complicated at its terminal stage. The

main purpose of *Pranvaha Srotas* is to contribute oxygen through the process of breathing to the capillary system of the lungs alveoli and this system is also responsible for the exhaling out the carbon dioxide as a waste product of the metabolic process of the cells present in the body.

Therefore, *Srotas* which carry the Pran or life or oxygen is described as *Pranvaha Srotas* in *Ayurvedic* classics. So, the passage from the course form (nose) to the fine terminal part (alveoli) and related capillaries can be assessed as *Pranvaha Srotas*.

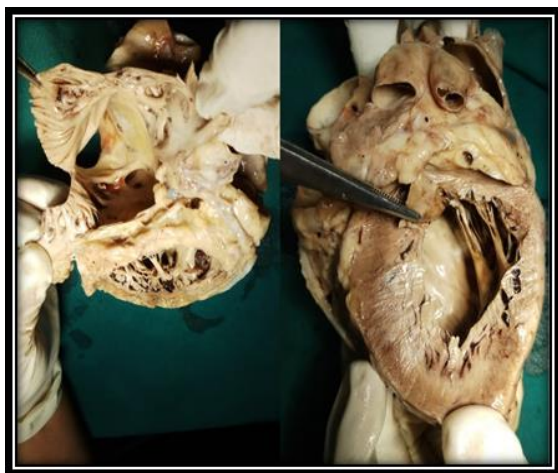
The difference in number regarding in different classics is only due to interpretation and each *Srotas* has been mentioned with *Mula*. According to *Charak* and *Vagbhatt*, the *Mula* of *Pranvaha Srotas* are *Hridaya* and *Mahasrotas* whereas *Sushrut* has his own opinion about *Mula* of *Pranvaha Srotas* as *Hridaya* and *Rasvahidhamnis*.<sup>[20]</sup>

*Charak*, *Sushrut* and *Vagbhatt* has the same opinion about one *Srotas Mula* that is *Hridaya*, but have different views regarding other *Srotas Mula*.<sup>[21]</sup> *Charak* and *Vagbhatt* places here *Maha Srotas* whereas *Sushrut* believe in *Rasvahi Dhamnis*. No other Opinion is available in regarding *Srotomula* except these mentioned in the texts. In previous explanation this has been already simplified supported by references that *Mula* means basic elements responsible for the causes of *Srotas*. Since *Ayurveda* is science of life has purely clinical and practical approach.

Hence, *Srotas* through being an anatomical subject but its clinical aspect is of importance.

If heart is affected with any the valvular deformity or any myocardial pathology, it definitely affects the respiratory tract which may result in shortness of breathing, dyspnoea, insomnia and cyanosis. The anatomy and physiology clearly shows that heart controls the systemic circulation as well as pulmonary circulation. The pulmonary circulation is important from haemato-aeration point of view. The oxygen which may be interpreted as *Pranvayu* received through pulmonary circulation is pushed into the systemic circulation and end product of *Pranvayu* in the form of waste i.e., carbon dioxide is given out through the same circulatory system after collected from systemic circulation. This pulmonary status evaluated through cardiac condition or cardiopulmonary complex is interdependent to each other. This emphasizes evaluation of *Pranvaha Srotas* through cardiac condition.



**Pic. 1: Left Atrium & Ventricle.****Pic. 2: Righth Atrium & Right Ventricle.**

The other *Mula* described by *Acharya Sushrut* is *Rasvahi Dhamnis* which is different by *Charak*. No detailed description about *Rasvahidhamni* is available in *Ayurvedic* texts. The nutrients which are oxidized in large cell with the help of oxygen (*Pranvayu*) is converted in two ways, the nutrients such as carbohydrate and protein are transported through blood stream and fat through lacteals or *Rasvahini* (*Sushrut*).

If heart rate is very high or very low the oxygen concentration or availability of alveolar is affected. If the rate of oxygenation is higher then the final metabolism of fat will be higher and it depends upon the amount in the thoracic duct and the condition of lacteal and they are apparently associated with GIT. This proves better connection between *Pranvaha Srotas* and lacteals, cardio pulmonary circulation and G.I.T. (*Mahasrotas*).

Therefore, it can be interpreted evidently that *Hridaya*, *Mahasrotas*, *Rasvahidhamni* have very well connection with *Pranvaha Srotas*. The healthy heart renders the good pulmonary circulation. The proper patency and normal elasticity of pulmonary vessels are responsible for better aeration. Any deformity and disfunction *Mahasrotas* gives rise to distention and belching which restricts the longitudinal expansion of thoracic cavity. So the *Mulas* mentioned by *Sushrut* and *Charak* are responsible for condition of *Pranvaha Srotas*.

The *Lakshana* explicated by *Acharya Charaka* for *Pranvaha srotas* when it gets deranged, appear to be same as that of many signs that arise due to the disorders of the respiratory system.<sup>[22]</sup> Hence, it would be appropriable to correlate *Pranvaha srotas* as a channel conveying *Pranvayu* within the body i.e., the respiratory system with both of its conducting and respiratory pathway. When it comes to the pathological aspect, the symptoms of *Hikka*,

*Kasa*, *Shwasa roga*, *Hridaya roga* seem to be same as the vitiation of *Pranvaha Srotas*. So, it is enlightened as *Pranvaha Srotas* vitiation should be managed with same line of treatment for *Shwasa Roga*. In this context, *Shwasa roga* is one of the symptoms of respiratory system disorders. Again, this shows the close association between *Pranvaha srotas* and respiratory system. All the above aspects definitely specify the *Pranvaha srotas* stands for nothing but the same respiratory system.

*Acharya Sushruta*, while labelling the impairments of *Pranvaha Srotas*<sup>[23]</sup> has emphasized the symptoms which are likely seen as the effects of hypoxia or anoxia to the brain. So, *Pranvaha Srotas* can be correlated with respiratory system.

The pulmonary circulation is responsible for deoxygenated blood from the right ventricle to air sacs of the lungs and return oxygenated blood loaded with *Pranvayu* from lungs to the left atrium. The pulmonary arteries divided and subdivided until finally terminate into capillaries around the alveoli (air sac). The input of oxygen in the same way but in reverse manner passed to left atrium through the pulmonary veins.<sup>[24]</sup>



**Pic. 1: Ant. and Post. view of right lung.**

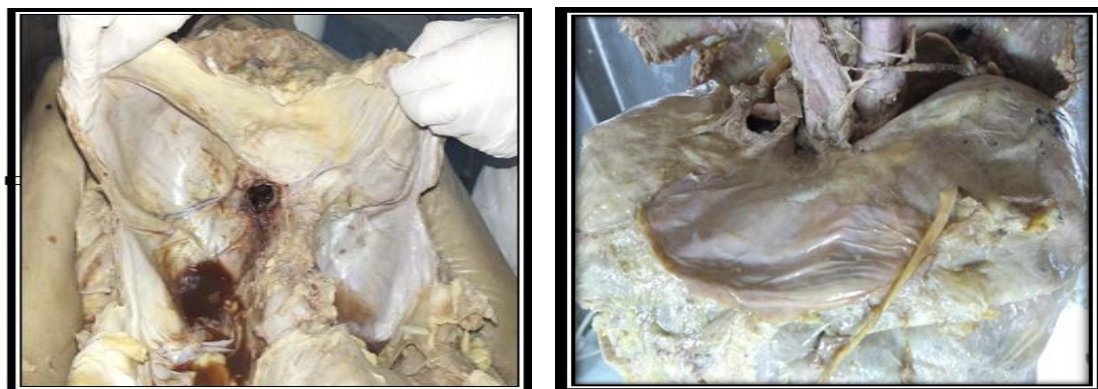


**Pic. 2: Ant. and Post. view of left lung.**

The pulmonary oedema affects the rate of absorption of oxygen and carbon dioxide and thus the exchange of respiratory gases in lungs (a physiology of *Pranvayu*). This, undoubtedly shows that pulmonary capillaries (*Pranvaha Srotas*) distinctly depend upon the health of the heart (*Hridaya*). The connected pulmonary vessels are equally responsible since the low hydrostatic pressure is a significant factor to resist pulmonary oedema for which the vessels are special designed having larger diameter, thinner wall and less elasticity.<sup>[25]</sup>



Deep breathing is called diaphragmatic or abdominal breathing in which *Mahasrotas* acting vital role. It involves of outward movement of the abdomen as an outcome of the contraction and descending of diaphragm. It is a matter of knowledge that under reduced vital capacity, if *Mahasrotas* is non-co-operative to descends the diaphragm due to its pathology or over eating the respiratory distress is increased since there is no comprise with the longitudinal axis of thorax. This is noteworthy clinical observation which relates to abnormality to *Pranvaha Srotas*.<sup>[26]</sup>



**Pic. 1 & 2: Diaphragm Superior and Inferior surface.**

Hence, the conditions that can be considered under the vitiation of *Pranvaha Srotas* include pulmonary hypertension, pulmonary embolism, asthma, chronic obstructive pulmonary disease, infective pathologies of respiratory system etc., where breathing difficulties and irregular breathing patterns are the key features. Major portion of the *Lakshanas* declared as *Viddha Lakshanas* are results of irregular circulation or oxygen deficiency to the body tissues. In the disease notify as *Shwasa*, somewhat same symptoms are viewed as that of *Dushti* of *Pranvaha Srotas*. So, the management is same as *Pranvaha Srotas*. The diseases of pulmonary system like pulmonary hypertension or embolism, COPD etc. can also be counted in in the diseases of *Pranvaha Srotas*.

Therefore, on the basis of abovementioned discussion and works the scholar summerized that this relationship of *Pranvaha Srotas* with respiratory system of the body and its diseases become self-evident as most of the functions related to the *Pranvaha Srotas* likewise it also suggests the clinical and functional association amongst lungs, heart, pulmonary vessels. As such this clinical remark emphasizes that fact mentioned in *Ayurvedic* literature that *Hridaya*, *Rasvahidhamni* and *Mahasrotas* are *Mula* of *Pranvaha Srotas* which is yet again exacerbated by modern literature.

## CONCLUSION

- *Srotas* are anatomical structure in the body like capillary, duct, blood vessels, opening or hollow space in the body which transport *Pran*, *Udak*, *Anna*, *Rasa*, *Raktadi Dhatu* and *Mala*.
- *Mula* means basic elements responsible for the causes of *Srotas*. It is the site of governing, transformation, manifestation, storage, remoting and controlling part of each and every *Srotas*. It is the area of influence.
- The scholar, on the basis of discussion, can conclude that the *Srotas* carrying *Pran* (life) is called *Pranvaha Srotas*. *Pran* is defined by different *Acharyas* in their own views which conveys the life. The tract from nasal passage to terminal alveoli along with related capillary is supposed to be *Pranvaha Srotas*.
- The purpose of *Pranvaha Srotas* is to contribute oxygen carried through inhaling received by the capillary complex. The same passage is used for exhaling out the waste given out by the tissues i.e., Carbon dioxide as result of metabolic process within the cell.
- The scholar on the view on *Pranvaha Srotomula* (*Hridayaa*, *Rasvahidhamni* and *Mahasrotas*) are responsible for maintaining the proper functioning of *Pran* as well as *Pranvaha Srotas* in all aspects.
- For the evaluation of *Pranvaha Srotas*, Ayurvedic authorities observed *Hridayaa*, *Rasvahi Dhamni* and *Mahasrotas* as *Srotomula* on its inherent functionality there is no explicit mentioning of heart, pulmonary vessels, and GIT.
- In Ayurveda however *Hridayaa*, *Rasvahi Dhamni* and *Mahasrotas* are mentioned as *Mulasthan* of *Pranvaha Srotas* which correlate with the function of the heart, pulmonary vessels and GIT along with lacteal in modern science.
- According to modern science heart, lungs, pulmonary vessels, and GIT are clinically and functionally associated with respiratory system and breathing. So, we can justify *Hridayaa*, *Rasvahi Dhamni* and *Mahasrotas* as a *Mula* of *Pranvaha Srotas* in Ayurveda.

The article conclude that the correlation of *Hridayaa*, *Mahasrotas*, *Rasvahidhamni* are closely associated with *Pranvaha Srotas*. The healthy heart ensures the good pulmonary circulation. The patency elastically of pulmonary vessels are responsible for better aeration. The dysfunction of *Mahasrotas* gives rise to distention and belching which restricts the longitudinal expansion of thoracic cavity. The *Mulas* mentioned by *Sushrut* and *Charak* may be meters for ascertaining to ensure the health of *Pranvaha Srotas*.

## REFERENCES

1. bUæL; ØksM® fnR;S IkkTkL;a fn'kka Tk«ko® fnR;S ÒLkTTkhewrku~  
ân;©i'køkUrfj{ka iqqjhrrk uHkM mn;sZk PkØokd® erLuH;ka fnoa o`DdkH;ak fXkjhu]  
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3. 'kfjjafgfoukok,kq% lerk,kkfrnk:fHk%Aok,kq% Ák.k%lq[ka ok;qokZ;q%loZfenatxr~ AA  
( Ramayan)
4. Rk=çk.kOkgkukalzkssrlkân,kewyaegklzksp'...(C.Vi.5/7)
5. ân;apsrukLFkkue~®tIPÜkkJ;® ere~ (S.Pu.5/48)
6. Shastri Dr. Ambika Dutta. Sushrut Samhita, Ayurved Tattva Sanddipika Varanasi,  
Chaukhamba Sanskrit sansthan Varanasi, 2012; 15-3.
7. Shastri Dr. Ambika Dutta. Sushrut Samhita, Ayurved Tattva Sanddipika Varanasi,  
Chaukhamba Sanskrit sansthan Varanasi, 2012; 9: 11-96.
8. Charak Samhita Vidyotinitika, Shastri K, Chaturvedi G, 1st edition. Varanasi:  
Chaukhambha Bharati Academy; 2008; 1, i: 5-3.
9. Shastri Dr. Ambika Dutta. Sushrut Samhita, Ayurved Tattva Sanddipika Varanasi,  
Chaukhamba Sanskrit sansthan Varanasi, 2012; 9.
10. Charak Samhita Vidyotinitika, Shastri K, Chaturvedi G, 1st edition. Varanasi:  
Chaukhambha Bharati Academy, 2008; i: 5-3.
11. Rk= lzksrlkEksOkfo'ks"kk%fLkjk/kEkU;% AA (A.S.Sha.6/48)
12. vU,ksROkU,kROkfePNfRkAfLkjk/keUkhlzkssrlka Dosya  
ijLijlf™kd"kkZRLkn`kdeZRokRI©{kE,kkPPk foHkDrdeZ.kkeI,kfoHkkXk bo  
Yk{,krsAA (A.S.Sha.6/49)
13. Charak Samhita Vidyotinitika, Shastri K, Chaturvedi G, 1st edition. Varanasi:  
Chaukhambha Bharati Academy, 2008; I, 712: 5-23.
14. Astanga Hrdayam Vidyotinitika, Kaviraja Gupta Atrideva, 1st edition. Varanasi:  
Chaukhambha Prakashan, Asthanghridayasharir, 2016; I,254: 3-46.
15. ftâkrkYoks"Bd.BDykse'kks"ka fiiklka pkfrizo`)ka n`"VksndogkU;L; L=ksrkafI  
iznq"Vkuhfr fo|kr~AA
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AA ( Ramayan)

17. Shastri Kashi Nath, Vidyotini Commentary on Charka Samhita, Varanashi: Chaukhamba Bharti Academy, 2018; 29-3.
18. Shastri Kashi Nath, Vidyotini Commentary on Charka Samhita, Varanashi: Chaukhamba Bharti Academy, 2018; 28-234.
19. Ák.k® U;L;ikau rq ÁorZ;fr nsfguke~ A (B.Su.16/15)
20. Charak Samhita Vidyotinitika, Shastri K, Chaturvedi G, 1st edition. Varanasi: Chaukhambha Bharati Academy, 2008; 710: 5-7. r= çk.kOkgs }s r,k®ew±ya ân,ka jlOkkfgU,k'p /keU,k% r= çk.kOkkfguk ân,ka ewya egklzksr'p PkA (A.S.Sha.6/36)
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22. r= çk.kOkgs }s r,k®ew±ya ân,ka jlOkkfgU,k'p /keU,k% ....
23. r= çk.kOkkfguk ân,ka ewya egklzksr'p PkA (A.S.Sha.6/36)
24. Vishram Singh, Chapter 28th The thorax: part 1 In: Textbook of anatomy upper limb and thorax. [Internet]. 2nd ed. New Delhi: Reed Elsevier India Private Limited, 2014; 269[6, 2014].
25. Gupta P. Concept of srotomula in view of srotas viz-a-viz microcirculation. Lucknow, 2001.
26. Gupta P. Concept of srotomula in view of srotas viz-a-viz microcirculation. Lucknow, 2001.