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A CRITICAL REVIEW OF PRANVAHA SROTAS IN THE CONTEXT OF AYURVEDA & MODERN SCIENCE

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ABSTRACT
Human body is mainly composed of three types of substances viz. Dosha, Dhatu and Mala. Although all these entities are present in body itself, but some kind of transportation system is required to carry these substances from the site of production to the site of action. For transportation mode of such body constituents, the special term 'Srotasa' is used which denotes a channel through which substances flow from one part to another part of body. Strotas are innumerable channels or pathways which supply nourishment to dhatu and whole body. Strotas carry all like poshya rasa to poshaka rasa, specific materials, hormones, enzymes, thought process, stimulus. The human body contains several channels through which the Doshas, Dhatus and Malas travel which are called as Srotamsi. There are thirteen Abhyantra srotamsi, each of which relates to specific organs, and are increased and vitiated by specific factors. Among thirteen Abhyantra srotas Pranavaha is one. Its main function is to provide the medium, through which Prana flows, which is governed by Vata. This literary review delves into the classical Ayurvedic texts to explore the depth of knowledge surrounding Pranavaha srotas and its functions. The foundational texts of Ayurveda, such as Charaka Samhita and Sushruta Samhita, extensively discuss Moolasthana, Dushti hetu and Dushti Lakshna of Pranavaha srotas. They describe the intricate network of channels responsible for the movement of Prana i.e. the vital life force. Pranavaha Srotas is the channel which carries the external air into the body to sustain the life.

KEYWORDS: Srotas, Pranavaha Srotas, Respiratory system.

INTRODUCTION
Ayurveda described many anatomical structures of body along with their physiological functions, Srotas is one structure defined as channels, through which the transportation of different biomaterials takes places. Srotas carry Dhatu or essence of Dhatus and other elements to their destination. Physiologically Srotas play vital role in the process of bio-transformation, nourishments and detoxification.[1-4]

INTRODUCTION
Ayurveda has accepted the human body to be made up of innumerable Srotas (channels) which are responsible for performing all the physiological and functional activities. All dosha, dhathu and mala perform their functional activities with the help of these Srotas. It has been a practice since long, to recognize all the vyadhi laskhana. The body is divided into small units depending upon their chief function or structure. Each unit comprises of many avayavas (Organs) and each organ is made up of innumerable Srotas. Hence these units are generally called Srotas. Srotas are the complex pathways or channels of the nervous system governed by Vayu for carrying out the functional and physiological activities of the human body. The following synonyms of Srotas Sira (Vein), Dhamani (Artery), Rasayani (Lymphatics ducts), Rasavahini (capillary), Nadi (Tubular conduits), Pantha (Passages), Marga (Pathways, tracts), Sharirachidra (Body orifices), Ashaya (Repertories), Niketa (resorts), Sthanas (Sites), Samvrutsamvrutani (open / closed passages). Rasa Savhana: Vyana Vayu having ability to move liquid quickly, this Vyana Vayu causes circulation of rasa in entire body. Srotas are channels or micropores which mainly perform functions of transportation, ayurveda described many types of Srotas and Rasa vaha srotas are one of them. There are seven srotas (out of 13) which associated with tissues (dhatus) and Rasa vaha srotas comes first in this category as follows.

Definatoin of Srotas- A channel that transport only dhatu under metabolic transformation is called srotas. There are a many number and types of srotas mention by different authors. Each srotas is attached to a specific anatomical structure called Moola Sthana.

"As per Acharya Sushrut- A srotas is tubular structure or organ which initiate the flow of the fluid material from the inner of the body to its outer opening". (Su.Sha. 9/13) "As per Acharya Charak- There are srotas as much organs are there in our body". (Ch.Vi. 5/2)

Panchabhautikatva of srotas (Constitution): Srotas are Panchabhautik with predominans o akash mahabhoot.

Utpatti of Srotas

In intrauterine life, due to pradhamana (movements) of vayu in embryo (pittadwara pachit mansakhanda) srotas are produced.

Functions of srotas

Sravan (Secretion), Parinamana (Reproduction and Recycling), Utsarjana (Excretion of Waste Products) The normal functioning of the particular srotas is depends upon its moolasthan. Any abnormalities in these n these peripheral srotas ultimately can affect the moolasthan of Srotas

Srotas related to dhatus

1. Rasa vaha srotas: carrying plasma and lymph.
2. Rakta vaha srotas: carrying blood cells and hemoglobin.
3. Mamsa vaha srotas: carrying muscle nutrients and wastes.
4. Meda vaha srotas: supplying to various adipose tissues of body.
5. Asthi vaha srotas: nutrients to the bones.
6. Majja vaha srotas: supplying the bone marrow and nerves.
7. Sukra vaha srota: carrying the sperm and ova and their nutrients.

Number of stotasa

"Yavantah purushe murtimanto bhavavisheshatavanta evasmin stotasam prakar visheshah."Strotasa are countless as everybody constituent has its own strotasa. According to Acharya Charak, grossly following 13 strotasas, are enumerated 1)Pranahava strotas 2) Udakvaha strotas 3) Annavaha strotas 4) Rasavaha strotas 5) Raktavaha strotas 6) Mansavaha strotas 7)Medovaha strotas 8)Asthivaha strotas 9) Majjavaha strotas 10) Shukravaha strotas 11) Mutravaha strotas 12) Purishvaha strotas 13) Swedavaha strotas. While according to Acharya Sushrut, there are 11 types of strotas. 1)Pranahava strotas 2)Udakvaha strotas 3)Annavaha strotas 4)Rasavaha strotas 5) Raktavaha strotas 6)Mansavaha strotas 7)Medovaha strotas 8)Mutravaha stoats 9)Purishvaha strotas 10)Shukravaha strotas 11)Artavavaha strotasa.

Understanding Prana in Pranavaha Srotas

1. Tatra Pranavahanam srotasaam hridayam moolam mahasrotascha.[6] (Ch.Vi. 5/7)
2. Tatra Pranavahe dwe tayormoolam hridayam rasavaahinyascha dhamanyaha. (Su.Sha 9/12)

Pranavaha Srotas is responsible for transportation of Prana Sanjnaka Vata**.**

Sites of Pranavata is Location and functions of Prana Vata

Murdha, Ura and Kanta. It has main functions like Budhi, Indriya, Chitta, Drik, Steevana, Shvayathu, Udgara, Nishwasa, Annapravesha5all are related to Respiratory, Higher mental function and Gastro Intestinal system.

Moola of Pranavaha Srotas: Mulam as "Mulamiti Prabhava Sthaanam" meaning that the Mula of Srotas is the anatomical and physiological seat of respective Srotas and also it is the main seat of pathology of that Srotas and the principalseat of manifestation of disease. According to Acharya Charaka, the Hridaya and Mahasrotas are the Moola of Pranavaha Srotas and Acharya Sushruta has described Hridaya and Rasavahini Dhamani as Moola of Pranavaha Srotas. Both Acharyas have mentioned Hridaya as a Moola of Pranavaha Srotas because of its role in Pranavahana Karma.

Pranavaha srotas to modern anatomy and Physiology[8]

Respiratory system or mamilian airway is formed by nose, nasal cavity, pharynx, larynx, trachea, bronchus, bronchioles and finally alveolar sac. This sack is surrounded by capillaries and vessels. As air inhaled through the upper airway filtered in the nose heated to body temperature and fully saturated with water vapors, partial recovery of this heat and moisture occurs on expiration. Then air goes to glottis and glottis to trachea, major bronchus, secondary; tertiary bronchioles and alveoli The acinus is gas exchange unit of the lung and comprises branching respiratory bronchioles and clusters of alveoli here filtered moistures heated air makes close contact with pulmonary capillaries and oxygen up take and carbon dioxide excretion occurs the alveoli lined with flatted epithelial cells. The gas exchange of oxygen and carbon dioxide are purely passive no ATP is consumed they depend on behavior of gases described in daltons law and henry law. Transport of gases between lungs and body tissue is function of blood, when oxygen enters the blood certain physical and chemical changes occurs that aids in gas transport and exchange. Oxygen does not dissolve easily in the water therefore very little oxygen only 1.5% is carried in the dissolved state in water blood plasma and remained oxygen 98.5% is transported as chemical combination with hemoglobin inside RBC. Each 100 ml oxygenated blood contains about 20 ml of oxygen and 0.3ml dissolved. The change of respiratory gases between lungs and blood takes place by diffusion across alveolar and capillary walls. Collectively the layer through which the respiratory gases diffuse are known as alveolar capillary membrane. The heart act as two separate pumps operating side by side. The right heart generate circulation to lungs and left heart feeds rest o body. The right atrium drains deoxygenated blood from superior and inferior vena cava

and discharges blood in to left atrium and in to left ventricle through bicuspid valve.

"Tatra pranvahanam hrudayam mullam mahastrotasam khavisheshmedh Vishehsh bhavati charak" When this srotas is not working properly then special signs and symptoms or seen more expiration rate, whising sounds at the time of respiration, painful breathing and tightening of chest also seen. Sushrut commentrator Dhalan says that "Tatra vidhasaya kroshanavinaman mohan bramhan vepenani maranam vaa bhavati". When this srotas hampers then following symptoms are seen croshan means to cry, winaman means bending forward, bramhana means vertigo, mohana means unconsciousness, vepenani means tremors of the body and lastly death occurs.

DISCUSSION

Ayurveda, with its roots deeply embedded in ancient wisdom, introduces us to a holistic approach to health. At the core of this philosophy lies the concept of Doshas, elemental forces governing the body. Unveiling the anatomical and physiological aspects of Pranavaha Srotas reveals its integral role in maintaining equilibrium within the body. To comprehend the essence of Pranavaha Srotas, one must delve into the sacred texts of Ayurveda – Charaka Samhita and Sushruta Samhita. These timeless classics provide a detailed roadmap, guiding us through key passages that unravel the ancient understanding of Nishwas, Prana, and their profound connection to overall well: being. The wisdom embedded in these texts bridges the gap between antiquity and modern comprehension. Pranavaha Srotas plays very crucial and multidimensional role by virtue of the most vital substance it carries through it i.e. Pranavayu. The Moolasthana of Pranavaha Srotas are Hridaya and Mahasrotas are vitiated due to vitiation of Pranavayu which is carried by Pranavaha Srotas. Acharya Charaka and Sushruta both had mentioned the Moolasthana of Pranavaha Srotas is mainly Hridaya because of its Pranavahan Karma (blood circulation). Mind:Body Connection and Pranavaha Srotas: The mind:body connection takes centre stage as we explore the intricate interplay between mental and emotional states and respiratory health. Ayurveda, recognizing this symbiotic relationship, prescribes practices such as This literary review concludes by underscoring the holistic approach of Ayurveda toward respiratory health. The comprehensive clarity, understanding of Pranavaha Srotas provided by ancient Ayurvedic texts serves as a valuable guide for contemporary healthcare, emphasizing preventive measures and personalized wellness strategies.

CONCLUSION

Pranavaha srotas is considered as one of the essential Srotas of the body which encompasses nose, alveoli, nasal chambers, trachea, bronchus, bronchioles and pharynx, etc. This system carries oxygen or carbon dioxide through the body vialungs. These gases ecstatic to heart from the lungs by pulmonary veins. The exchange of gases occurs at the tissue/cellular level. Heart is mentioned as Mulsthana of Pranavaha srotas since it plays vital role in the operative of respiration. Nose, alveoli, heart, pulmonary veins, arteries and microchannels, etc. are major functional component of this system. These body parts form a path which includes in Pranavahini dhamanya. Ayurveda philosopher stated Pranavaha Srotasas Mahastrotasam. As per moder science the nose, nasal cavity, pharynx, larynx, trachea, bronchi and branches, as well as the lungs, which involves alveoli, or terminal air sacs, are the most prominent parts of a respiratory system.

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