

CONCEPTUAL STUDY OF PRANAVAHA STROTAS WITH REFERENCE TO MODERN ANATOMY

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strotas, but for clarification and under-

ABSTRACT

Sharir Rachana is basic subject of medical science. Hence concepts of Sharir should be cleared. Ayurveda gives various ideas of sharir, which should be explained on the modern basis. Strotas is one of Ayurvedic terminology & basic thing of Ayurveda, but it should be cleared to ayurvedic students. Charak had explained strotas as medicinal view while sushrut had explained strotas according to surgical aspect. Pranavaha strotas is first & important strotas, which carry pran all over body. By studying this strotas mulasthana, vidha laxanas & vahana, also by studying concern reference regarding prahvaha strotas, respiration, etc. idea of this strotas is explained, how it is related to respiratory system & internal & external respiration is elaborated in this article. It will be helpful to ayurvedic students to clear ideas regarding strotas as well as pranvaha strotas. How Pranavaha strotas related to heart, lungs and other structures like pulmonary artery and pulmonary vein is elaborated in this article.

KEY WORDS: pranavaha strotas, prana, respiration, strotas, lungs, oxygen

INTRODUCTION

Sharir Rachana and *Sharir Kriya* are two sides of coin. These two departments are now different made by ccim but should work hand to hand. *Ayurveda* never given separate *Sharir Rachana* or Anatomy and Physiology or *Sharir Kriya*. Anatomy is well mentioned with physiology, pathology, surgery or medicine. We must to know basic things or anatomical concepts. Now in globalization world these concepts should be clear on the modern basis. *Strotas* is one of the major anatomical concept of *Ayurveda*. It is said that '*stroto aium purusha*' that means human body is made up of so many

standing various functions of *strotas* are mentioned by *Sushrut* and *Charak*. *Charak*

gives 14 numbers of *strotas* while *Sushrut* gives 11 numbers of *strotas*. First and most important *strotas* given by both *acharyas* is *pranavaha strotas*. It is very important hence we must know details of this *strotas* in relation with modern science. The concept of *strotas* is not detail mentioned by ancient scholars hence I am elaborating this concept of *pranavaha strotas*.

Charak first clears concept of *strotas* as , *Yavant purushe murtimanto, Bhavavish-*

eshanto avasmin strotasam prakar vishesh
|1

Charak says that number of matters or *bhava* present in the body, same number of *strotas* present in the body, hence he says that infinite number of *strotas* present in the body. These *strotas* has individual work according to separate *bhavas*, that is which matter stored or conducted through it. There are mainly 16 *murtimant bhav* present in the body and these are *prana*, *anna* or food, *udak* or water, *rasadisapatdhatu*, and *trimala* and *tridosha*. Individual each *bhav* suggest its own *strotas*. All these *strotas* come together to form body. *Charaka* has given example of cloth. If we separate all fibers of the cloth then we can't say it as a cloth but when all fibers are collectively arranged then it is said to be cloth, same way separate *strotas* is not constitute body but all *strotas* collectively indicates body.

Strotavansi khalu parinam, Prapadhemananam dahtunam vahini, bhavatyayanarthena |2

This gives clear idea about *strotas*. *Strotas* either create matter or transfer matter from one place to another places

Tatre pranvaha strotasan, Hrudya mulam mahastrotasam |3 *Charak* told that *pranavah strotas* has main *mulasthan* is *hridaya* and secondary is *mahastrotas*. *Charak* and *Sushrut* both give first priority to *pranavaha strotas*. *sushrut* gives clear idea regarding *prana*, *agnisomvayu satvarajatama*, *panchendriya bhutatmethi prana* |4 He says that *agni*, *soma*, *vayu satwa, raja* and *tama* and also *panchdnyanendriya* are *pranas* because due to these vital factors signs of aliveness is seen. one more important definition is *pranaha vahantiti prana* means: The *chaitnya* or *jivana* giving matter is *pran*. The *vahan* or transfer or conduction of this

prana through all structures of the body is called as *pranvaha strotas*. The factor which gives life to body is called as *prana*. Oxygen is very important factor for life process which is inhaled by respiration. And the *strotas* which carry this *prana* is called as *pranvaha strotas* and the system which supplies oxygen is called as respiratory system. *Nadya panthano margaha sharir chidrani* |5 *Charak* has given various synonyms of *strotas* that are *sira, dhamani rasayani, rasavahini, nadi, path, sharirchidrani, niket* but he mentioned important thing is *nadi* or tube like structure, *path* or *marg* means special way for special matter, *sharirchidrani* means vacuoles of body. These structures are specially called as *strotas*.

MATERIALS AND METHODOLOGY

Respiratory system or mammalian airway is formed by nose, nasal cavity, pharynx, larynx, trachea, bronchus, bronchioles and finally alveolar sac. This sack is surrounded by capillaries and vessels. |6

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 |7 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 flattened epithelial cells. |8 The gas exchange of oxygen and carbon dioxide are purely passive no ATP is consumed they depend on behavior of gases described in dalton's law and henry law |9

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. |10

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. |11 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. |12

The heart act as two separate pumps operating side by side . The right heart generate circulation to lungs and left heart feeds rest of 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. 13

Tatra pranvahanam hrudayam mullam mahastrotasam pradustanam khavisheshmedh Vishehsh bhavati charak |14

When this *strotas* is not working properly then special signs and symptoms or seen more expiration rate, vising sounds at the time of respiration, painful breathing and tightening of chest also seen. *Sushrut* commentator *Dhalan* says that

Tatra vidhasaya kroshanavinaman mohan bramhan vepenani maranam vaa bhavati |15
When this *strotas* hampers then following symptoms are seen *croshan* means to cry, *winamana* means bending forward, *bramhana* means vertigo, *mohana* means uncon-

sciousness, *vepenani* means tremors of the body and lastly death occurs.

DISCUSSION

As we seen that *pranvaha strotas* is first *strotas* of the body. *Strotas* concept is based on following four main qualities.

1. To produce specific *bhava* or matter that means *utpatti* of *bhav*.
2. to transfer or to carry these *bhava* from one place to another place means *vahana* of these *bhavas*.
3. To secreat these specific *bhava* means *stravanath strothansi*.

Specific root or *marg* of these *bhava*. Some *strotas* has all four qualities but some has one quality out of four the structure used for above functions. These structures are like ducts, tubules, blood vessels, capillaries, organs and *ashaya*. *Strotas* is decided according to transfer of matter through it and it is related to its *mulsthana*. *charak* and *sushriut* gives there *mulsthana* according to their function or *storage* of *bhava* or relay center of *bhava*. Second *mula* is considered as conducting system of these *bhava*. In case of *pranvaha strotas* air entered from external nares to pharynx, larynx, trachea and right and left bronchus and then bronchioles and finally to alveoli. This is the path of oxygen. In this way external atmospheric oxygen is reaches to lungs. In alveoli gas exchange process of oxygen and carbon dioxide takes place. This is purely passive process, hence no ATP is consumed. Transport of gases between lungs and body tissue is physical and chemical process. The exchange of respiratory gases takes place by diffusion method across alveoli and capillary walls. 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 is transported in chemical combination with hemoglobin inside RBC. Each 100 ml oxygenated blood contains about 20 ml of oxygen and 0.3ml dissolved.

Hemoglobin consists of protein portion called globins and an iron pigment called heme. Each hemoglobin molecule has four heme group can combined with one molecule of oxygen. Oxygen and hemoglobin combine in an easily reversible reaction to form oxyhemoglobin since 98.5% of oxygen is bound to hemoglobin and trapped inside RBC only 1.5 can diffuse out tissue capillaries into tissue cells.

When we think *sharir rachana & sharir kriya* regarding *pranavaha strotas*. Ancient scholar never given separate *sharir rachana & sharir kriya*. Anatomy is well mentioned in the *ayurved*. We must know basic concepts of the *ayurveda*. Now in globalization world this concept of *pranavaha strotas* must be proved on the modern basis. *Strotoaium purusha* Means body is made by so many *strotas* . But for understanding these *strotas* properly *charak & sushrut* mentioned special *strotas*, *charaka* has given 14 number of *strotas* while *sushrut* given 11 number of *strotas*.

Pranavaha strotas starts from nose and supply oxygen to haemoglobin through alveoli. This is clear path of *pranavaha strotas*, but next to it gases exchange occurs with the help of blood. This blood is firstly transferred to heart by pulmonary veins and poured to left atrium. From left atrium poured to left ventricles and all over body through aorta, arterioles and capillaries. Thus oxygen is supplied to every cell.

Same time carbon dioxide is absorbed by RBC. In each 100 ml of deoxygenated blood 7% of carbon dioxide is dissolved in plasma 23% combines with hemoglobin as carbonation and 70% is converted into bicarbonate ions. This carbon dioxide along with hemoglobin travels through veins, vena cava to right atrium of the heart. Then it is poured into right ventricle. This deoxygenated blood then transferred to lungs by pulmonary arteries. Exchange of carbon dioxide and oxygen occurs in alveoli by alveolar-capillary membrane,

Mainly carbon dioxide and oxygen exchange occurs in lungs and heart. Hence *Charak* As well As *Susarut* both mentioned heart as a *mulasthan*, and path from nose to alveoli, alveoli to left ventricle, then to all body tissue and cells, body tissue to veins and right ventricle of the heart includes in the *pranavahana dhamani*. This gives clear idea about *pranavaha strotas*.

CONCLUSION

Pranavaha strotas is important & main *strotas* of the body. It consists from nose to alveoli via external nares, nasal chambers, pharynx, larynx, trachea, bronchus & bronchioles, which carry oxygen or carbon dioxide to lungs. From lungs these gases are transported to heart by pulmonary veins. From heart oxygen is supplied to all body cells. Then gases exchange occurs in tissue cell level. In this process heart plays very important role so heart is mentioned as *mulsthana* of the *pranavaha strotas*. The gases path and exchange occurs nose to alveoli, alveoli to heart by pulmonary veins, heart to all cells of body by arteries, all body cells to again heart with the help of veins. This total path includes in *pranavahini dhamanya*.

.There is very less amount of gases transported through plasma hence ancient scholars not clearly mentioned regarding *vahana* of *prana* through artery and veins This includes respiration as well as pulmonary and systemic circulation hence *Charak* might be called as *mahastrotasam*, Thus *Charak* and *Susharut* both described nicely and clearly about *pranavaha strotas*.

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