CONCEPTUAL STUDY OF PRANAVAHA STROTAS WITH REFERENCE TO MODERN ANATOMY

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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 purusa’ 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-
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. Individually 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.

This gives clear idea about strotas. Strotas either create matter or transfer matter form one place to another places. Tatre pranavaha strotasan, Hrudya mulam mahastrotasam Charak told that pranavah strotas has main mulasthan is hridaya and secondary is mahastrotas. Chrak and Sushrut both give first priority to pranavaha strotas. Sushrut gives clear idea regarding prana, agnisomvaya satvarajatama, panchendriya bhutatmethi prana. 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 chatmya or jivana giving matter is pran. The vahan or transfer or conduction of this prana through all structures of the body is called as pranavaha 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 pranavaha strotas and the system which supplies oxygen is called as respiratory system.

Materials and Methodology
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 flattened 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 daltens 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. [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 khavishshmedh 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 resperation, painful breathing and tightening of chest also seen. _Sushrut_ commentator _Dhala_ 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 unconsciousness, _vepenani_ means tremors of the body and lastly death occurs.

**DISCUSSION**

As we seen that _pranvaha strotas_ is first _strotas_ of the body. _Srotas_ concept is based on following four main qualities.

1. To produce specific _bhava_ or matter that means _upatti_ of _bhav_.
2. to transfer or to carry these _bhava_ from one place to another place means _vahana_ of these _bhavas_.
3. To secrete 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 _multhana_. _Charak_ and _sushriut_ gives there _multhana_ 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 ayurveda. We must know basic concepts of the ayurveda. Now in globalization world this concept of pranavaha strotas must be proved on the modern basis. Srotatvaum purusha Means body is made by so many strotas . But for understanding these strotas properly charak & susrut mentioned special strotas, charaka has given 14 number of strotas while susrut given11 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 blood7% 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 Chrak As well As Susarut both mentioned heart as a mulasthana, 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 impotent & 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 Sushrut both described nicely and clearly about pranavaha strotas.

REFERENCES


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