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Importance of *Raktdhatu* in Tissue Level Respiration w.s.r. to Premature Aging

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ABSTRACT

Internal respiration is gaseous substitute among the blood and the tissue of the body. With the help of cardiovascular system the inhaled O₂ rich blood is transported to the tissues of body. So blood is central and familiar arbitrator to sustenance of all dhatus through respiratory and cardiovascular System. The adjustments to increased metabolic rate or to hypoxia are achieved by increasing conductances¹. So these adjustments consists both augmented and decrease local blood flow and in upgrading of diffusion conditions means enlargements and recruitment of capillaries. So blood is transport medium of gases exchange at tissue level. The exact phenomenon of this exchange model stated in Ayurveda in the form of Raktdhatu and its functions as 'Prano Shonitam Anuvartate' i.e. Prana Vayu follows Raktadhatu to foster tissues of whole body². Age of person depends upon age of capillary. Rakta dhatu is important for oxygenation and deoxygenating of blood as inspired air is travelled through blood to the capillaries and expired CO₂ also travelled through blood vessels up to heart and lungs. Functions of Rakta dhatu- are as nutrition, oxygen supply to tissues. By depletion of tissue due to bleeding, the fire (digestive power) becomes weak and vata becomes aggravated. Decrease of blood produces roughness of skin, desire for sour and cold things looseness of the veins etc. So in this changing life style it is essential thing to rule out or understand to prevent premature ageing. So, this attempt is to see the role of Rakta dhatu in tissue level respiration and premature aging.

KEYWORDS

Raktadhatu, Premature Ageing, Tissue level respiration



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INTRODUCTION

The respiratory system functions unswervingly with the circulatory system to provide oxygen to the body. Oxygen taken in from the respiratory system buds into blood vessels that then circulate oxygen-rich blood to tissues and cells.³ Rakta dhatu is most crucial factor out of ten vital points hence utmost care should be taken of Raktadhatu². Body cannot survive without Prana and Rakta dhatu is **an** intermediate for the transmission of Prana hence life depends on Rakta dhatu. Susruta considered the Rakta dhatu as fourth body humors⁴. Sushrutacharya tried to highlight control of Rakta dhatu on the other body entities. Sushrutacharya also mentioned that Rakta dhatu is responsible for nourishment of all remaining dhatu⁴ (tissue). As body humor, Tridosha are responsible for creation of living body and maintain the homeostasis of the body in similar way Rakta dhatu (Blood) also takes part in origin, supporting and maintaining homeostasis of the body. As far as age is concerned regarding premature aging Ras dhatu has significant role in this course of action. But here role of Rakta dhatu is taken in case of premature aging. Rakta dhatu is formed by rasa dhatu. The Prasad portion of rasa dhatu which is watery in color, when enters in Yakrit (Liver), Pleeha(Spleen), with the help of Ranjak Pitta it twirl to red

color and called Rakta. Blood when it is pure it gives strength color & Complexion, it increases life span, keeps human being healthy. Ayurved classics mentions vivid information about the concept of aging, Process and loss or impairment of tissue system/ functions during various Decades of life and their management Charaka says 'Prano hi Shonitam Anuvartate', that means blood is essential moderator for oxygenation and deoxygenating of blood, and as this process is important for abiding life. So along with Rasa dhatu Rakta also plays important role in premature aging.

Physiological qualities of Rakta Dhatu:

Rakta dhatu in pure status looks like heated gold which turns red after putting in fire; insect Indragopa red lotus Gunja⁵. These various shades depend upon individuals Sushruta also described characteristics of pure Rakta dhatu are of proper density & do not bear any other color than meant of pure blood Rakta dhatu is neither very cool nor very warm. It is sweet; unctuous, red in color, heavy, smells typically⁴.

Pranvata:

Vata from nature and the Vata from sharir (body) are not visible. They are identified by their works. The Pranavayu plays a very important in the process of respiration. Sites of Prana Vayu head (shira) and thorax (Vaksha) are two main sites⁶. Head, throat,



mouth, tongue, nose, heart, mind and intelligence are also included in sites of Pranavayu. Pranas of the living beings stay in umbilicus & umbilicus is dependent on Pranas. Umbilicus is surrounded by Siras in the same way as the nave of the wheel is surrounded by spoks⁷. Prana depends on siras, because through this Siras from heart the Prana is circulated to whole parts of the body and here the work Prana is done.

Functions of Prana Vayu⁸:

Movement, carrying sensation upwards, filling with food (ingestion), isolation and perpetuation characterized by these and divided into five accordingly Vata sustains the body.

Prasandanam - Movements of the body, function of Vyanavata.

Udvahanam - Carrying sensation upwards, function of Udanavata.

Puranam - Filling of stomach with food, function of Pranavata.

Vivekah - Segregation of essence (Rasa) and excrement (urine and feces) function of Samanavata.

Dharanam - Upholding semen, urine etc. and during urge pushing them out, this is the function of Apanavata.

Pure air and food (external Prana) are taken in the direction and Prana activity is from nature to body (external to internal). If these inwards movements get stymied problems like asthma begins. Spitting, sneezing and

belching are reasonably less important functions.

Pranavaha Srotas:

Prana is imperative for living body and this Prana is carried by Pranavaha Srotas.

Mulasthana⁹:

According to Charak, the Hridaya and Mahasrotas are the Mula (Root) of "Pranavaha Srotas".

Respiration:

In Yajurveda, it is mentioned that air (vata) in the form of Prana and Apana enters in the nasika (Nose).

("Vatampranenaapanenasike": YAJ 15/12).

It shows that prana and apana are the words used to point out inspiration and expiration.

Shwasa Kriya is the process which involves two segments as Nishwasa (Inspiration) and Uchawasa (Expiration) going on otherwise.

The Pranavayu which enters through the nasal passages, along the course of Trachea, Bronchi and fills up the kostha (alveoli).

This whole process depends mainly on Pranavayu for inspiration and Udanavayu for expiration. From nose to the

Vayukoshas there is interior mucous membrane is lined and which secretes a small amount of Kapha. This Kapha

acknowledged as Awalambaka Kapha, helps the part by keeping moist and also conferring strength. It helps to hold any foreign matter coming along with the air.

Hemoglobin¹⁰:



Hemoglobin is iron matter of RBC. The function of hemoglobin is to carry respiratory gases, oxygen and carbon dioxide. The main function of hemoglobin is transport of respiratory gases- Oxygen from the lungs to tissues and Carbon dioxide from tissues to lungs. It is a conjugated protein. It. Iron is an indispensable mineral and chief constituent of protein involved in oxygen transport.

Tissue respiration-Ayurved concept:

Acharya Sharangdhar⁷ has described in Purvakhandha the physiological process of normal breathing as the total process of normal breathing to far transportation of organ to the tissue and the cells. He stands with the view that it is the PranaVayu situated at Nabhi Pradesha (center of the body) comes out of the neck; touching the lotus like heart & after getting saturated with Vishnu Padamrata (O₂) from atmospheric air again enters back forcefully¹¹. This respiration starts from nabhi, which may be considered as umbilical region. Diaphragm plays an important role of respiratory process. The upward and downward movement of diaphragm produces expiratory and inspiratory process of respiration where it touches to Hrutkamalantaram. Inhaled air travels through trachea reaches to the lungs where gaseous exchange takes place.

A certain amount of blood is continuously being pumped out by heart and Lungs. This blood absorbs the O₂ from the air present inside and leaves off its waste CO₂ which is exhaled out. Prof. Dr. B.G. Ghanekar says that both the lungs situated on either side in the thorax, should be regarded. In this view the term “Mulam Hridayam” suggests the pulmonary arteries originating from the heart and transfers towards the lungs. He also accounts the bronchioles branching out from both the bronchi.

PEFR¹⁰:

Peak expiratory flow rate is the maximum rate at which air can be expired after deep inspiration. It is useful for assessing the respiratory diseases particularly to distinguish the obstructive and restrictive diseases.

PREMATURE AGEING:

Increase of Vata in old age which causes improper nourishment of Rasa Dhatu. The dependent Dhatus also undergo improper nourishment. This process is steady and leads to irreversible process of aging. The etiology of premature aging can be momentarily summarized as causative factors such as excess food intake and improper lifestyle, non-suppression of unpleasant emotions leading blocking the body channels which in turn causes agnimandya and ama. When the function of



Agni is vitiated, there is inappropriate nourishment of Rasa.

DISCUSSION

Pranavaha Srotas is clearly the transport system of Prana which has been narrated as vital air inhaled and also be the vital energy of the body responsible for each and every activity of living being. Among the five types of Vata, there is Pranavata which is usually used and appear to be appropriate. This Pranavata signify the atmospheric air which is important for respiration and vitality of life. The organs described in Pranavaha Srotas according to Gangadhar Tikka are Hridaya and Vaksha.(Phusphusa i.e. Lungs). Chakrapani says the passage through which “Vayu” in terms of “Pranavaha” passes through the body is known as Pranavaha Srotas. Pranavayu is circulated through the body by hridaya with the help of Vyan Vayu. Sadhak Pitta which is in the heart (hridaya) with the help of Vyan Vayu Avalambaka Kapha is secreted by micro respiratory tubules and alveoli (Vayu Kostha) in Phuphusa. Avalambaka Kapha is present between hridayavaran (Pericardium) and Phuphusavaran (pleural cavity). Sleshaka Kapha present in Pranavaha Srotas helps in the sandhan of all the peshis. According to Susruta, there are two Pranavaha Srotasas originating from

hridaya (heart) & Rasavahinis dhamanis (Arteries carrying nutritional fluid). In connection with Rasavahinis dhamanis, there is difference of text, where one can find Pranavahi dhamanis in its place⁸.

The basic control of breathing is governed by the activities of neurons of medulla oblongata and pons. The respiratory centers in the medulla and pons are sensitive to both excitatory and inhibitory stimuli. According to Charaka Samhita the increased and decreases number of respiration is found in the internal covering (avarana) of Vatadosha. Thus the Pranavayu seated at brain controls the swasana karma in life. In fact the swasana is a well-known carrier of Prana Vayu (Nabhisthapranapawanah) which is the crucial of life and without the proper supply of air the O₂ cannot be absorbed by the blood.

So, Rakta dhatu along with **Raktavaha strotas** and Pranavaha strotas plays important role in tissue respiration process. Aging is one of the inevitable processes occurring in each and every living being and one cannot avoid it. Ayurvedic references have mentioned it asa natural developing different disease increases in old age. There are structural and functional changes takes place at cellular level, tissue level and organ level. The biochemical symphony of cells and tissues undergo



changes with age, physiological capability reduces and the aptitude to sustain homeostasis in adapting to a variety of stress decline there by person becomes more exposed to diseases. For understanding the process of aging in terms of ayurveda, needs the scrutiny of the physiological changes occurring at the level of doshas, dhatus, malas, srotas, indriyas, agni and ojas. Nourishment of all the dhatu is done by Rakta dhatu. Kshaya and vriddhi in all other dhatu is caused by shonita.

oxygenation of blood, and this is essential for enduring the existence. So, Rakta dhatu plays significant role in premature aging.

CONCLUSION

The precise noticeable fact of this exchange model is stated in ayurveda in the form of Rakta dhatu and its functions as 'Prano Shonitam Anuvartate' i.e. PranaVayu follows Rakta dhatu to promote tissues of whole body. So execution of respiratory system that sustains and reflects exterior and inner atmosphere of body through Rakta dhatu and through tissue respiration process. Kaalaja Jara is inevitable but one can delay the premature aging by following healthy life style. Ayurveda gives sound concept of aging; it has given different measures among Dinacharya, Rutucharya and Sadvrutta which straight forwardly or circuitously work on delaying aging. According to Charaka, blood is important negotiator for oxygenation and de



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