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## A CONCEPTUAL STUDY OF KALA SHARIRW.S.R.TO RAKTADHARA KALA: A REVIEW ARTICLE

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### ABSTRACT

The word kala has been used in many senses in vedic & other ancient literature, Kala Sharira is an important part of Ayurvedic anatomy. Kala was first time described by Sushruta. He has explained kala as a barrier between dhatu and its ashaya. Vagbhata has then added embryological development that it is the important physical and functional components of the body. They form a protective coating for the ashayas as well as boundary between the ashayas and dhatus. There are seven kala in the body, in which second kala is Raktadhara kala. Kala sharira (anatomy and physiology of kala) gives us information about the important membranes and layers of the body which take part in many important functions of the body. Acharyas of Ayurveda have described the Anatomy & Physiology of Raktadhara kala in very brief manner. It is explained that Raktadhara kala holds the Rakta dhatu (Blood) & present especially in sira (vessels), yakrita (liver) & pleeha (spleen) but which structure inside of them is responsible for Raktadhara kala is not clearly mentioned. Hridaya (Heart) is an important organ of blood circulatory system but it is not included as a specific site of Raktadhara kala. So for proper understanding, it is essential to correlate it with the modern science & elaborate in a proper way.

**KEY WORDS:** Kala, Kalasharir, Raktadhara kala, Dhatu, Aashaya

## INTRODUCTION:

As we know, the diagnosis of any diseases is very important before treatment, similarly the knowledge of Sharir (Anatomy & physiology) is also important before diagnosis. So, the knowledge of Sharir is the base of treatment. Sharir is a part of Sharirsthana of Samhitas in which many important Anga, pratyangas are described. Kala is also one of them. Acharya Sushruta has described about Kala in Garbhavyakaran chapter of Sharirsthana. He stated that kala is a thin membranous layer which separates underlying Dhatu from its Aashaya. The specific kalas are located at their specific sites in the body. There are seven kalas in the body. Raktadhara kala is also one of them which is described as second kala by Acharyas. It is present inside the flesh (muscle) within which Shonita (blood) contains & is found especially in sira, yakrit & pleeha.

### AIM :-

To study the kala sharir & Raktadhara kala in ayurvedic as well as modern view

### OBJECTIVE: -

To study the kala sharir from various samhita.

To study the kala and Raktadhara kala as per modern view

## MATERIAL AND METHODS:

Classical texts of Ayurveda viz Sushruta Samhita, Ashtanga sangraha, Ashtangahridaya, Bhavprakash and Sharangdhar Samhita. Reviewing of journals, articles, internet material and previous research papers related to this subjects.

Description of Kala according to Sushruta Kala is defined as a separator between dhatu and its ashaya. By definition is clear that the kalas are the layers or membranes present at the junction of the dhatu and their ashayas. They are principally of 7 types

**Mansadhara Kala** –It is the first type of kala. Which is found inside the muscles and which allows the siras (veins), snayu (ligaments), and dhamani (arteries) to spread their branches inside the muscles.

**Raktadhara Kala** –It is second type of kala. Which is present inside the mansa (muscles) within which shonita (blood) is present especially in siras (veins) localized in yakrit (liver) and pleeha (spleen).

**Medodhara Kala** –It is the third kala, and med is present in the abdomen and small bones of all living beings.

**Shleshmadhara kala** –It is the fourth type of kala. This kala is present in synovial membrane. This is present in all sandhi (joints).

**Purishdhara kala** –It is the fifth kala. It is found in pakvashaya (large intestine and rectum) within abdominal cavity. This kala extends from yakrit (hepatic flexure) to whole large intestine or the remaining segments of large intestine which surround other viscera of abdomen. This kala separates the kitta and sara bhag right from unduk.

**Pittadhara kala** –It is sixth type of kala. Which supports the four kinds of food and drinks pushed out from the amashaya (stomach) and staying in the pakvashaya (small and large intestine).

Shukradhara kala –It is last and seventh kala. Which pervades the entire body in all living beings.

Acharya Sushruta also described other kala :

Phuphusavarana:- Each lung is invaginated by membrane known as pleura, formed from serous membrane. It has two layers – parietal and visceral. It helps in lubrication of the organ and helps to expand and contract easily during breathing process.

Hrudayavarana :- Covering over the heart known as pericardium, has two layers fibrous and serous. It is made up of strong fibrous tissue. It protects the heart from distension of overfilling. It helps to maintain general position of the heart.

Udaravarana :- Covering immediately underneath the abdominal wall known as peritoneum. It is a sac of two membrane having two layers – parietal and visceral. It is made up of serous membrane. It provides a slippery surface for free movement of abdominal viscera. It helps in protection of viscera. Helps in absorption of fluid effusion from peritoneal cavity. It helps in healing of wound. It is storage of fat.

Mastulungavarana:- The brain is very important but delicate organ. It is enclosed by membranes is called as meninges. It consists of three layers – duramater, arachnoid and piameter. The cerebrospinal fluid is filled between its layers. It protects the brain.

Asthyavarana:- Covering over the bone known as periosteum. It is made up of dense fibrous tissue. Ashtyavarana kala may be called as ashtidhara kala. It protects the bone.

Vrushanavarana:- Covering over the testes known as tunica vaginalis. It has two layers parietal and visceral. It is a serous membrane. Kala acts as shock absorber in the body.

### **Description of Kala in Ashtangasangraha**

Kleda located between dhatu and ashaya, gets matured by its own ushma, becomes coverings like that of snayu, shleshma, jarayu etc. Like saar (pith) of wood, it is saar of dhatu; however, small amount of rasa is left within it so it is called kala..Vagbhata has mentioned kalas in ashtangasangraha..

### **Description of Kala in Ashtanghridaya**

Kala is kleda between dhatu and ashaya. He has given more clarification about its genesis that ushma of rasadhatu matures the kleda located between rasadhatu and its ashaya to form the first kala. Like this it continues till ushma in shukradhatu forms seventh kala. Vagbhata also mentions kalas in ashtanghridaya as like sushruta instead of raktadhara kala – asrigdhara kala, shleshmadharakala – kaphadhara kala.

### **Description of Kala in Bhavprakash**

Bhavprakash's opinion about kala is almost same as that of sushruta and vagbhata; only difference is the specificity made about kleda and ushma. He has deviated from his predecessors by specifically stating that the kleda involved is of dhatu (located in ashaya) and its maturation to the form of kala is achieved by the action of body heat.

### **Description of Kala in Sharangdhara Samhita**

Sharangdhara's explanation of kala also gives the same meaning and anatomical definition of kala. According to him 'The kleda or moisture or liquid portion present in between dhatu and ashaya is processed by the heat of the body and converts into kala. Sharangdhara explained also seven kala – Mansadhara, ashrukdhara, medodhara,

yakritpleehadhara, antradhara,  
agnidhara, retodhara kala.

- Pleeha – Spleen
- Siras – Blood Vessels

Functions of Kala:

- a) Formation
- b) Protection
- c) Absorption
- d) Transformation
- e) Secretion
- f) Selection

According to location (sthana) of kala they perform following functions :

1. Mansadhara kala supports and protects sira, snayu, dhamani, srotas etc, and also gives the origin to certain muscles like cremaster or platysma.
2. Raktadhara kala helps in formation and transmission of blood.
3. Medodhara kala acts as a lubricant and provides protection to the underlying structures, and gives supports to meda.
4. Shleshmadhara kala secretes synovial fluid (shleshmak kapha) and lubricates the joints. This kala allows all bony joints to move freely on their respective axis and supporting its life functions.
5. Purishadhara kala is meant for supporting fecal matter and separates waste products.
6. Pittadhara kala holds four type of food and water and digest them by absorbing heat of pachak pitta.
7. Shukradhara kala secretes shukra and it is present all over the body in all living beings. As a hormones which circulate in the entire body.

#### **Sthana Nishchiti**

According to Acharya Sushruta, Raktadhara kala is deeply embedded in Mamsa Dhatu i.e. muscle tissues. The specific site of this kala is Siras, Yakrut and Pleeha. Yakruta and Pleeha are completely made up of Rakta. Also these two are stated as the origin of Raktavaha Srotas i.e. Circulatory system. Correlation-

- Yakruta – Liver

#### **MODERN VIEW:**

Actually Kala means different types of membrane like fibrous, serous & mucous or lining, supporting & separating or fasciae, septa, sheath & capsules which covers the organ externally or internally & separates from one structure to another. They are given names according to their place & function. The main function of kala is to holding (Dharan) of fundamental constitutions (Dhatu) not to make some of the Dhatu. According to "Dhatva-shayan-tar-maryadah" it is clear that the Raktadhara kala is a membranous limitation between Raktadhatu (blood) & Aashaya (cavity of vessels).

This verse clearly indicates that Raktadhara kala is present within the capillaries, blood vessels & also the vascular organs. Modern science has explained the different types of blood vessels which include artery, vein, capillary, arteriole & venules. It means a unique structure is present within all the vessels which are responsible for Raktadhara kala. Through exploring the anatomy of vessels we find three distinct layers from the walls of vessels that are tunica externa, tunica media & tunica intima, in sequence from outer to inner. Since tunica externa & media are not in direct contact with blood, so we will not consider these layers under Raktadhara kala. Fact, which comes out from modern literatures that, a special type of structure called sinusoids are present inside the liver & spleen in very large amount. So, the presence of sinusoids may be a reason mentioning that liver & spleen are also a place of Raktadhara kala. Because sinusoids are a special type of capillaries which

differ from other capillaries in the body. Structurally the wall of sinusoids consists of nothing but endothelial cells and it is a prime layer which holds the blood under circulation. So it may consider as Raktadhara kala. The wall of the human heart is composed of three layer-epicardium, myocardium & endocardium. The inner lining of the heart is called endocardium. & is being in direct contact with blood. It is a smooth membrane of endothelium & is the same layer that covers the inside of all blood vessels, So it merges with the inner lining (endothelium) of the blood vessels.

### CONCLUSION: -

Structurally kala can be correlated with mucous membrane, fibrous membrane or serous membrane. Kala shareer gives us information about the important membranes and layers of the body which take part in many important functions of the body. They also produce and hold the important components of the body like blood, mucous, stool etc. From above discussion, one important point can be drawn out that all the vessels and heart also have a similar innermost layer which is being in direct contact with blood and is a limiting lining between blood and vessels wall. It is called vascular endothelium. It is also present in sinusoids. Most of the sinusoids are present in liver & spleen, possibly due to which these are specially considered as a site of Raktadhara kala, So we may consider vascular endothelium as a Raktadhara kala.

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