



RAKTDHARADHARA KALA AND ITS CLINICAL ASPECT A REVIEW STUDY FROM SUSHRUT SHARIR STHANA

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ABSTRACT

Anatomy is science that deal with the different structures of human body like bones, joints, *Twacha*, different sense organs and kala etc. Relevant knowledge of anatomy is very important for better understanding of diseases and their cure in form of medicinal or surgical process. Kala is unique *ayurvedic* concept explained by *Acharaya sushruta* in *sushrut samhita*. *Acharya Sushruta* while explaining the detailed development of body parts in *Garbhavyakaran Sharir* Chapter of *Sharir* sthan mentioned the concepts of *Kala*. There are total Seven *kala* in body. *Kala* is limiting membrane or layers in our body situated between *Dhatu* and *Aashaya*. These are extremely minute particles and in visible to naked eye, similar to cell. They can be understood by their functions in the body. The word *kala* stand for, the property or a quality so these are special membranes in the body which are having important role in performing body physiology. There are many layers or membranes in the body which form an envelope over the organs. The cell membranes separating each cell from each other can be considered as *Kala*.

KEYWORDS: Cell membrane, membranes, *sushrut samhita*, *Acharya Sushruta*, *Dhatu*, *Aashaya*, *Garbhavyakaran sharer*, *Raktadhara Kala*.

INTRODUCTION

Ayurveda is described as science of life. It mainly focuses on maintaining sound health by prevention from diseases and also curing one if diseased. The goal of this science is to fulfill four *Pursharthas*; *Dharma*, *Artha*, *Kama* and *Moksha*. In order to attain it, healthy body and mind is of prime importance. The nature of human body is described in details in various *Ayurveda* classics. In this *Acharya Sushruta* had described human body in a very elaborate fashion and with relevant clinical utility. The structural and functional organization of body is briefed in *Tridosha*, *Saptadhatu* and *Trimala*. Further ramification of each of this aspect structurally and functionally gives a wide holistic approach to view the human body. This gives us access to know the working physiology of human body and thus enables us to rectify it in any pathological condition. *Kala Sharir* is one such least discussed topic by most of the *Acharya*. *Ayurveda* classic *Sushrut Samhita* had mentioned this topic and described it in a very useful way. *Rachana Sharir* is one of branch of *Ayurved* which deals with anatomy and physiology of body parts. *Kala-sharir* is also one of important concept described by ancients *Acharyas* in their respective compendia. *Acharya Sushruta* while explaining the detailed development of body parts in *Garbhavyakaran Sharir* chapter of *Sharirsthan*

mentioned the concept of *Kala*. There are total seven *Kala* in the body. *Kala* is a limiting membrane or layers in our body situated between *Dhatu* and *Aashaya*.^[1]

Aim

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

Objective

Study the *kala sharir* from various *samhita*.

Study the *kala*. & *Raktadhara kala* as per modern view

MATERIAL AND METHODS

Classical texts of *Ayurveda* viz. *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Sangrah* and *Ashtanga Hridaya* were consulted as research references, to know the line of treatment in ancient system *Ayurveda*. Evidence based resources as journals, books and data based information from various search engines were referred for recent information. As *Kala* performs some specific functions in the body the malfunction of it may leads to diseases so to study the applicability of the *Kala* described in *Ayurveda* in the light of present contemporary knowledge this study was initiated. These are not mere the limiting or covering membranes but also perform some vital functions of the body. The word *Kala*

stands for property or a quality so these are some special membranes in the body which are having important role in performing body physiology. There are many layers or membranes in the body which form an envelope over the organs. They provide support and protections to the organs.^[2]

Observations

There are total seven Kala in the body. Kala is a limiting membrane in our body situated between *Dhatu* and *Aashaya*. These are not mere the limiting membranes but also perform some vital functions of the body. The word Kala stands for property or a quality so these are some special membranes in the body which are having important role in performing body physiology.^[3]

The *Kala* are further classified in three groups *Snayu Pratichanna*, *Jarayu Santat* and *Shleshma Vestita*.

- i. ***Snayu pratichanna kala*** – membranes of connective tissues such as fascia, aponeurosis, ligaments, tendons, external layer of wall of organ of digestive, respiratory, circulatory, urinary, reproductive systems etc.
- ii. ***Jarayu santata kala*** – membranes formed from fibrous connective tissue making for superficial and deep fascia forming part of muscles etc., separating them into functional units or even uniting the parts together, these also form body cavities etc.
- iii. ***Shleshma veshita kala*** - membranes formed from fibrous epithelial tissues, which secrete fluids; these are two, viz – mucous membrane and serous membrane.

Modern view of *Kala* (Membrane)

Membrane are formed, during the embryonic period itself, mainly from three kinds of primary tissues – epithelial, connective and adipose.^[4,5]

1. **Epithelial tissue** – makes for two kinds of secreting membrane viz, mucous and serous; the Former secretes thick jelly like fluid i.e. mucus and are inside all hollow organs of digestive, respiratory, circulatory, urinary and reproductive system, Serous membranes secretes thin watery fluid and are present enveloping certain organs (heart, lungs, testes etc.)
2. **Connective tissue** – Membranes formed from this are of different shapes – long, cylindrical, flat etc and go into the formation of fascia, aponeurosis, septa, ligaments, tendons, cartilages etc; some of these are inelastic, some moderately elastic and some greatly elastic. These are found in the skin, walls of organs of digestive, circulatory, urinary, and muscular and haemopoietic systems.
3. **Adipose tissue (fat)** is a storage tissue. It forms membranes or layers – thin or thick in various places. It is present in the subcutaneous tissue, bone marrow, abdominal wall, omentum, forms padding around some organs like kidneys, eyeball etc. With the help of above facts, three kinds of *kala*.

DISCUSSION

Kala is important concept described in Ayurved which has to be given more emphasis. Kala are some special membrane in the body which performs some functions and assist to maintain body physiology. The three types of Kala described in Ayurved i.e. *Snayu Pratichanna*, *Jarayu Santat* and *Shleshma Vestita* can be correlated with fibrous, serous and mucous membranes in the body. The second kala is *Raktadhara kala* (supporting membrane of blood) it is present in *Mamsa* (Muscle tissues) especially in *Sira*, *Pleeha* (Spleen) and *Yakrut* (Liver). When muscles are cut *Rakta* flows from the wound just as a milky sap when trees are cut.^[7,8] *Acharya sharangadhara* mentioned *dvitiya Rakta dhara kala* but he differs in his opinion he claims that *Yakrut* (Liver) *Pleeha* (Spleen) is the 4th kala where *Sleshma dhara kala* is present. Initially *Raktadhara kala* is considered as a semi permeable barrier separating lumen from vessel wall, the endothelium is now recognised as a complex endocrine organ responsible for a variety of physiological processes vital for vascular homeostasis. The endothelium has an important role in maintaining vascular homeostasis.^[9] Although once considered simply as a semi permeable membrane, endothelial cells transducer a wide range of physiological stimuli, and in response, produce a variety of signalling molecules that exert autocrine and paracrine effects. The endothelium can therefore be considered as an important endocrine organ and is responsible for maintaining vasomotor tone, haemostasis and thrombosis, inflammatory processes, platelet and leucocytes vessel-wall interactions and controlling vascular permeability. The endothelium modulates arterial stiffness which precedes overt atherosclerosis and is an independent predictor of cardiovascular events.

Unsurprisingly, dysfunction of the endothelium may be considered as an early and potentially reversible step in the process of atherogenesis and numerous methods have been developed to assess endothelial status and large artery stiffness.^[10] Atherosclerosis a slow disease in which arteries becomes clogged and hardened. It is the underlying cause of most cases of heart attack, stroke and vascular dementia and is found in 80 to 90% of Americans over the age of 30. Fat, cholesterol, calcium and other substances form plaque which builds up in arteries. Hard plaque narrows the passage that blood flows through. That causes arteries to become stiff and inflexible (atherosclerosis is also known as hardening of the arteries). It contributes to the development of cardiovascular disease which is the leading cause of death in people over 45. Soft plaque is more likely to break free from the artery wall and cause a blood clot which can block blood flow to vital organs. Many researchers believe it begins with injury to the innermost layer of the artery, known as the endothelium. The *Raktadhara Kala* mentioned in Ayurved has great similarity with that of endothelial lining of blood vessels. Any dysfunction will leads to formation of diseases. In contemporary science atherosclerosis is associated with

endothelium and other layers of vessels. So kipping in mind the concepts of Kala told by Ayurved the treatment approach to this life threatening disease can be obtained. It could be possible that by means of herbal remedies acting on Raktavaha Srotas or Rakta dhatu would contribute to reverse the pathology occurred in blood vessels, by normalizing the functions of Raktadhara Kala. In this view a clinical study is planned to assess the role of Raktaprasadana Dravya in the cases of Atherosclerosis. The study includes the anti-lipolytic and anti-inflammatory effects of these drugs in albino rats. The study is ongoing the results are not observed.

Since this is the novel aspect of treatment in Ayurved. Many people have developed Gunachikitsa, Panchabhautika Chikitsa, Tridosha Chikitsa, Nadichikitsa etc. Similarly this can be a new instinct to develop Kalachikitsa as a specialty of Rachana Sharir.

CONCLUSION

Kala described in *Ayurved* are special membranes in the body present between *Dhatu* and *Aashaya* which performs the vital functions in the body. These are having three categories viz. Snayu Praticihanna, Jarayu Santat and Shleshma Vestita and can be correlated with fibrous, serous and mucous membranes respectively. The *Raktadhara Kala* described in *Ayurved* can be correlated with endothelial linings present in blood vessels and sinusoids of liver and spleen. *Kala* can be considered as one of treatment site for the diseases associated with respective *Kala*.

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