

A CONCEPTUAL REVIEW OF LITERATURE OF KALA SHARIR

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Article Received on 16/02/2022

Article Revised on 10/03/2022

Article Accepted on 31/03/2022

INTRODUCTION

The word Kala has been originated from the root “Kal” “Gatau Sankhya”. Gati means that which is having movement and Sankhyan means which has been used in counting. As per Panini Dhatu Patha the word Kala means “Kalayati iti Kala” i.e. which moves and counts.

The word 'Kala' has been used in various senses in common Sanskrit parlance, in Vedic literature and in Ayurveda. In Anatomy, however, it is acceptable only in one sense as the promiscuous use of the term will vitiate the scientific nomenclature. The following passages of famous ancient Lexicographers will show the various meanings of 'Kala' in common phraseology.

When trying to understand the term Kala in a broader perspective; we come across an assortment of meanings. Among them which are in closest relation to Sharira, are.

b) 'Shodashakala' (Ca.su.10/3) a) Vatakala stands for the meritorious qualities of Vata, whereas Vata –akala stands for the demerits of Vata. b) Sixteen qualities of the Chatushpada, i.e. four each.

2) Subtle part. – A part of anything, especially the sixteenth part.

शङ्खोर्पकिं हिमिफुआहिं चोर्षि (Amarkosha pg.35)

Often a term used for the segments of the moon.

शब्दों गतासिद्धिन्द्रिनः² द्विं दृष्टोर्त्तानिर्गुणैर्द्विह्यं घूर्णद्विघफोर्त्तानिर्गुणैर्द्विह्यं
बर्त्तसिद्धुगतं दुर्त्तसिद्धिन्द्रिनः³ (Medinikosha)

3) Kala as a division of time:

One Kala = 1min, 48 sec. (Dict. Vaman Apte)

As described for the time required for conversion of Ahara rasa from one Dhatu to another. (Su.su.14/14)

4) Kala as a different types of fine arts.

“कला स्यादंश-शिल्पयोः ।” (Hemachandra Kosha).

5) The semen which is in the process of formation is called Kala. (Amarkosha, pg.35)

6) Any practical skill of art, e.g. Music, dancing etc. But here in this context, Kala is understood as an Anatomical structure in the body and can be defined as follows:

a) Kala is like the subtle garment of silk, uniformly spreading, enveloping the Ashrayas and of various body tissues, Mamsa, Asthis etc. (Pratyaksha Shareeram, pg.6)

b) Angapratyanga. (Dalhana. Su. U. 66)

Charaka describes the term, 'Purusha ShodaShakala', the Purusha comprising of sixteen entities i.e. Pancamahabhutas and eleven Indriyas. The limiting

membrane between the Dhatu and the Ashaya is called Kala.

१. अमरकोषीय व्याख्यासुधाख्य टीकायाम्-“तालेषु च गुरुः कला ।” एवञ्च लोके कलापदस्य सप्तार्थाः पर्य वस्यन्ति । ते यथा-

१. चन्द्रषोडशांशः,

२. मूलाधन वृद्धिः

३. कालमानम्,

४. शिल्पविशेषाः (यथा चतुःषष्टि-कलाः),

५. तालमानम्,

६. अंशमात्रम्,

७. कलना ।

It is clear, therefore, that there are at least seven meanings ascribed to the word 'Kala'. These are: (1) The sixteenth part of the moon, (2) Increase on capital invested (interest or profit), (3) Measure of time, (4) The fine arts (Cf. sixty-four 'Kalas'), (5) The long stroke in music. (6) A fraction. (7) Collation.

MATERIAL AND METHODS

CONCEPTUAL REVIEW

Kala's and its types were first described by Sushruta, followed suit by both the Vagbhata. Some revolutions have been taken in the present period regarding the seven Kala's were the authors have mentioned more than seven Kalas by P.S.Variar where he has been mentioned about total seventeen Kalas have been considered. There are some authors who have categorized some of the Kalas as Vishita Kalas. Structures like Peritoneum, Meninges etc. have been pointed out under the heading of **ĪĪĪĪĪĪ** **MūsĒĒ** || But Acharya Sushruta was very perceptible in

his concepts than any Acharya's, where he has used the word "Khalu" which means without any doubt he has mentioned that Kalas are only seven in number not more than that, so all the Vishita Kalas should fall within one of these seven Kalas itself.

Acharya Sushruta elaborated the following seven Kalas.

1. Mamasadhar Kala
2. Raktadhara Kala
3. Medodhara Kala
4. Shleshmadhara Kala
5. Purishadhara Kala
6. Pittadhara Kala and
7. Shukradhara Kala

Sharangdhara though elaborated seven Kalas; he substituted the Shleshmadhara Kala with as Yakrita-Pleeha dhara Kala. The details of which will be discussed later. Some additional Kalas have been mentioned by P.S. Varier in his book the Bruhatshariram. These Kalas have been explained in a typical chronology that Kalas can be understood in a better way. But there are difference of opinions regarding the chronology of the Kalas like Vaidya Rames Nanal has explained that the Kalas have been mentioned in this chronology might be based on their creative path or in opting nutrition to these Kalas.

The Kalas are formed from the Kleda which is present between the Dhatu and Ashaya by its own heat the Kleda is converted into a form of Kala which will be having the similar features of Snayu or Jarayu or Shleshma in nature.

These Kalas have been correlated to three structures of our body as.

1. Snayu 2. Jarayu and 3. Slehamna vestitam.

1. Snayu: these are the structures of our body which have a specific function in the body located in some parts of the body. They have been explained as four types, having a main role to abide the weight of the person said as –

नसायुर्भिर्बहुभिर्बद्धास्तेन भारसहा नराः ॥

So these Kalas should definitely have this quality in them in the sense that they also abide the weight of the Dhatu that which it is holding. Particularly this quality can be associated to Mamsadhara and Raktadhara Kalas.

Dr. Ghanekar comments that the Snayu Kala has its origination from the tendons e.g. the fibrous membranes and hence appears to be like the tendon (Su.su.sh.4). Whereas, as Dr. Thatte implies that, these Kala's are considered here which cover the tendons. He mentions the specific term, 'Snayubhishca pratichanna' (Manava Sharira, pg 440).

2. Jarayu: it is the structure related to the foetal membranes. These membranes protect the foetus from the internal as well as external damages which can affect the foetus. These membranes are not very thick but still enough to protect the foetus from damages. Foetal membranes also have selective permeability which

allows only required substances to the foetus. In the same way some of the Kalas may also possess the function of selective permeability or selective absorption, commonly seen in the epithelial tissue membranes. Particularly this quality can be related to Purishadhara and Pittadhara Kalas. Dr. Ghanekar opines that these are created from the placenta and are similar to the placental membranes. Dr. Thatte says that these Kalas derive their name because they are similar to those covering the placenta.

3. Shleshma: here the surface of a structure looks like it is been smeared by Shleshma. Means this may have main role to have a smooth surface for easy moving over the vicinity structures also in the interior of the vessels where it provides a smooth layer appears as a polished floor for the free flow of the blood, which is known as endothelium. Particularly this quality is seen in Shleshmadhara and Medhodhara Kalas, where on contemporary science these can be related to Peritoneum, Pericardium, Meninges, Synovial membranes, Loose areola connective tissues etc.

Whereas, Dr Ghanekar in his commentary state that these originate from the mucous membrane and appear like a thin layer of mucous membrane covering the surface of the various tracts and Dr. Thatte says these are membranes which look to be as if covered by mucous.

By these three correlations it is understood that all the Kalas may not encompass all three distinctive features in them. Any one among these three will certainly can be observed in all the Kalas.

Dr. Varier mentioned four kinds of Kala's which are in accordance with their modern comparison.

1. Prayahstaneva: the epithelial membranes.
2. Snayava : the fibrous membranes
3. Slaishmika : the mucous membranes.
4. Mamsaja : the muscular layer of the membranes.

Vaidya Vilas Nanal classifies the Kala's as Saumya and Aagneya. (Shareera guna visheshank, 1993, pg.109). The saumya Kalas are Mamsa, Meda, Shleshma, and Sukra. Whereas the Aagneya Kala's are Rakta, Purisha and Pitta.

Coming to individual Kala's here is an attempt made to illustrate in depth analyses and interpretation of the literature is done with available texts in the classics and the allied sciences.

DISCUSSION

1. MAMSADHARA KALA: The first Kala mentioned in the Sushruta samhita (Su.sa.4/2) and the third to be revealed in the Bruhatshariram. This is a layer which covers the Mamsa and in which the Sira, Snayu, Dhamani and Srotus are embedded within this Kala (Su.sa.4).

This whole structure is compared to a lotus stalk which grows in a swampy area & its stalk penetrates the muddy layer below the water & spreads taking footage within that layer. Taking into account Dalhana Acharyas

commentary, the lotus roots are compared to the Sira, Dhamani etc. the water layer to the Mamsa Dhatu & the soil beneath, which provides nexus for the roots, the Mamsadhara Kala.

2. RAKTADHARA KALA: The second Kala is Rkthadhara Kala where Sushruta mentioned as it is present in the Muscle. It is also the second one in the order by all the authors. Sushruta said when the Masma is incised the blood oozes out similarly like when a Shiri vruksha is cut as it lactates the milky secretion from it in the same form it is seen when this Kala is wounded. Later he explains about the important location in the body where the presence of Rakthadhara Kala is seen. This Kala is effectively seen in Dhamni, Sira, Yakrut and Pleeha. But while mentioning these places he has not quoted about Hridaya which is also related to blood flow. Why Acharya has not considered Hridaya in relation to Rakthadhara Kala? As it has been said that Kalas are the structures acts as an boundary between Dhatu and Ashaya where Hridaya may not be an Ashaya for Raktha. So Acharya would have not mentioned Hridaya in relation to this Kala. Hridaya cannot become an Ashaya for Raktha dhatu, because if blood commence to stay in Hridaya it leads to formation of clots which can cause embolism which may lodge anywhere in the body. Heart (Hridaya) is the only organ in the body which pumps the blood endlessly by which the output and input of the blood depends. If it is as an Ashaya then the pumping should be stopped for a while and again it has to be continued but which is not see like that. Whereas Liver and Spleen are concerned as reservoir for blood and to the certain extent in the veins the blood may stay for a short period like in the sinusoid of Soleus muscles.

3. MEDODHARA KALA: This is the 3rd Kala as per Sushruta and as per Brihatsharira it has been explained as fourth Kala in the order. Acharya has said that this Kala is present in Udara of all the human beings. When it comes to the Medhodhara Kala he has tried to explain about the location of Medous in the body common for both the sexes. He said that this Kala is mainly related to Udhara and then he explains about the types of Medouses present in the body along its location. Why this Medous is mainly seen in Udhara has to be understood. Because as per the modern science the fat in the abdomen is more harmful than any other parts of the body. If we look at the distribution of fat mainly depends on Estrogen which promotes filling of fat depots whereas testosterone inhibits fat deposition, fat is more present in the abdomen anteriorly related to omentum and posteriorly with folds of mesentery by which the whole abdomen is surrounded by fat so that the abdominal temperature is maintained more than the body temperature. It is in the abdomen all the process of digestion will be carried out where the temperature here should be higher to have a proper digestion of the ingested food. Japanis believe that if you drink very cold water regularly it annihilate the internal organs. It is true because if we drink the cold water internal abdominal temperature will fall down where the organs have to function more to get digest the ingested food. And not

only that it will sure affects the digestion which may lead to formation of Aama which leads to many complications in the body.

4. SHLESHMADHARA KALA: The fourth Kala according to Sushruta and Vagbhata; whereas the ninth Kala according to the Brihatshareeram. As mentioned before, this Kala is not described by Sharangdhara, but instead of this he mentioned as Yakruta Pliha dhara Kala. In the body there are different types of membranes existed which are formed from different types of tissues of the body. The members of the body can be classified as and the connective tissue is developed from the mesoderm which is all a middle layer of the trigeminal layers. This has been collected from an article titled – “Connective tissue: A body-wide signalling network?” there he has said as the musculoskeletal system exemplifies a physiological system that has been studied very much in isolation from the rest of the body. This is perhaps because the role of specialized musculoskeletal tissues (e.g. bones, muscles, cartilage, tendons etc) is so strongly associated with posture and movement. Paradoxically, a more extensive, even global physiological role for connective tissue was suggested over 2000 years ago by the ancient practice of acupuncture. Traditional Chinese medicine is based on the premise that a network of “meridians” exists within the “fat, greasy membranes” extending throughout the body and that this network functionally “connects” all parts of the body with one another. Recent evidence suggests that a correspondence may exist between the network of meridians and the body-wide network formed by connective tissue. Following this lead, the hypothesis presented in this paper is that the “connectivity” provided by connective tissue is not only be anatomical, but functional as well.

5. PURISHADHARA KALA This is the fifth among the Kalas, but is mentioned as fourteenth in the Bruhatshareeram. There are many interpretations are available on this saying that this Kala is present in Liver and Kidneys. While expaling about this Kala he has used the names of three organs they are – Yakrut, Pakwashaya and Unduka. As he has used the word यकृतसमन्तात् people have tried to relate this Kala with Yakrut. Regarding Pakwashaya and Unduka he has said at these two places the Mala vibhaja takes place, so how to understand these two structes in the body in relation to Purishadhara Kala? Purishadhara Kala has to be related to only Purisha Mala of the body not to any other Malas of the body. The mucosa of the large intestine consists of simple columnar epithelium, lamina propria and muscularis mucosae. The epithelium contains mostly absorptive goblet cells. Absorptive goblet cells secrete mucous which lubricates the passage. Both of the cells are located in the crypts of Lieberkuhn embedded in the mucosa.

6. PITTADHARA KALA: It is the sixth Kala mentioned in the classical texts and the tenth according to Bruhatshareeram. It is the place where mainly Agni is related. Vagbhat took a step ahead to relate this Kala with Grahani. While explain this Kala he has mentioned about two organ which is related with this Kala they are

– Amashya and Pakwashaya, between these two structures Pittadhara Kala is present. At this Kala all four types of food are digested and also absorbed into the body before it reaches Pakwashaya. But here one point has to be noted why Pittadhara Kala is mentioned after Purishadhara Kala. Because Purisha is formed only after the proper digestion and absorption is over. Then what made Acharya to mention first Purishadhara instead of Pittadhara Kala. The Pittadhara Kala in the light of modern medicine is compared to the mucous membranes of the small intestine especially those of the duodenum and up to jejunum. Hence is stated; ‘The major events of digestion and absorption occur in a long tube called a small intestine. Because most of the digestion and absorption of nutrients occur in the small intestine, its structure is specially adapted for these functions.’ – Principles of Anatomy and Physiology, Tortora.

As in the body, Pittadhara Kala is present in every cell. Here it has the closest resemblance with the bi-layered membrane of the mitochondria, the power houses of the cell; as it provides energy for every conversion that occurs in the cell. Gastro Jejunaoustami is a procedure where jejunum is attached to stomach in that condition the person will not be able to eat all the food items because there will be no involvement of the bile and pancreatic juice which opens into the second part of the duodenum, which is related to Pittadhara Kala.

7. SHUKRADHARA KALA: This is the last among the seven Kalas described in the classical texts and as well as in Brihatshareeram. Susruta mentioned about this Kala as it is present all over the body. What may be the reason why the Acharyas have mentioned that this Kala is present all over the body and at the time of copulation the Shukra is collected from all over the body and then ejaculated through the Mootra Sroto margha and how it takes place? Because if the Shukra is present all over the body in its original form for which there was a question raised by a student that if we cut our finger and then keep it in the vagina will that lady will get pregnancy because as Shukra is present all over the body. But we do not find that so how to understand this concept of presence of Shukra dhara Kala all over the body and at the time of ejaculation how the Shukra is collected and ejaculated from all over the body. The upamana which he mentioned here is that like presence of ghee in the milk and jaggery in the sugar cane it has to be understood in the same way that shukra is present all over the body. But to obtain ghee and jaggery from milk and sugar cane it requires many processes.

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