

AN ANATOMICAL STUDY OF PITTADHARA KALA - A REVIEW ARTICLE

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ABSTRACT

In the absence of advance modern technology, the *Acharyas* have explained about *Kala* by their divine power of observation, knowledge and logic. *Kala Sharir* gives us information about the important membranes and layers of the body. *Kalas* are the limiting membrane between *Dhatu* and *Ashaya*. They also produce and hold the *Dhatu*s. They can be understood by their functions in the body. The specific *Kalas* are located at specific sites one of them is *Pittadhara kala*. It is situated between *Pakwamashaya*. The aim & objectives of this study was to compare functional aspects of *Pittadhara Kala*. All the relevant material was compiled from *Brihatrayi* and available commentaries on it. Research articles are also searched from various websites. All the references were collected & analyzed & finally conclusion was drawn. Conclusion of this study is that as per the modern science *Pittadhara Kala* can be compared as mucous membrane of small intestine. Thus, a precise knowledge of *Kala* is important for physicians to make a diagnosis at the right time & also to know if the disease is at the level of *Kala*.

Keywords: Duodenum, *Dhatu*, *Kala*, *Pittadhara Kala*

INTRODUCTION

Acharya Sushrut described *kala* in anatomical sense in *Garbhvyakaran* chapter of *Sharir Sthan*. He states *Kala* is a thin membrane which separates *Dhatu* from its *Ashaya*. The function of *kala* results into the formation of *Dhatu*s. They are minute elements and by their activity they transform *Dhaturasa* to respective *Dhatu*s.^{3,4} In the absence of advance modern technology, the *Acharyas* have explained about *kala* by their divine power of observation, knowledge and logic.

Acharya Dalhan has been said that the *Kala* structurally can correlate with fascia, septum, fibrous membrane, mucous membrane and serous membrane while

functionally can correlate them with cells or formative elements.¹²

As on cutting wood its pith is observed, likewise *Dhatu*s is found dissecting the musculature, the *Kala* are covered by *Snayu* spread as *Jarayu* and smeared with *Shleshma*.⁴

Aim & objectives

- 1) To collect the references from different *Ayurvedic* texts regarding the concept of *Pittadhara Kala*.
- 2) To collect the references from different *modern* texts regarding small intestine and digestion.
- 3) To compare functional aspects of *Pittadhara Kala*

Material & Methods

This is conceptual type of study, all sort of references has been collected and compiled from various available Ayurvedic classics text like *Sushrut Samhita*, *Charak Samhita*, *Vagbhat Samhita* and available commentaries on it. Literature is also compiled from modern textbooks. Research article is also searched from various website related to *Pittadhara Kala* and small intestine and digestion. All matter is analyzed, and attempt has been made to draw best possible conclusions.

Review of Literature

Kala is 'Dhatwashayanter Maryada' which separates *Dhatu* and *Ashaya*¹. The *Ashaya* is cavity which gives *Ashraya* to the *Dosha*, *Dhatu* and *Mala*². *Snayu*, *Jarayu* and *Shleshma* are the three basic principles in the formation of *Kala*, these three structures can be compared with fiber, serous and mucous layers respectively³ *Kala* are the pith of the stem in the tissues.

While describing *Kala*, it is said as the duramen of cores of a piece of wood or stem becomes exposed to view by cutting into it, so the *Dhatu*s of the body may be seen by removing the successive layers. These *Kalas* are extensively supplied with *Snayus* bathed in *Jarayu* and encased in *Shleshma*.⁴ *Acharaya Vagbhata* says the *Kleda* which is lies in the internal part of the *Ashaya* that becomes *Pakwa* by *Dhatwagni* and forms as *Kala*.⁵ It covers the internal and external layers of the organ, and it may separate the muscle. It helps for holding, movement, supporting, absorption and lubrication in the different parts of the body⁶. There are seven *Kalas* explained in *Samhita*.

Pittadhara Kala

Pittadhara Kala is on sixth number which is said to be lies in between *Amashaya* and *Pakwashaya* i.e. *Grahani*, which is correlated as small intestine.⁷ *Grahani* not only store the *Chaturvidha Anna* propelled from the *Amashaya* and on its way to the *Pakwashaya* but also promotes complete digestion, assimilation and absorption with the help of *Pachaka pitta* which is secreted by *Pittadharakala*.^{8,9} *Amashaya* is the part before the small intestine i.e. stomach of modern anatomy. *Grahani* is a *Sthan* of *Pachakagni* which helps in digestion of food.¹⁰ After digestion of food

Ahar is converted into *Aharras* which is then absorbed by the *Pittadharakala* for the further nourishment of the seven *Dhatu*s.¹¹ *Acharya Sushrut* also stated *Pittadhara Kala* as *Majjadhara kala* in *Kalpasthan* while describing *Sarpdansha Chikitsa*.^{12,13}

DISCUSSION

Concept of *Pittadhara Kala* is explained by *Acharya Sushrut*. We find references about *Pittadhara Kala* in *Ashtanga Samgraha* and *Sharangdhar Samhita* also. All *Acharya*'s mentioned seven types of *Kala*. Describing the structure of *Pittadhara Kala* *Acharya'ssushrut* has stated that it holds four kinds of food propelled from *Amashaya* on its way to *Pakwashaya*. All types of food brought into *Koshtha* of man becomes *Jirnra* and undergoing *Shoshan* in proper through heating agency of *pitta* thus *Amashaya* And *Pakwashaya* appear to be upper and lower limit of *Pittadhara Kala* respectively.⁹ According to *Acharya-vagbhata*, being the abode of internal fire, it with holds by force, the movement of food material passing form *Amashaya* i.e. stomach into the *Pakwashaya* i.e. intestine, digest food by heat of *Pitta*, absorbs it and allows the digested food to move further.¹⁰ *Pittadhara Kala* can be compared as mucous membrane of small intestine. The wall of the small intestine is made up of 4 layers –

- 1 – Mucosa
- 2 – Submucosa
- 3 – Muscular Layer
- 4 – Serosa (Adventitia)

According to modern anatomy following structures are responsible for digestion and absorption. Relevant features responsible for digestion.⁶

Mucosa-

- Major duodenal papilla –which is also called as hepatopancreatic ampulla and lies 8-10 cm distal to pyloric orifice.¹⁴
- Minor duodenal papilla- at which accessory pancreatic duct opens and it lies 6-8 cm distal to pyloric orifice.
- The presence of intestinal gland i.e. crypts of Lieberkuhn which invades the lamina propria. these glands are lined by goblet cells, columnar

cells, Paneth cells and enteroendocrine cells which scattered over the entire mucous membrane of jejunum and ileum.¹⁴

- Functional anatomy –the above glands secretes digestive enzymes and mucous i.e. epithelial cells deep in the crypts show a high level of mitotic activity. The proliferated cells gradually move towards the surface to be shed from the tips of the villi. In this way the complete epithelial lining of the intestine is replaced every two to four days.
- Enterocyte – absorbing water & electrolytes.
- Goblet cell- secreting mucus.
- Enteroendocrine Cell-
- 1-Secretin-Pancreatic Juice Secretion
- 2-cck- bile juice secretion.
- Paneth cell- secrete lysosomal enzyme.¹⁴

Relevant features responsible for absorption

- The length of small intestine which provides large surface area.
- villi are finger like projection, with large blood supply in the form of plexus of blood capillaries which helps in rapid absorption of nutrients into the blood.
- Plicae circularis for increase the surface area of mucosa.
- Microvilli are the smaller fold that helps to increase the surface area.

SUBMUCOSA

It is rich with Brunner's glands i.e. duodenal glands. They secrete alkaline mucous with bicarbonates which neutralize acid effect secreted by stomach. The serosal and muscular layers correspond exactly to the general structure of alimentary canal^{14, 15}

CONCLUSION

The maximum digestion takes place in duodenum supporting characteristics are as follows. The large length of small intestine provides more surface area for absorption. The intestinal glands are scattered over the entire mucosa of jejunum and ileum. Villi are large as well numerous in the duodenum and jejunum. So, we conclude that the greater length, circular folds as well intestinal glands are the main characteristics of small intestine which helps in performing digestion

and absorption which is the basic function of *Pachak Pitta* so we can easily correlate with *Pittadhara Kala*.

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