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A CRITICAL CONCEPTUAL STUDY IN UNDERSTANDING *VAPAVAHANA* AS *KOSHTANGA*

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ABSTRACT:

Vapavahana is the term use for an organ which is situated in *Udara* region and it is said as *Moolasthana* of *Medovaha Srotas*. While explaining *Medodhara Kala*, *Sushruta* mentioned site of *Medas* is *Udara*. It is an indefinite organ. The terminologies and its relation to *Vapavahana* need a probe in identifying a relevant organ or part from modern point of view and its association as *Moolasthana* of *Medovaha Srotas* with applied importance. So identifying structural entity is more important to prevent and treat metabolic disorders which are burning issue of present era.

Keywords: Koshtanga, Medovaha Srotas, Vapavahana.

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INTRODUCTION

Koshtanga is one among basic concept in *Rachana Shareera*. *Charaka Samhita* mentions *Vapavahana* as one among the *Panchaadasha Koshtanga*. [1] *Chakrapani teeka* has been quoted it as *Tailavartika* and seat for *Medas*. [2] While explaining *Vapavahana* as *Medovahasrotomoola* there is a reference regarding its location as *Udara* and is also referred as *Snigdhavartika.* [3] It is an indefinite organ. The terminologies and its relation to *Vapavahana* need a probe in identifying a relevant organ or part from modern point of view and its association as *Moolasthana* of *Medovahasrotas* with applied importance.

VAPAVAHANA

As per *Vaidyaka Shabda Sindu***,** *Medasthana roopi Koshtanga* is *Vapavahana. Charaka Samhita* mentioned it as one among fifteen *Koshtanga.* [1] *In Chakrapani teeka it is* quoted as *Tailavartika* and seat for *Medas*. [2]

While explaining *Vapavahana* as *Medovahasrotomoola* there is a reference regarding its location as *Udara* and is also referred as *Snigdhavartika*.[3] *Bhela Samhita and Kashyapa Samhita* considers *Vapavahana* as a *Koshtanga.*[4,5] It is *Matruja Bhava*.[6] *Sushruta Samhita ChikitaSthana* 2nd chapter while explaining *Chikitsa* for *Udara* there is mentioning of *Medovarti* which can correlate with *Vapavahana*.[7]

In *Parishadya Shabdhartha Shareeram* the terms used synonymously for *Vapavahana* are *Tailavartika, Medosthana, Vapa* and *Udarastha medhodharakala*.[8]Ghanekar has quoted that there is covering layer in abdominal cavity which carries fat in it and hence the name *Vapavahana*.[9]

Gananathasen Sharma has mentioned *Sthana* of *Vapavahana* and its structural definition. He considered it as *Audarya kala* and support for *Amashaya*. It protects *Kshudrantra* and *Sthoolantra*. [10]

As per Dinkar Govind Thatte *Paryudara Kala* (*Manava Shareera*) is of 3 types. They are *Vapa*, *Antrayojani* and *Snayu*. *Vapa* is layer of *Paryudara kala* (peritoneum) and lies between *Amashaya* and other abdominal internal organ. *Paryudara Kala* can be considered as *Medodhara Kala* because in these *Vasa* seen abundantly. *Vapavahana* considered one among *Koshtanga* because through *Vapavahana*, Fat is transported. [11]

Recent authors Mahendra Singh, [12] C.R Agnivesh, [13] and Tharachand Sharma consider *Vapavahana* as omentum.[14] Krishna kanth pandey considers it as part of *Paryudara Kala*(peritoneum).[15]He further divided it as *Laghu Vapa*(lesser omentum) and *Deergha Vapa*(greater omentum).Ram Sundar Rao also consider *Vapavahana* as Peritoneum.[16]

Recent conceptual study done by Shriram Khalidkar(*Vapavahana* overview) opine that *Vapavahana* is pancreas. Further substantiate that *Vartika* means small piece of cotton. So *Vartika* stands for small nature of that part. Pancreas is small in size. It resembles typical *Vartika* which use for lamp and twin in nature and embedded in oil or ghee. It is oily and bigger in mid part and tapered at end. Hence *Upama* of *Taila Vartika* more belongs to Pancreas. [17]

Other studies related with *Medovaha Srotas* done by Anil avhad,[18] and Vishal M Khandre considered *Vapavahana* as omentum only.[19]

DISCUSSION

Discussion on *Vapavahana as Moola Sthana Medovaha Srotas*

The *Medovaha Srotas Moola* means the organ which may be closely related to *Medo Dhatu* functions or which are important sites related to beginning or ending of the channels of *Medo Dhatu*. *Vapavahana* is considered as one of the *Moolasthana* (root/origin/functional centre/disease or disorder expression centre) of *Medovaha Srotas*. [3]*Srotomoola* is the organs which may be directly related to formation, origin, storage, or circulation of *Dhatu*.

The term *Vapavahana* denotes that which carry *Vapa*. *Vapa* is nothing but *Shudha Mamsa Sneha* or *Medas* by itself and *Medas* located in *Udara* is termed as *Vapa*. [20,21,22,23] Role of *Vapavahana* in *Medovaha Srotas* can be taken as both Storage place and as a conduit.

Vapavahana is *Udarastha Medodhara Kala* and act as reservoir of fat in abdominal region.[8] *Snigdhavartika* or *Tailavartika* are synonymously used for *Vapavahana* as the name suggests that it is dipped in oil, means completely coated with *Sneha* or *Vapa*. Gananathasen, one of the researchers in the field of basic principle of Ayurveda and author has quoted it as carriers of *Vasa*. [24]

So based on this, *Vapavahana* consider as peritoneal folds in which abundance of fat is observed. Apart from peritoneal folds that can be predominantly considered are extension of folds of peritoneum in the form of mesentery that forms serous coat of small intestine and extends up to the root where it extends in the form of dorsal mesogastrium conducting blood vessels, lymphatics, nerves and restores abundance of fat along with omenta (both greater and lesser omenta), transverse mesocolon and sigmoid mesocolon. One of the cardinal features of large intestine is presence of appendices epiploicae that resembles wick and the shape like sesame seeds with oil/fat.

The mesentery is the organ in which all abdominal digestive organs develop, and

which maintains these in systemic continuity in adulthood. It is a large, fan-shaped, double-layered fold of peritoneum that connects the jejunum and ileum to the posterior abdominal wall.

It mediates both local and systemic responses. Mesenteric production of C-reactive protein is an important determinant of systemic concentrations. C-reactive protein regulates glycemic and lipid metabolism. It is largest storehouse of fat and felicitates metabolism and conduction of lipids. In the fat between the two peritoneal layers of the mesentery carries the arteries, veins, nerves, and lymphatics that supply the jejunum and ileum.

Mesenteric fat is metabolically more active than subcutaneous or extraperitoneal fat. King hung liu et.al proved that mesenteric fat thickness is an independent determinant of metabolic syndrome and identifies subjects with increased carotid intima media thickness. [25]

Ying kui Yang et.al did study on human mesenteric adipose tissue .He did comparison between subcutaneous and omental fat with mesenteric fat in obesity related diabetes and he found that alteration of adipose tissue lipolysis and gene expression in mesentery adipose depot may play a critical role for insulin resistance of type 2 diabetes and metabolic syndrome and also his study suggesting that malfunction of the mesenteric adipose tissue may play a more important role in the diabetic-related metabolic and vascular complications.[26]

Marisa Coelho et.al opined that adipose tissue is the primary storage site for excess energy but it is also recognized as an endocrine organ. This adipocyte largely deposited as visceral fat in omenta and mesentery which is located in abdominal region. Hence mesenteric fat has the capacity to vitiate the normalcy and produce metabolic disorders. [27]

So above said descriptions holds good to correlate *Vapavahana* with mesentery as these exactly goes in hand with *Medovaha Sroto dushti lakshana* said by *Acharya Charaka*. Contemporary science and classical references suggests if vitiation occur it will lead to metabolic disorders only.

Discussion based on location of *Vapavahana* as one of the *Koshtanga*

Vapa can be considered as fat/lipids. *Vapavahana* means that which carries/stores/circulates *Vapa*/lipids. In our body lipid absorption starts from small intestine. Digestion and absorption of dietary lipid in the gastrointestinal tract involves various steps. First, hydrolysis of neutral lipids in the gut lumen generates fatty acids and

monoglycerides, which transfer through apical membrane of mucosal enterocytes, where endoplasmic reticulum enzymes re-esterify them into Triacylglycerols (TAGs). Then the TAGs along with cholesterol, cholesterol esters, and phospholipids and with Apolipoprotein B are assembled into chylomicron and enter into intestinal lymphatics. Lipids in the form of chylomicron transported into lacteal (specialized lymphatic capillaries on the villi of small intestine) further drain in to collecting lymphatic vessels. In the intestine lacteals are located exclusively in intestinal villi and collecting lymphatic vessels occupy in the mesentery. The majority of lacteal tips present filopoida, which are cytoplasmic, actin-rich cellular extensions indicating active regeneration. Lacteal lymphatic endothelial cells have a mix of button and zipper like junctions and more filopodia are found on zipper junction enriched lacteals. Once inside the lacteals, Chylomicrons are transported via the lymph through mesenteric lymph nodes and collecting lymphatic vessels, ultimately reaching the thoracic duct, which drains into the venous circulation at the level of the left subclavian vein. [28] Hence mesentery helps to transport chylomicron which is nothing but form of metabolized lipid from small intestine by collecting through various lymph nodes spread over it.

Mesentery got major role in lipid transport that which justifies the term *Vapavahana* which carries *Vapa*. It is double fold of peritoneum and located in abdominal region which is nothing but *Udarastha Medodhara Kala*, resembles oil dipped cloth (*Tailavartika*), largest store house of fat or adipose depot because it is associated with small intestine which is having 6 m length, protects *Kshudrantra* and *Sthoolantra* (it will hold small intestine in position), Mesenteric fat has direct relation with metabolic disorders.

Mesenteric Adipose Tissue and β-Cell Function: The most relevant of the visceral depots is likely to be mesenteric adipose tissue, a recently recognized separate organ that is anatomically connected to the pancreas by the superior mesenteric artery. In Type 2 Diabetes, the decrease in β-cell density is most pronounced in the “head” part of the pancreas ,which is perfused by the superior mesenteric artery .In experimental studies, substances administered through the mesenteric artery have been shown to efficiently reach and influence the β-cells , confirming communication between the mesentery and endocrine pancreas through the mesenteric artery.[29]

Impaired lymphatic vasculature (promoted by haploinsufficiency of Prox1, a master gene for the development of the lymphatic system) increased adipose tissue accumulation around mesenteric lymph vessels in mice. Accordingly, Prox1 expression was decreased in adipose tissue of patients with familial combined hyperlipidaemia (FCHL), a form of genetic dyslipidemia associated with insulin resistance and abdominal obesity. [30]

Mesentery recently proved that a continuous organ from oesophagogastric to anorectal junctions. Upper and lower regions are continuous at the mesenteric root and have definite functions. [31]

CONCLUSION

As a final point, *Vapavahana* is one among *Koshtanga* which is confined to *Udara* (abdominal region) and resembles *Tailavartika* or *Snigdhavartika*. It is *Moolasthana* of *Medovaha Srotas*. So identifying structural entity is more important to prevent and treat metabolic disorders which are burning issue of present era. As the classical description is supporting the position of *Vapavahana* as *Udara* the structure which can be considered here are Peritoneum and its folds predominantly in the form of mesentery.

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