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Review Article

A PHYSIOLOGICAL UNDERSTANDING ON THE
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ABSTRACT

Dosha, Dathu, Mala together forms the basis of the body. The balance of these entities represents the healthy state and imbalance will cause various diseases. By mentioning the various *Sthana* of the each *Dosha* the different function performed by individual *Dosha* in different sites has been emphasised. The sub-types of *Dosha*, its location and function have also been mentioned.

There are five types of *Kapha* namely *Bodhaka, Sleshaka, Tarpaka, Avalambaka, Kledaka*. The *Visesha Sthana* of *Kledaka Kapha* is said to be *Amashaya*. The main function of *Kledaka Kapha* is said to be Loosening & moistening of food bolus.

Mucus is a slippery aqueous secretion produced by, and covering, mucous membranes. It is typically produced from cells found in mucous glands, although it may also originate from mixed glands, which contain both serous and mucous cells. It is a viscous colloid containing inorganic salts, antiseptic enzymes (such as lysozymes), immunoglobulins, and glycoproteins such as lactoferrin and mucins, which are produced by goblet cells in the mucous membranes and submucosal glands. In the human digestive system, mucus is used as a lubricant for materials that must pass over membranes, e.g., food passing down the esophagus and helps in loosening & moistening the food bolus.

The functions of *Kledaka Kapha* can be related to the functions of mucus secretion in upper gut which is responsible for the lubrication, moistening & loosening of the food bolus.

Keywords: *Kledaka, Kapha, Shareera, Kriya, Mucus, Physiology*

INTRODUCTION

The individual is an epitome of the universe. All the material & spiritual phenomenon of the universe are present in the individual. Similarly all those present in the individual are also contained in the universe¹. Originating in cosmic consciousness, this wisdom was intuitively received in the hearts of the ancient scholars. They perceived that consciousness was energy manifested into the five basic principles or elements. Man is microcosm of the nature and so the five basic elements present in all matter also exists within each individual. Thus out of the womb of the five elements, all matter is born. The five basic elements exist in all matter. Water provides the classic example: - the solids of iced water are manifestation of the *Prithvi Mahabhuta* (earth principle). Latent heat in the ice (*Agni*) liquefies it, manifesting into *Jala Mahabhuta* (water principle). And then eventually it turns into steam expressing the *Vayu Mahabhuta* (air principle) the steam disappears into *Akasha* or space². *Bhuta* is that which is not born out of something, but out of which something is born. It is the material cause of substances in the world. When we

say *Bhuta* we mean that subtle level of existence, where as *Mahabhuta* refers to gross level of existence³. *Panchikarana* is the process through which invisible *Bhutas* combine with each other and form the visible *Mahabhutas* in such a way that all *Bhutas* are present together in each *Drisya Bhuta* in varying degrees of predominance. Thus in the physical world everything is a combination of *Pancha Mahabhutas* & we cannot see them independently⁴.

Body is comprised of *Dosha, Dathu, Mala*⁵. The balance of these entities represents the health and imbalance will cause diseases⁶. In normalcy, *Dosha* will be performing their own functions and individual *Dosha* will be having their own specific site. By mentioning the various *Sthana* of the each *Dosha* the different function performed by individual *Dosha* in different sites has been emphasised. The sub-types of *Dosha*, its location and function have also been mentioned⁷.

Regarding the *Sthana* of various *Dosha* authors have different opinion. Later authors have added some more *Sthana* of *Dosha*. For example, ears among the location of *Vata*; umbilicus, eyes and skin among the location of *Pitta*; *Kloma*, nose, tongue among the location of *Kapha*⁸.

There are five types of *Kapha* namely *Bodhaka*, *Sleshaka*, *Tarpaka*, *Avalambaka*, *Kledaka*. The *Visesha Sthana* of *Kledaka Kapha* is said to be *Amashaya*. The main function of *Kledaka Kapha* is said to be Loosening & moistening of food bolus⁹.

Brief Physio- anatomical understanding of the gastrointestinal system with reference to mucus secretion is necessary to understand physiology of *Kledaka kapha*.

The mucosa of the esophagus consists of non keratinized stratified squamous epithelium, lamina propria (areolar connective tissue), and a muscularis muscosae (smooth muscle). Near the stomach, the mucosa of the esophagus also contains mucous glands. The stratified squamous epithelium associated with the lips, mouth, tongue, oropharynx, laryngopharynx, and esophagus affords considerable protection against abrasion and wear-and-tear from food particles that are chewed, mixed with secretions, and swallowed. The submucosa contains areolar connective tissue, blood vessels, and mucous glands. The muscularis of the superior third of the esophagus is skeletal muscle, the intermediate third is skeletal and smooth muscle, and the inferior third is smooth muscle. At each end of the esophagus, the muscularis becomes slightly more prominent and forms two sphincters—the upper esophageal sphincter, which consists of skeletal muscle, and the lower esophageal sphincter (LES), which consists of smooth muscle. The upper esophageal sphincter regulates the movement of food from the pharynx into the esophagus; the lower esophageal sphincter regulates the movement of food from the esophagus into the stomach. The superficial layer of the esophagus is known as the adventitia, rather than the serosa as in the stomach and intestines, because the areolar connective tissue of this layer is not covered by mesothelium and because the connective tissue merges with the connective tissue of surrounding structures of the mediastinum through which it passes. The adventitia attaches the esophagus to surrounding structures¹⁰.

In the human digestive system, mucus is used as a lubricant for materials that must pass over membranes, e.g., food passing down the esophagus. Mucus is extremely important in the intestinal tract. It forms an essential layer in the colon and in the small intestine that helps reduce intestinal inflammation by decreasing bacterial interaction with intestinal epithelial cells. A layer of mucus along the inner walls of the stomach is vital to protect the cell linings of that organ from the highly acidic environment within it. Mucus is not digested in the intestinal tract. Mucus is also secreted from glands within the rectum due to stimulation of the mucous membrane within. The gastric glands contain three types of *exocrine gland cells* that secrete their products into the stomach lumen: mucous neck cells, chief cells, and parietal cells. Both surface mucous cells and mucous neck cells secrete mucus.

Mucus is a slippery aqueous secretion produced by, and covering, mucous membranes. It is typically produced from cells found in mucous glands, although it may also originate from mixed glands, which contain both serous and mucous cells. It is a viscous colloid containing inorganic salts, antiseptic enzymes (such as lysozymes), immunoglobulins, and glycoproteins such as lactoferrin and mucins, which are produced by goblet cells in the mucous membranes

and submucosal glands. Mucus serves to protect epithelial cells (that line the tubes) in the respiratory, gastrointestinal, urogenital, visual, and auditory systems; the epidermis in amphibians; and the gills in fish, against infectious agents such as fungi, bacteria and viruses. The average human nose produces about a liter of mucus per day. Most of the mucus produced is in the gastrointestinal tract¹¹.

Major esophageal defenses against injury by contact with an acidic refluxate are (1) luminal acid clearance, and (2) tissue resistance. Tissue resistance has three protective components: these designated as pre epithelial, epithelial, and post epithelial defenses. The pre epithelial defense consists of surface mucus and unstirred water layer within which bicarbonate ions are entrapped providing an alkaline microenvironment. The pre epithelial defense in esophagus is weak relative to that of stomach and duodenum. The epithelial defense consists of the apical cell membranes and junctional complexes; these act to limit the diffusion of H⁺ from lumen to cell and intercellular space, respectively. In esophagitis, the junctional complexes are damaged, leading to increased H⁺ diffusion and dilation of the intercellular spaces. The post epithelial defense is provided by the acid buffering effects of HCO₃⁻ in cells and within the intracellular space. Blood supply is essential for the delivery of HCO₃⁻. A Na⁺-dependent Cl⁻/HCO₃⁻ exchanger on the basolateral membrane of squamous cells provide a route for blood-derived HCO₃⁻ to enter the cell cytosol. Cells in the stratum germinativum repair the damaged epithelium by two processes: restitution and replication. Epidermal growth factor (EGF) is a major promoter of cell replication and this can begin as early as 30 minutes after acid injury. It also consist of Gut Associated Lymphatic tissue which is also playing a major role in defense mechanism¹²

AIMS & OBJECTIVES

To critically analyze the *Kledaka Kapha*

MATERIALS ANS METHODS

The *Bruhat Trayi* were scrutinised regarding the references for the *Guna* and *Karma* of the *Kledaka Kapha*. Later, physiologico-anatomical aspects of the gastrointestinal system with reference to mucus secretion were studied from modern physiology books. Later, supportive correlation was done between *Ayurvedic* and modern views to build valid and reliable hypothesis regarding *Kledaka Kapha* in relation to the various anatomical and physiological aspects of the gastrointestinal system with reference to mucus secretion.

DISCUSSION

There are five types of *Kapha* namely *Bodhaka*, *Sleshaka*, *Tarpaka*, *Avalambaka*, *Kledaka*. The *Visesha Sthana* of *Kledaka Kapha* is said to be *Amashaya*. The main function of *Kledaka Kapha* is said to be Loosening & moistening of food bolus. *Kapha* is also said as *Bala* & is responsible for *Vyadhikshamatva* i.e fighting against the pathogens.

In the human digestive system, mucus is used as a lubricant for materials that must pass over membranes, loosening & moistening the food bolus. Mucus is extremely important in the intestinal tract. It forms an essential layer in the colon and

in the small intestine that helps reduce intestinal inflammation by decreasing bacterial interaction with intestinal epithelial cells. A layer of mucus along the inner walls of the stomach is vital to protect the cell linings of that organ from the highly acidic environment within it. Mucus is not digested in the intestinal tract. Mucus is also secreted from glands within the rectum due to stimulation of the mucous membrane within. The gastric glands contain three types of exocrine gland *cells* that secrete their products into the stomach lumen: mucous neck cells, chief cells, and parietal cells. Both surface mucous cells and mucous neck cells secrete mucus.

Mucus is used as a lubricant for materials that must pass over membranes, loosening & moistening the food bolus, this function of the mucus can be related to functions of *Kledaka Kapha*. Major esophageal defenses against injury by contact with an acidic refluxate are (1) luminal acid clearance, and (2) tissue resistance. It also consist of Gut Associated Lymphatic tissue which is also playing a major role in defense mechanism. The defensive function provided by Gut Associated Lymphatic tissue& other mechanism can be related to *Vyadhikshamatva* property of *Bala of PrakrutaKapha*¹³

CONCLUSION

There are five types of *Kapha* namely *Bodhaka, Sleshaka, Tarpaka, Avalambaka, Kledaka*. The *Visesha Sthana* of *Kledaka Kapha* is said to be *Amashaya*. The main function of *Kledaka Kapha* is said to be Loosening & moistening of food bolus. *Kapha* is also said as *Bala* & is responsible for *Vyadhikshamatva* i.e fighting against the pathogens. Mucus is used as a lubricant for materials that must pass over membranes, loosening & moistening the food bolus, this function of the mucus can be related to functions of *Kledaka Kapha*. The defensive function provided by Gut Associated Lymphatic tissue& other mechanism can be related to *Vyadhikshamatva* property of *Bala of Prakruta Kapha*.

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