

A PHYSIOLOGICAL UNDERSTANDING ON THE CONCEPT OF TARPAKA KAPHA

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ABSTRACT

Background: *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 those sites has been emphasised. The sub-types of *Dosha*, its location and function have also been mentioned. Methodology: There are five types of *Kapha* namely *Bodhaka, Sleshaka, Tarpaka, Avalambaka, Kledaka*. The *Visesha Sthana* of *Tarpaka Kapha* is said to be *Shirah(head)*. The main function of *Tarpaka Kapha* is said to be nourishment of *Indriya* (senseorgans/centres controlling sense organs). Synovial fluid secreted from synovial membrane is necessary for normal joint function. Synovial fluid moves into the cartilage when a joint is resting and moves out into the joint is active, particularly when the joint is engaged in a weight bearing activity such as exercise. Synovial fluid lubricates the joints & permits smooth movement. It also provides important nutrients to the structures involved in joint formation. Result: The functions of *Tarpaka Kapha* can be related to the functions of Cerebrospinal fluid which is responsible for the nourishment of different centres of the brain which control sense organs, fluids/ nourishing structures present in eye, ear, nose, tongue which is responsible for the nourishment of receptors in respective sense organ.

Keywords: *Tarpaka, Kapha, Shareera, Kriya*, nourishing fluid.

INTRODUCTION

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. ^[1] 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 space. ^[2] *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 exist-

ence.^[3] *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 independently.^[4] Body is comprised of *Dosha, Dathu, Mala*.^[5] The balance of these entities represents the health and imbalance will cause diseases.^[6] 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 mentioned.^[7]

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 *Tarpaka Kapha* is said to be *Shirah(head)*. The main function of *Tarpaka Kapha* is said to be nourishment of *Indriya* (senseorgans/centres controlling sense organs).^[9]

Brief Physio- anatomical understanding of the cerebrospinal fluid, nourishing fluids present in different sense organs is necessary to understand physiology of *Tarpaka kapha*.

Cerebrospinal fluid (CSF) is a clear, colorless liquid that protects the brain and spinal cord from chemical and physical injuries. It also carries oxygen, glucose, and other needed chemicals from the blood to neurons and neuroglia. CSF continuously circulates through cavities in the brain and spinal cord and around the brain and spinal cord in the subarachnoid space (between the arachnoid mater and pia mater). The total volume of CSF is 80 to 150 mL (3 to 5 oz) in an adult. CSF contains glucose, proteins, lactic

acid, urea, cations (Na_+ , K_+ , Ca^{2+} , Mg^{2+}), and anions (Cl^- and HCO_3^-); it also contains some white blood cells. CSF provides an optimal chemical environment for accurate neuronal signaling. Even slight changes in the ionic composition of CSF within the brain can seriously disrupt production of action potentials and postsynaptic potentials. CSF is the medium through which many substances, particularly nutritive substances and waste materials are exchanged between blood and brain tissues CSF allows exchange of nutrients and waste products between the blood and nervous tissue.^[10]

Aqueous humor is a thin fluid present in front of retina. It fills the space between lens and cornea. This space is divided into anterior and posterior chambers by iris. Both the chambers communicate with each other through pupil. Aqueous humor is formed by ciliary processes. It is formed from plasma within capillary network of ciliary process by diffusion, ultrafiltration and active transport through the epithelial cells lining the ciliary processes. After formation, aqueous humor reaches the posterior chamber by passing through the suspensory ligaments. From here, it reaches the anterior chamber via pupil. Formation of aqueous humor is a continuous process. Rate of formation is about 2 to 3 μL per minute. Amount of aqueous humor in anterior chamber is about 230 μL to 250 μL and in posterior chamber it is about 50 μL to 60 μL . Aqueous humor Maintains the shape of eyeball, Maintains the intraocular pressure, Provides nutrients, oxygen and electrolytes to avascular structures, Removes the metabolic end products.^[11]

The internal (inner) ear is also called the labyrinth because of its complicated series of canals. Structurally, it consists of two main divisions: an outer bony labyrinth that encloses an inner membranous labyrinth. The bony labyrinth is a series of cavities in the petrous portion of the temporal bone divided into three areas: (1) the semicircular canals and (2) the vestibule, both of which contain receptors equilibrium, and (3) the cochlea, which contains receptors for hearing. The bony labyrinth is lined with perio-

steum and perilymph. This fluid, which is chemically similar to cerebrospinal fluid, surrounds the membranous labyrinth, a series of epithelial sacs and tubes inside the bony labyrinth that have the same general form as the bony labyrinth. The epithelial membranous labyrinth contains endolymph. The level of potassium ions (K₊) in endolymph is unusually high for an extracellular fluid, and potassium ions play a role in the generation of auditory signals. [12]

Olfactory receptors are the first-order neurons of the olfactory pathway. Each olfactory receptor is a bipolar neuron with an exposed knob-shaped dendrite and an axon projecting through the cribriform plate and ending in the olfactory bulb. The parts of the olfactory receptors that respond to inhaled chemicals are the olfactory hairs, cilia that project from the dendrite. Chemicals that have an odor and can therefore stimulate the olfactory hairs are called odorants. Olfactory receptors respond to the chemical stimulation an odorant molecule by producing a generator potential, thus initiating the olfactory response. Supporting cells are columnar epithelial cells of the mucous membrane lining the nose. They provide physical support, nourishment and electrical insulation for the olfactory receptors, and they help detoxify chemicals that come in contact with the olfactory epithelium. [13]

The receptors for sensations of taste are located in the taste buds. Most of the nearly 10,000 taste buds of a young adult are on the tongue, but some are found on the soft palate (posterior portion of the roof of the mouth), pharynx (throat), and epiglottis (cartilage lid over voice box). The number of taste buds declines with age. Each taste bud is an oval body consisting of three kinds of epithelial cells: supporting cells, gustatory receptor cells, and basal cells. The supporting cells surround about 50 gustatory receptor cells in each taste bud. They provide physical support, nourishment and electrical insulation for the gustatory receptors, and they help detoxify chemicals that come in contact with the olfactory epithelium. [14]

AIM & OBJECTIVES

To critically analyze the *Tarpaka Kapha*

MATERIALS & METHODS

The *BruhatTrayi* were scrutinised regarding the references for the *Guna* and *Karma* of the *Tarpaka Kapha*. Later, physiologico-anatomical aspects of Cerebrospinal fluid which is responsible for the nourishment of different centres of the brain, fluids present in eye, ear, nose, tongue which is responsible for the nourishment of receptors in respective sense organ were studied from modern physiology books. Later, supportive correlation was done between *Ayurvedic* and modern views to build valid and reliable hypothesis regarding *Tarpaka Kapha* in relation to the various anatomical and physiological aspects of the nourishing fluid & structures in head region.

DISCUSSION

There are five types of *Kapha* namely *Bodhaka*, *Sleshaka*, *Tarpaka*, *Avalambaka*, *Kledaka*. The *Visesha Sthana* of *Tarpaka Kapha* is said to be *Shirah (head)*. The main function of *Tarpaka Kapha* is said to be nourishment of *Indriya* (senseorgans/centres controlling sense organs).

Centres in the brain which control functions of sense organs get nourishment from Cerebrospinal Fluid. . CSF is the medium through which many substances, particularly nutritive substances and waste materials are exchanged between blood and brain tissues CSF allows exchange of nutrients and waste products between the blood and nervous tissue.

Receptor cells present in sense organs get nourishment from the fluid medium or from the structures like supporting cells etc. In eyeball, Aqueous humor provides nutrients, oxygen and electrolytes to avascular structures, Removes the metabolic end products. In ear, the bony labyrinth is lined with perosteum and perilymph. This fluid, which is chemically similar to cerebrospinal fluid & the epithelial membranous labyrinth contains endolymph. The level of potassium ions (K₊) in endolymph is unusually high for an extracellular fluid, and potassium

ions play a role in the generation of auditory signals. In tongue & nose, Supporting cells are columnar epithelial cells of the mucous membrane lining the nose, tongue. They provide physical support, nourishment and electrical insulation for the gustatory, olfactory receptors and they help detoxify chemicals that come in contact with the gustatory, olfactory epithelium.

CONCLUSION

There are five types of *Kapha* namely *Bodhaka*, *Sleshaka*, *Tarpaka*, *Avalambaka*, *Kledaka*. The *Visesha Sthana* of *Tarpaka Kapha* is said to be *Shirah(head)*. The main function of *Tarpaka Kapha* is said to be nourishment of *Indriya* (senseorgans/centres controlling sense organs). The functions of *Tarpaka Kapha* is similar to the functions of Cerebrospinal fluid which is responsible for the nourishment of different centres of the brain which control sense organs, fluids/ nourishing structures present in eye, ear, nose, tongue which is responsible for the nourishment of receptors in respective sense organ.

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