

STUDY OF URDHVAGAMI DHAMANI WITH ITS MODERN CORRELATION

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ABSTRACT

Ayurvedic Acharyas have used an anatomical term *Dhamani*(arteries), which is one of the controversial terms (structure), used to represent tubular structure and it is one of the synonyms of *Srotas*. Modern science describes blood vessels of three types viz-artery, vein & capillaries. The other two important channels for the maintenance of the body are lymphatic & nerves. The relevant terms in Ayurvedic language are *Sira*, *Dhamani*(arteries) and *Srotas* and in these three terms the modern five structures namely artery, vein, capillary, lymphatic and nerve are incorporated. According to *Sushruta*, ten *Dhamani* (arteries) spread upward, ten downward, and four sideward emerging from the *Nabhi*(umbilicus). According to *Charak*, *Hridaya*(heart) produces ten *Dhamani*(arteries). *Dhamanis* (arteries) described in *Ayurveda* represent a tubular channel taking origin from the *Hridaya* (heart) and possess the characteristics of pulsation and circulation of *Rasa* (lymph chyle or plasma) and *Rakta* (blood) throughout the body. The up-coursing *Dhamani* (arteries) prefer to maintain the body's integrity by performing particular body functions such as sound, touch, taste, smell, sneezing, laughter, speech, and so on. The *Dhamanis*(arteries) that come down establish a pathway for *Vata*, urine, excrement, semen, and contained food to flow downward. The *Tiryaggami-Dhamani*(arteries) can be taken as the cutaneous or peripheral vessels supplying the superficial and deep layers of the skin. In this Article I am trying to correlate *Shusrutokta Urdhwagami Dhamani* with modern perspective.

❖ **KEYWORDS:** Ayurveda, Urdhwagami Dhamani, Hridaya, Nabhi, Sira, Dhamni.

❖ INTRODUCTION

Dhamani(arteries) is a pipe like structures or tubular vessel or canal of the human body which starts from heart or umbilicus on support to carry *rasa* and maintains the *Poshana* (nutrition) of the *sharira*. *Sushruta* enumerated that there are Twenty four *Dhamani* (arteries). It is one of the *Pitruja bhava*. According to *Acharya Charaka* has stated that the channel which carries the related contents (*Dravya*) with *Dhmana* (Pulsation) has been named as *Dhamani*. In *Sushrut Samhita* *Dhamani*(arteries) word is used in many references like *Moola* of *Srotas*, *Nabhinadi*, etc. the up-coursing *Dhamani*(arteries) perform such specific function of body on sound, touch, taste, smell, sneezing, laughter, speech, etc. and tend to maintain the integrity of the body. The down-coming *Dhamanis* (arteries) form the channel for downward conveyance of *Vayu*, urine, stool, semen, contaminated food. *Dhamanis* (arteries) carry *Rasa* all over body and fill it with air, it is significant that the conveyance of *Rasa* is confirmed to the *Dhamanis* (arteries) only. On the other hand

Dhamanyath Anilapuranath Dhamani (arteries) technically speaks about related structure of arteries but when added the word *Nadi* which are also arteries we have to limit the meaning of palpable arteries. Though we have *Hrudaya*(heart) and *Nabhi*(umbilicus) as *Mulasthanas* of *Rasavaha Srotas* but neither case in any way justifies the *Dasha Dhamani*(arteries).

❖ MATERIAL AND METHOD

Literary data collected from all available classical as well as modern text, the present study depends on the data collected from *Ayurvedic Samhitas* and modern book, journals etc. Previous work done, magazines, etc. data studied, reviewed and the appropriate conclusion have been withdrawn from reviewed literature. Tried to identify and understand the term used in ancient literature. In these Articles I am trying to correlate *Shusrutokta Urdhwagami Dhamani* with modern perspective.

❖ MOOLS OF DHAMNI

In the context of *Sharira Sankhya Vyakharana*, *Dhamani* originated from *Nabhi*(umbilicus) as *Moola*. In the context of *Shonitavarniya Adhyaya* after the formation of *Rasa* it enters the *Hridaya* (heart) from *Hridaya Dhamani*(arteries) emerges and helps in conducting *Rasa* throughout the *Sharira*. *Arthedashmahaa mooliyam Adhyaya* of *Charaka* says that *Dhamani*(arteries) *Moola* is *Mahat*, for this *Chakrapani* commented *Mahat* is *Hridaya*. Among the *Dhamani* (arteries) arising from the *Nabhi* (umbilicus), ten spread upward, ten downward and four sideward (transverse).

❖ OBSERVATIONS AND DISCUSSION

URDHVAGAMI DHAMANI (upward arteries) AND ITS FUNCTION-

Those spreading upward, support(maintain) the body by attending to functions such as receiving sensation of sound, touch, vision, smell, inspiration, expiration, yawning, sneezing, laughing, speech, weeping etc. These *Dhamani* (arteries) after reaching the *Hrudaya*(heart) divides into three branches each and become thirty in totals. Out of them *Vata*, *Pitta*, *Kapha*, *Rakta* and *Rasa* are carried by two *Dhamanis*(arteries) each, thus becoming ten in total. those which are meant to carry sound, vision, taste and smell are eight in number (i.e. two for each) .Two are meant for speech, two for rhythmic phonation, two for sleep, two for keeping awake, two for the flow of tear and two for the flow of milk (externally) from the breasts in female and the corresponding ones carry the semen (internally) from the breasts in the males. Thus all these thirty *Dhamani*(arteries) have been described according to their functions. With the help of these, the parts of the body above the umbilicus namely abdomen, lateral side of the trunk, chest, shoulders, and neck and superior extremities are nourished and maintained.

ACCORDING TO MODERN VIEW

1. SABDAVAHA DHAMNI

The internal ear is supplied by the labyrinthine artery (internal auditory artery). which either arises from the anterior inferior cerebellar artery or is a direct branch of the basilar artery. It enter the internal acoustic meatus with the facial (VII) and vestibulocochlear (VIII) nerves (Gray's Anatomy, pg-917).

INNERVATION

The vestibulocochlear nerve (VIII) carries special afferent fibers for hearing (the cochlear component) and balance (the vestibular component). It enters the lateral surface of the brainstem, between the Pons and medulla, after exiting the temporal bone through the internal acoustic meatus and crossing the posterior cranial fossa (Gray's Anatomy, pg-917). Injury of the vestibulocochlear nerve may cause impairment or loss of hearing, tinnitus, and central lesions may involve either cochlear or vestibular division of CN VIII (Clinically Oriented Anatomy, pg no-1082).

2. RUPAVAH DHAMNI

The central retinal artery first and important branch of the ophthalmic artery, which enters the optic nerve, proceeds down the center of the nerve to the retina. Occlusion of this vessel leads to blindness (Gray's Anatomy, pg-893).

INNERVATION

The optic nerve (II) is not a true cranial nerve, but rather an extension of the brain carrying afferent fibers from the retina of the eye ball to the visual centers of the brain. The optic nerve is surrounded by the cranial meninges, including the subarachnoid space, which extend as forward as the eyeball. The optic nerve leaves the orbit through the optic canal. it is accompanied in the optic canal by the ophthalmic artery.(Gray's Atomy, pg no-894) .Optic nerve lesion- Complete section of an optic nerve results in blindness in the temporal and nasal visual fields of the ipsilateral eye (depicted in black) (Clinically Oriented Anatomy, pg no-1080).

3. RASAWAH DHAMNI

The major artery of the tongue is the lingual artery. On each side, the lingual artery originates from the external carotid artery in the neck adjacent to the tip of the greater horn of the hyoid bone. The lingual artery travels forward in the plane between the hyoglossus and genioglossus muscles to the apex of the tongue (Gray's Anatomy, pg no-1041).

INNERVATION

Glossopharyngeal nerve- Taste and general sensation from the pharyngeal part of the tongue are carried by the glossopharyngeal nerve (IX). The glossopharyngeal nerve leaves the skull through the jugular foramen and descends along the posterior surface of the stylopharyngeus muscle (Gray's Anatomy, pg no-1042). Then slip through the posterior aspect of the gap between the superior constrictor, middle constrictor, and mylohyoid muscle. The nerve then passes forward on the oropharyngeal wall just below the palatine tonsil and enters the pharyngeal part of the tongue deep to the styloglossus and hyoglossus muscles. In addition to taste and general sensation on the posterior one third of the tongue, branches creep anterior to the terminal sulcus of tongue to carry taste and general sensation from the vallate papillae (Gray's Anatomy, pg no-1042). Lesion of the glossopharyngeal nerve-taste is absent on the posterior third of the tongue, and the gag reflex is absent on the side of the lesion. Ipsilateral weakness may produce a noticeable change in swallowing (Clinical Oriented Anatomy, pg no-1082).

4. GANDAVAH DHAMNI

The largest vessel supplying the nasal cavity is the sphenopalatine artery, which is the terminal branch of the maxillary artery in the pterygopalatine fossa. It leaves the pterygopalatine fossa and enters the nasal cavity by passing medially through the sphenopalatine foramen (Gray's Anatomy, Pg No-1027).

INNERVATION

Olfactory nerve (I)-that innervate nasal cavities. The olfactory nerve carries special afferent fibers for the sense of smell. The receptors are in the roof and upper parts of nasal cavity and the central processes, after joining in to small bundles; enter the cranial cavity by passing through the cribriform plate of the ethmoid bone. They terminate by synapsing with the secondary neurons in the olfactory bulbs (Gray's Anatomy, Pg No-849-850). Lesion of olfactory nerve causes loss of smell (anosmia) due to the injury of the cribriform plate or congenital absence (Gray's Anatomy, Pg No-850).

5. GHOSHAKAR DHAMNI

The major blood supply to the larynx is by the superior and inferior laryngeal artery. The superior laryngeal artery originates from the superior thyroid branch of the external carotid artery, and its accompanies the internal branch of the superior laryngeal nerve through the thyrohyoid membrane to reach the larynx (Gray's Anatomy, Pg No-1010).

INNERVATION

Sensory and motor innervation of the larynx is by two branches of the vagus nerve- the superior laryngeal nerve and the recurrent laryngeal nerve. The superior laryngeal nerves originate from the inferior vagal ganglia high in the neck. On each side, they descend medial to the internal carotid artery and divide in to internal and external branches. The internal laryngeal nerve passes anteroinferiorly to penetrate the thyrohyoid membrane- it is mainly supplies the laryngeal cavity down to the level of the vocal folds (Gray's Anatomy, Pg No-1012)

6. BHASHAKAR DHAMNI

The hypoglossal nerve (XII) carries general somatic efferent fibers to innervate all intrinsic and most of the extrinsic muscles of the tongue. It arises as several rootlets from the anterior surface of the medulla, passes laterally across the posterior cranial fossa and exits through the hypoglossal canal and this nerve innervates the hyoglossus, styloglossus, and genioglossus muscles and all intrinsic muscles of the tongue (Gray's Anatomy, Pg No-854). Lesion of the hypoglossal nerve (XII) causes atrophy of ipsilateral muscles of the tongue and deviation toward the affected side i.e. speech disturbance (Gray's Anatomy, Pg No-855).

7. ASHRUVAH DHAMNI

The lacrimal artery which arises from the ophthalmic artery on the lateral side of the optic nerve, and passes anteriorly on the lateral side of the orbit, supplying the lacrimal gland (Gray's Anatomy, Pg No-892).

INNERVATION

Lacrimal nerve is the smallest of the three branches of ophthalmic nerve. It enters the orbit through lateral part of superior orbital fissure and runs forwards along the upper border of lateral rectus muscle, in company with lacrimal artery. Anteriorly, it receive communication

from zygomaticotemporal nerve, passes deep to the lacrimal gland (B D Chaurasia, Pg No-214).

8. STANYAVAH DHAMNI

The mammary gland is extremely vascular. It is supplied by internal thoracic artery (mammary artery), a branch of the subclavian artery (B D Chaurasia, Pg No-36).

Nerve supply

The breast is supplied by the anterior and lateral cutaneous branches of the 4th to 6th intercostal nerves. The nerve convey sensory to the skin, and autonomic fibers to smooth muscles and to blood vessels. The nerves do not control the secretion of milk. Secretion is controlled by the hormone Prolactin, secreted by the pars anterior of the hypophysis cerebri (B D Chaurasia, Pg No-36-37). Some *Urdhvaha Dhamanis* (upward arteries) are related to respiratory movement in which diaphragm and other muscles are involved. So, the blood vessels which supply these muscles are included in these i.e phrenic and intercostal arteries (phrenic nerve). Except of these local arteries all other function are controlled by brain. The principal arteries of supply to the head and neck are the two common carotid, they ascend in the neck and each divide into two branches, viz

1. The external carotid, supplying the exterior of the head, the face, and the greater part of the neck
2. The internal carotid, supplying to a great extent the parts within the cranial and orbital cavity.

So *Urdhvaha Dhamani* is correlated with all arteries and its branches which supply to head, neck, brain, upper limbs and thorax. (JAIMS-Conceptual study of Dhamani-A critical review)

❖ CONCLUSION

The *Urdhvagami Dhamani* perform all these functions always (throughout life). Dr. Ghanekar and Gangadher Shastri both have submitted his statements in reference to the above couplet. Pandit Gangadher Shastri has labelled all these *Dhamani* as nerve in the following order. *Sabdavaha Dhamani* (auditory nerves), *Rupavaha Dhamani* (optic nerves), *Rashavaha Dhamani* (nerves of taste i.e. branch from glossopharyngeal and lingual nerves), *Gandhvaha Dhamani* (olfactory nerves), *Bhasan Dhamani* (inferior laryngeal nerves), *Ghosakar Dhamani* (hypoglossal nerves) and *Ashruvaha Dhamani* (lacrimal nerves). Dr. Ghanekar preferred to label some of these vessels as internal auditory artery for *Sabdavaha Dhamani* (voice carrying vessels), central retinal artery for sense of *Rupavaha Dhamani* (vision), lingual artery for *Rashavaha Dhamani* (sense of taste), sphenopalatine branch of internal maxillary artery for *Gandhvaha Dhamani* (the sense of smell), laryngeal artery for *Ghosakar Dhamani* (the sense of sound), sublingual artery for *Bhasan Dhamani* (the sense of speech), lacrimal artery for *Ashruvaha Dhamani* (the sense of lacrimation), mammary artery for *Stanyavaha Dhamani* (the sense of lactation). The modern correlation of *Urdhwaga Dhamani* is given below-

- **SABDAVAHA DHAMNI**- Internal Auditory Artery(Vestibulocochlear Nerve)
- **RUPAVAH DHAMNI**- Central retinal artery (Optic Nerve)
- **RASAWAH DHAMNI** - Lingual Artery (Glossopharyngeal Nerve)
- **GANDAVAH DHAMNI**- Sphenopalatine Artery (Olfactory Nerve)
- **GHOSHAKAR DHAMNI** - Laryngeal Artery (Laryngeal Nerve)
- **BHASHAKAR DHAMNI**- Hypoglossal Nerve
- **ASHRUVAH DHAMNI** - Lacrimal Artery (Lacrimal Nerve)
- **STANYAVAH DHAMNI** – Internal Thoracic Artery(4-6 intercostal Nerve)

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