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KLOMA: A CLASSICAL AYURVEDIC CONCEPT IN THE LIGHT OF MODERN ANATOMY – A REVIEW

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ABSTRACT

Ayurveda, being one of the most ancient systems of medicine places strong emphasis on *Rachana Sharir* (anatomy) for understanding physiological and pathological processes. Within this framework, *Kloma* is one of the most debated structures in classical literature generating diverse interpretations regarding its anatomical identity. Texts describe it as one of the roots of *Udakavaha Srotas*, primarily associated with thirst and fluid balance yet its precise location and nature remain a subject of scholarly discussion. Different interpretations attempt to link *Kloma* with the pancreas, lungs, gall bladder and adrenal glands but none fully match the textual descriptions of singularity, its proximity to the heart and liver and its vital role in water regulation. This review revisits classical references in light of modern biomedical evidence, suggesting that the cisterna chyli and thoracic duct may provide the closest anatomical correlation, enriching both Ayurvedic understanding and integrative medical research.

KEYWORDS: *Kloma, Udakavaha Srotas*, Cisterna chyli, Thoracic duct, Fluid regulation.

I. INTRODUCTION

Ayurveda, the ancient science of life describes the human body in terms of *Sharir Rachana* (anatomy) and *Sharir Kriya* (physiology). Among the organs mentioned in classical texts, *Kloma* is one of the most debated and least understood. Unlike well-defined organs such as *Yakrit* (liver) and *Vrikka* (kidneys), the identity of *Kloma* remains uncertain with different interpretations by different *Acharyas* and commentators. In both *Charaka Samhita* and *Sushruta Samhita*, *Kloma* is mentioned as the *Moola* (root) of *Udakavaha Srota* along with *Talu* (palate). Injury to these channels produces *Pipasa* (intense thirst) and *Sadyomarana* (sudden death), highlighting their vital role in water balance. Despite this significance, the exact anatomical identity of *Kloma* remains debated with scholars variously correlating it to pancreas, lungs, adrenal glands, mesentery and lymph nodes. None of these identifications fully satisfy the classical descriptions regarding its singularity, positional relation to *Hridaya* and *Yakrit* and its crucial role in fluid regulation. Therefore, a re-examination of *Kloma* through the lens of both classical *Ayurvedic* and modern anatomical evidence becomes essential. The present study aims to critically evaluate textual references, scholarly commentaries, clinical insights and proposes a novel correlation of *Kloma* with the cisterna chyli–thoracic duct complex—a singular lymphatic structure whose location and functions most closely parallel the descriptions found in *Ayurveda.*

II. AIMS AND OBJECTIVES

Aim: To critically study the classical concept of *Kloma* in *Ayurveda* and explore its possible anatomical correlation with modern medical understanding.

Objectives

1. To collect and analyze references of *Kloma* from classical *Ayurvedic* texts such as *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya* and their commentaries.
2. To review interpretations of *Kloma* by traditional scholars and modern *Ayurvedic* researchers.
3. To examine the structural and functional aspects of the cisterna chyli and thoracic duct from modern medical literature.
4. To compare *Ayurvedic* descriptions with modern findings and identify anatomical and physiological similarities.

III. MATERIALS AND METHODS

1. Classical *Ayurvedic* texts especially the *Brihattrayi* and their commentaries were critically reviewed to gather references and descriptions related to *Kloma*.
2. Modern anatomical literature was consulted to identify structures that match the classical description in terms of location and functional role in fluid regulation.

IV. REVIEW OF LITERATURE

AYURVEDIC REVIEW

The earliest mentions of *Kloma* are found in the *Vedic* texts such as the *Atharvaveda, Vajasneya Samhita* and *Shrauta Sutra*. Here, *Kloma* is mentioned alongside *Yakrit* and *Pittasthana,* sometimes in connection with disease (e.g. *Yakṣma*) or as an organ offered in rituals. These references suggest that *Kloma* was recognized as a distinct organ in the *Vedic* era though its exact anatomical identity was not defined. In the classical *Samhitas, Acharya Charaka* and *Acharya Sushruta* both described *Kloma* together with *Talu* as the *Moola* (roots) of *Udakavaha Srotas*. Disturbance of this channel is said to produce dryness of oral structures, excessive thirst (*Atipravṛiddha Pipasa)*[1] and in severe conditions may even lead to sudden death *(Sadyomaraṇa).*[2] Both also include *Kloma* among the sites of *Antarvidradhi* where its involvement is again marked by *Mukhshosha*, *Galagraha*[3] and *Pipasa Adhikya.*[4] *Acharya Sushruta* further places *Kloma* to the right of the heart in relation to the liver while spleen and lungs are situated to the left.[5]

Scholarly Interpretations of *Kloma*

Later scholars offered diverse views on the nature and location of *Kloma*.

- *Acharya Vagbhaṭa* considered *Kloma* as a *Kapha-Sthana*.[6]
- *Acharya Dalhaṇa* identified *Kloma* variously as *Agnyashaya* (pancreas) or *Kalakhaṇḍa* and consistently located it on the right side of the body.
- *Acharya Sharangdhara* described *Klom* as *Til* or *Kaliyaka,* stating that it originated from *Rakta* and *Vayu* at the time of conception. He further mentioned that its position is on the right side of the body.[7]
- *Acharya Chakrapaṇi* associated *Kloma* with *Hṛidaya* (heart) and seat of thirst.[8]
- *Acharya Gangadhara* equated it with *Phupphusa* and *Unduka*.
- *Acharya Gaṇananath Sena* described *Kloma* as *Kaṇṭhanadi* or *Shwaspath* (respiratory pathway).
- *Paṇḍit Hari Prapanna Sharma* correlated *Kloma* with *Pittashaya* (gall bladder).

- *Acharya Arunadatta* explained that when *Rakta* undergoes transformation under the influence of *Dehoshma* (the body's metabolic heat) and *Samana Vayu*, a slightly elevated structure arises which is designated as *Kloma*. It is situated to the right of the heart.[9]
- Modern *Ayurvedic* Scholars - Dr. *Ghanekar* interpreted *Udaka* as lymph, identifying *Udakavaha Srotas* with the thoracic duct and right lymphatic duct. He noted that their obstruction could cause ascites, thirst and even sudden death. He also related this to modern accounts such as F.W. Price's observations of ascites in thoracic duct obstruction.[10]

Kloma* as a *Koṣṭhanga

Classical authorities differ in enumerating *Kloma* among the visceral organs (*Koṣṭhanga*):

- *Charaka*, *Bhela* and *Kashyapa* include *Kloma* but not *Phupphus*.
- *Vagbhaṭa* includes both *Kloma* and *Phupphus* distinctly.
- *Sushruta* does not consistently list *Kloma* as a *Koṣṭhanga* but describes it in positional relation to *Hridaya* and *Yakrit*.

Despite variations in anatomical correlation, the consistent themes across *Vedic*, classical and modern literature are.

(1) *Kloma's* association with thirst and fluid regulation

(2) its consistent right-sided location in relation to the heart and liver

(3) its recognition as a distinct visceral organ within the thoraco-abdominal cavity.

MODERN REVIEW

1. Anatomy of the Cisterna Chyli and Thoracic Duct

The cisterna chyli is a dilated sac located in the posterior abdominal cavity, typically anterior to the bodies of the first and second lumbar vertebrae. It serves as the origin of the thoracic duct, the largest lymphatic vessel in the human body. The cisterna chyli is positioned just beneath the diaphragm, posterior to the right crus and slightly to the right of the midline—placing it in close proximity to the inferior surface of the liver and the right side of the heart via the diaphragm's venous and lymphatic connections. The cisterna chyli measures approximately 5–7 cm[11] in length and 0.5–1 cm in diameter, though variations are common. It collects lymph from the intestinal trunk (carrying chyle from the gastrointestinal tract) and lumbar lymphatic trunks (draining the lower limbs and pelvic organs). From here, the thoracic duct ascends through the aortic hiatus of the diaphragm, travelling upward to drain into the venous system at the junction of the left subclavian and internal jugular veins.[12]

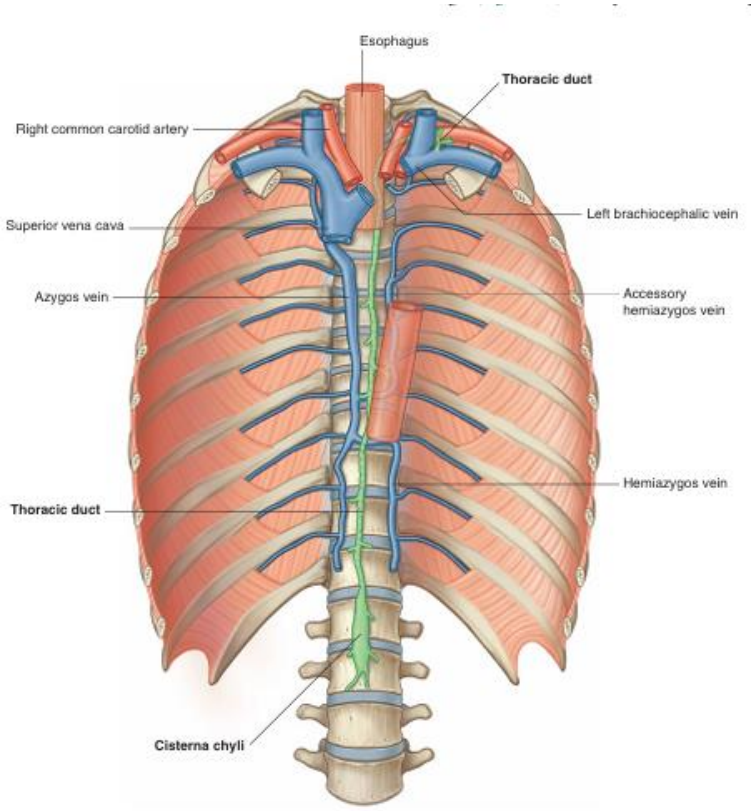

Fig 1: Anatomical illustration of the thoracic duct and cisterna chyli within the thoracic cavity.

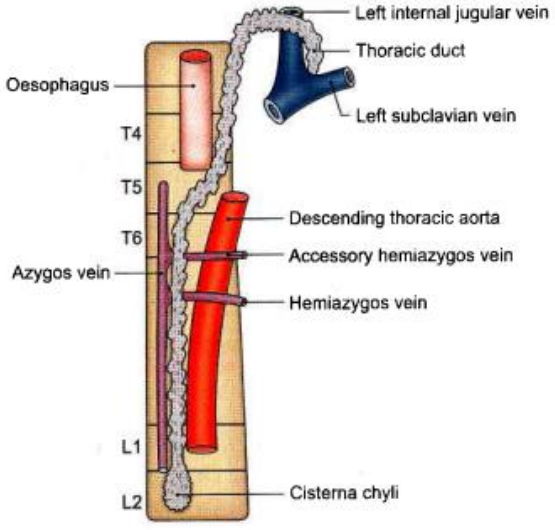

Fig 2: The course of the thoracic duct.

2. Functional Role in Fluid Regulation

The cisterna chyli and thoracic duct together form the central conduit for returning lymph and absorbed fats (chyle) from most of the body to the venous circulation. This process is critical for.

a) Maintaining plasma volume – continuous return of interstitial fluid prevents dehydration.
b) Regulating osmotic balance – lymphatic drainage maintains electrolyte and protein homeostasis.
c) Absorbing dietary fats – via lacteals in the small intestine, contributing to nutritional balance.

Any sudden obstruction, rupture or severe leak from this system can lead to chylous ascites or chylothorax, rapid depletion of body fluids, electrolyte imbalance, intense thirst, hypotension, and potentially sudden death—closely resembling the *Pipasa* and *Sadyomarana*.

3. Clinical Correlations from Modern Surgery

Bailey & Love: Chylous ascites and chylothorax result from megalymphatics or thoracic duct lesions. In severe cases, excess lymph retention may lead to death from lymph-logged lungs when drainage pathways are blocked[13] — a striking parallel to *Sadyomaraṇa* in *Ayurveda.*

Sabiston's Textbook of Surgery: Chylothorax can cause leakage of 0.5–3 L/day of chyle into the pleural cavity. This results in rapid fluid depletion, nutritional loss (fat, protein) and intense thirst-like symptoms closely resembling *Pipasa*. If untreated, progressive deterioration occurs, often requiring thoracic duct ligation.[14]

V. DISCUSSION

The study of classical and modern sources shows that *Kloma* has been one of the most debated visceral organs in *Ayurveda*. From *Vedic* texts to later *Samhitas* and commentaries, it is consistently associated with thirst regulation, water balance and a right-sided position near the heart and liver. Over time, multiple modern anatomical correlations have been proposed for *Kloma* including the lungs, pleura, pancreas, adrenal glands, mesentery and lymph nodes. However, none of these correlations fully explain its unpaired nature, precise location and vital role in fluid homeostasis. A closer comparison indicates that the cisterna chyli provides the most appropriate anatomical correlate.

- **Single structure** – matches the *Ayurvedic* description of *Kloma* as unpaired.
- **Location** – in front of L1–L2 vertebrae, behind the right crus of diaphragm, indirectly beneath the liver. The *Ayurvedic* description of *Kloma* as situated 'beneath the liver' can be logically explained anatomically. The inferior surface of the right lobe of the liver rests upon the right dome of the diaphragm and the cisterna chyli lies just below this

diaphragm behind its right crus. This positional relationship places the cisterna chyli indirectly beneath the liver thereby supporting the classical locational statement.

- **Function** – reservoir of lymph and chyle, maintaining hydration, osmotic balance and plasma volume.
- **Pathology** – injury or obstruction produces chylous ascites or chylothorax with excessive thirst, hypotension, dehydration and even sudden death — closely resembling *Pipasa* and *Sadyomaraṇa* described in *Ayurveda.*

The classical connection of *Kloma* with *Talu* is also clarified. Disturbance of lymphatic return alters plasma osmolarity which activates hypothalamic osmoreceptors. This reduces salivary secretion and causes dryness of mouth and palate perceived as thirst. Hence *Kloma* and *Talu* may be viewed as two ends of a regulatory-sensory loop maintaining water balance. Previous authors have suggested several possible modern equivalents for *Kloma.* However, to the best of our knowledge, no prior work has explicitly identified *Kloma* with the cisterna chyli, the unpaired lymphatic reservoir that forms the origin of the thoracic duct. This study therefore offers a new interpretation, supported by both classical *Ayurvedic* references and modern anatomical–physiological evidence.

VI. CONCLUSION

The concept of *Kloma* in *Ayurveda* represents one of the less clearly understood anatomical entities yet its clinical significance is evident from classical descriptions. As the *Moola* of *Udakavaha Srotas*, it is consistently linked to the regulation of body fluids and thirst. While the *Viddha Lakṣaṇas* such as excessive thirst and sudden death are attributed to disturbances of *Udakavaha Srotas*, classical texts also describe *Kloma* as a site of *Antarvidradhi* where features like *Pipasa*, *Mukhshosh* and *Galagraha* further emphasize its role in water regulation. Among many anatomical correlations suggested by scholars—including lungs, pleura, pancreas, adrenal glands and lymph nodes—the cisterna chyli most closely aligns with the *Ayurvedic* description in terms of location, singularity and function. Modern anatomy defines the cisterna chyli as an unpaired lymphatic reservoir situated posterior to the right crus of the diaphragm and indirectly beneath the liver continuing as the thoracic duct to drain lymph into the venous circulation. Disruption of this pathway produces fluid imbalance, dehydration and circulatory collapse closely paralleling the *Ayurvedic* descriptions. Thus, correlating *Kloma* with the cisterna chyli provides a coherent anatomical interpretation that bridges ancient *Ayurvedic* concepts with modern clinical anatomy enriching our

understanding of both systems and offering fresh insight into ancient descriptions of fluid-regulating organs.

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