

A Critical Review of Concept of *Lasika* in Ayurved w.s.r. to Interstitial Fluid

Review Article

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Abstract

Ayurveda is a science which was in dynamic continuum of development like all sciences. However due to various geopolitical and social reasons after 5th Century true development of Ayurveda science has stagnated hence few terms and concepts remain unexplained. Therefore a lot of concepts in Ayurved are there which need more understanding from modern physiological point of view. The concept of *Lasika* is one of them. It is a physiological entity, said to be the seat of *Pitta*, *Mala* of *Rasa Dhatu* and play major role in the pathological conditions like *Kushtha*, *Visarpa*, *Vrana*, *Dagdha* and most importantly in *Prameha*. The present article aims at exploration of concept of *Lasika* in Ayurved and its comparison with interstitial fluid on the basis of its modern physiological resemblance. This also be required to be discussed whether *Lasika* is *Dhatu*, *Upadhatu* or *Mala*.

Keywords: *Lasika*, Inflammation, *Prameha*, *Mala*.

Introduction:

Following are references and view point regarding *Lasika* in classical texts.

- *Lasika* has been defined in clinical point of view as 'fluid which oozes out from the wound.'(1)
- *Lasika* has been described as *Mala* of *Rasa Dhatu* (2) and site of *Pitta* i.e. physiologically it exhibit functions of *Pitta*.
- It is also stated that when due to *Ushna* (hot) property of *Pitta*, the liquid part is secreted from *Mamsa Dhatu* by fomentation, it is called as *Lasika*. (3)
- It is also considered as *Upadhatu* along with *Stanya*, *Artava*.(4)
- It is said to be the liquid part residing in between the layers of *Tvak* and *Mamsa*.(5)
- *Lasika* is also narrated as *Pichchha Bhaaga* of *Udaka* indicating fluid with sticky nature or may indicate residue.(6)
- It is mostly *Jalaprayah* in nature i.e. predominantly contains water.(7)
- Though it is explained as a part of *Udaka Dhatu*, the terms *Sweda* and *lasika* are explained separately which indicate that it is a separate entity than *Udaka* itself(1). *Lasika* is also said to be having the nature of *Vilina Medah Prayam* (8) (appears like melted fat).
- *Lasika* is one the factors involved in pathology of

Prameha (9) and mainly in a type of *Vataja Prameha* named *Hastimeha*.(10) It is mentioned in continuity along with other liquid biological factors like *Oja*, *Rasa*, *Shukra*, *Shonita* (8) indicating separate biological structure than others.

Vitiation of *Lasika* occurs in the diseases like - *Vicharchika*, *Visarpa*, *Pundarika Kushtha*, *Dagdha* which have dominance of *Pitta*. *Lasika* is explained in *Vrana srava* (exudates from ulcers) along with *Pooya*, *Jala*, *Asruka* (11) again indicating the separate entity than all the others explained there.

The term *Lasika* used in *Kushtha Nidana* (12) is replaced by the word *Ambu* in *Kushtha chikitsa* chapter (13) while explaining *Dosha-Dushya Samgraha*. It is also explained as which oozes out of the skin in the disease conditions like types of *Kushtha- Kapala* (14), *Audumbar* (15), *Pundarika* (16), *Sidhma* (17), and *Asadhya Lakshana* (18) along with other pathological secretions like *Pooya*, *Rakta*. Thus, it is evident that it is completely different entity than blood and pus.

In *Karna Roga*, in *Pakva* condition i.e. when acute inflammatory stage gets subsided, secretion of *Lasika* gets reduced (19). In *Kaphaja Shotha* also, if someone gets hurt on the *Shotha*, blood does not ooze out. Instead, after some period of time, *Pichha* starts secreting out which is also known as *Lasika* (20).

In nutshell–

1. *Lasika* is considered as liquid component having separate entity other than *Udaka* /*Jala*, *Rasa*, *Shonita* /*Rakta*, *Pooya*.
2. The physical nature of *Lasika* is viewed differently by different scholars. It looks turbid (6) or clear (21).
3. *Lasika* is said to be the seat of *Pitta*.
4. It is also considered as *Mala* of *Rasadhatu* and having the nature of *Upadhatu*.

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5. It comes out of the skin after various types of injuries like burns, wounds and oozes out as secretions in some skin diseases.
6. It is oozing out in various clinical conditions like *Audumbar Kustha*, *Vrana*, *Visarpa*, *Dagdha* which mostly are having *Pitta* dominance.

In comparison with the modern science, fluid which oozes out from the wound is an inflammatory exudate in response to the wound. Present article aims to elaborate the concept of *Lasika* in Ayurved and in comparison with interstitial fluid in various aspects.

Interstitial fluid

Extracellular space is filled with a composite material, known as the extracellular matrix, composed of gel which is known as the interstitial fluid. Interstitial fluid is by far major component of Extracellular fluid (ECF). It is the fluid solution that bathes and surrounds the cell. It is found in interstitial spaces (22). Interstitial fluid consists of a water solvent containing sugars, salts, fatty acids, amino acids, coenzymes, hormones, neurotransmitters, white blood cells and waste products from the cell. This water solvent accounts for 26% of the water in the human body (23). Interstitial fluid (IF) is created by trans-capillary filtration and cleared by lymphatic vessels. It transports nutrients and waste products between cells and blood capillaries, signaling molecules between cells, and antigens and cytokines to local draining lymph nodes for immune regulation. Its alterations are fundamental to changes in cell function in inflammation etc pathologies (24).

Piccha as synonym of *Lasika* (21)

Word *Piccha* stands for sliminess and *Vilina Meda Prayah* indicates its semi-transparent form. According to Ayurved, *Lasika* is viscous in nature. Polysaccharides or glycans in extracellular matrix which attracts the water molecules are responsible for its gel like quality (25) which is slimy and semi-transparent in nature.

Lasika as *Pittasthana* (26)

Lasika has been described as seat of *Pitta* i.e. physiologically it exhibit functions of *Pitta*. *Pitta* is one of the three *Doshas* described in texts of Ayurveda. *Doshas*, in balanced state execute their normal functions in the body. But they are actual intrinsic factors which are responsible for disease manifestation when they get imbalanced due to extrinsic factors (27). Interstitial fluid is most important part of extracellular space. The composition of the extracellular space includes metabolites, ions, various proteins and non-protein substances that might affect cellular function. For example, hormones, growth factors, cytokines and chemokines act by travelling the extracellular space towards biochemical receptors on cells. Other proteins that are active outside the cell are various enzymes, including digestive enzymes (Trypsin, Pepsin), extracellular proteinases and antioxidant enzymes. Often, proteins present in the extracellular space are stored outside the cells by attaching to various

extracellular matrix components (Collagens, Proteoglycans, etc.) (28).

Lasika as *Dhatu* (1) and *Upadhatu* (4)

Lasika has been described as *Udaka Dhatu*. According to texts of Ayurved, *Dhatu* has been considered as such entity which plays very important role to support the body structurally as well as functionally (29). Interstitial fluid provides means of delivering materials to the cells, intercellular communication which is an important function in body. But Acharya Vagbhat considered it as *Upadhatu* which has minor function as compared with *Dhatu* (30) maybe due to its less important functions as compared to other body tissues. Glycolysis is the metabolic pathway that converts glucose into pyruvate. The free energy released in this process is used to form the high-energy molecules ATP (adenosine triphosphate) and NADH (reduced nicotinamide adenine dinucleotide). Glycolysis occurs in most organisms in the cytosol of the cell. But in a condition of cell death, glycolysis occurs in interstitial fluid as Lactate dehydrogenase (LDH) is present in interstitial fluid (31). According to Ayurved, *Prinana* which can be correlated with ATP release in the cell is a function of *Rasa Dhatu*. Cytosol can be correlated with *Rasa Dhatu* on the basis of its function. Interstitial fluid has nourishing function less than as compared with cytosol.

Lasika as *Mala* of *Rasa Dhatu*

Lasika has been quoted as *Mala* of *Rasa Dhatu*. According to Ayurved classics, *Mala* means waste product. Interstitial fluid plays important role in removal of waste products produced by metabolic activities of cell.

Role of *Lasika* in pathogenesis of *Vataja Prameha*

Hyperglycaemia in untreated diabetics results in ECF which is both hyperosmolar and hypertonic. The rise in interstitial fluid osmolarity causes fluid shift from the ICF to the ECF. In this condition, water moves out of the cells because of which cell shrinks in size which is called as hyperosmotic dehydration and glucose cannot easily enter cells because of affected cell permeability (32). According to texts of Ayurved, *Lasika* is involved in *Vataja Prameha* which is later stage of *Prameha*. The pathological condition of *Lasika* in *Prameha* has been described as '*Atibahutvat Lasika*' (33) i.e. *Lasika* increases in volume which can be correlated with above explanation of increase in volume of interstitial fluid which occurs in untreated or later stage of Diabetes mellitus.

Lasika Dushti

According to Ayurved classics, vitiation of *Lasika* has been mentioned in diseases like *Vicharchika* (34) i.e. Wheeping eczema (35), *Visarpa* (36) i.e. Erysepalus (37), *Pundarikakustha* (38) i.e. Discoid lupus erythematosus (39). In all these conditions, inflammation is a common factor. As per the definition of '*Lasika*' given in Charak Samhita, it is the fluid which is emitted from the *Vrana* i.e. wound. In the context of wound, exudates are emitted which can be either serous for mild

inflammation or purulent for severe inflammation. Inflammation occurs as a response in the wound healing (40). In the process of inflammation, interstitial fluid plays very important role. The colloid osmotic pressure of interstitial fluid gets increased in relative terms to plasma, suggesting a significant buffering capacity against edema formation, and also that there is a significant local production of pro-inflammatory mediators to a systemic inflammatory stimulus. Inflammatory stimuli may furthermore result in a rapid reduction in interstitial fluid pressure, thus leading to increased filtration and edema formation (41). C-reactive protein which is a biomarker of inflammation (42) can be taken as biomarker for assessment of *Lasika Dushti*.

Conclusion

On the basis of similarities between *Lasika* and interstitial fluid, in respect to their nature, functions and pathological aspect, it can be concluded that interstitial fluid may be considered as *Lasika*.

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