Review Article: Shushkaakshipaaka [Dry Eye Syndrome]

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ABSTRACT

Eyes are the windows to the soul. Ayurvedic classical texts and writings have mentioned and discussed about eye and its related disorders, demonstrating the significance of the eye and the ways to protect it. Hence the importance of eye care has always a high priority. Patients with Shushkaakshipaaka experience varying severity of symptoms. Shushkaakshipaaka is co-related with Dry eye syndrome regarding the similarities in the presentation of signs and symptoms. Most patients complain of eye irritation, blurring of vision that fluctuates across the day and even photophobia. DES significantly reduces the quality of life among those affected. The treatment modalities that are mentioned in classics are of cooling and rejuvenating therapies for Vataja-Pitta disorders can be intervened to treat DES, which increase the stability of tear film and give relief from the symptoms of DES. The treatment principle for Shushkaakshipaaka mentioned in Ayurveda classics are Tarpana, Seka, Aschotana, Anjana etc., which are known to increase the stability of tear film and give relief from the symptoms of Shushkaakshipaaka. Current article focuses to gather all of types, diagnosis, etiology, pathogenesis and treatment of Shushkaakshipaaka.

Key words: Shushkaakshipaaka, Dry eye syndrome, Tarpana, Seka, Aschotana, Anjana

INTRODUCTION

Ashru (tear) secretion is an integral component of the ocular surface physiology; when compromised (quantitatively or qualitatively) leads to Shushkaakshipaaka (Dry eye syndrome) with various ocular discomfort symptoms and ultimately the patient may land in corneal blindness. Shushkaakshipaaka is one among the “Sarvagata Netra Rogas” mentioned by Acharya’s Sushruta¹ as well as Vagbhata² under Saadhya Netra Roga. The symptoms include Gharsha, Toda, Bheda, Upadeha, Krichronmeelana, Vikunana, Rooksha Daruna Vartma.³

Dry eye syndrome (DES), also known as keratoconjunctivitis sicca (KCS), a common ocular condition, arises when the tear film does not adequately support biological functions of the ocular surface. It is a multi-factorial disease of the tear and ocular surface. This arises due to environmental or endogenous stress, microbial insult or genetic factors. Acute inflammatory pathways of the ocular surface are triggered with tear dysfunction and hyperosmolarity and this potentiates a chronic inflammatory cycle that is seen in DES. Such inflammatory pathways are driven by host ocular immunity.⁴

Patients with DES experience varying severity of symptoms. Most patients complain of eye irritation, blurring of vision that fluctuates across the day and even photophobia. DES significantly reduces the quality of life among those affected. The impact of DES on patients was found to be equivalent to unstable angina, a life-threatening cardiac condition.⁵

Local, systemic and environmental factors play a major role in its pathogenesis. Vata & Pitta/Rakta vitiation as per Ayurveda are the major contributing pathological
factors in its manifestation. Contrary to the available modern medical treatment / management regimen, Ayurveda propounds a systematic systemic/ holistic treatment approach in the treatment of dry eye syndrome.

The treatment modalities that are mentioned in classics are of cooling and rejuvenating therapies for Vata-Pitta disorders can be intervened to treat DES, which increase the stability of tear film and give relief from the symptoms of DES.

The treatment principle for Shushkaakshipaaka mentioned in Ayurveda classics are Tarpana, Seka, Aschotana[6], Anjana etc., which are known to increase the stability of tear film and give relief from the symptoms of Shushkaakshipaaka.

**DISEASE REVIEW**

Shushkaakshipaaka is one among the Sarvagata Nettaroga mentioned by Acharyas under Saadhya Vyadhi.

**Derivation of word Shushka:** Tri (Susha Sheshae + Ktah)[7]

**Paribhasha[8]**

“Shushkena Akshipakena Upahatam Akshihi”

Acharya Madhukosha explains Shushkaakshipaaka as Paka (Inflammation) of Netra which develops as a result of Shushkata (Adravata) leading to Netra Upahata.

**Nidana**

Acharyas have described Hetu of all Netra Rogas in general.

**Table 1: Showing the Nettaroga Nidana according to various Acharyas.**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ushnabitaptasyaj alepraveshat</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>2.</td>
<td>Durekshana</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>3.</td>
<td>Swapnaviparyaya</td>
<td>+</td>
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<td>+</td>
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</tbody>
</table>

**Vishesha Nidana**[14]

The Vishesha Nidana which includes Asatmendriyartha Samyoga, Prajnaparadha, Parinama with respect to Chakshurendriya can be considered in case of Shushkaakshipaaka.

**Asatmendriyartha Samyoga**

These abnormal associations or contacts might happen either accidentally, inevitably or intentionally. Each such improper contact causes bad effects not only in the sense organ concerned but also on the mind, body...
and makes them diseased. Examples for such abnormal contacts applicable to Chakshurendriya are:

**Atiyoga (Excessive)**

Seeing very bright light or objects for long periods of time, such as sun, TV and constantly looking at the monitor (screen) without blinking.

**Heenayoga**

Remaining in a very dim light or even darkness, seeing objects in dim light or not seeing at all (not using the eyes properly).

**Mithyayoga**

Gazing of objects which are very near or very far, concentrating on the small letters over the screen (Improper accommodation), watching bright objects, the surrounding environment like poor visual hygiene, visualizing from a distance of less than six inches or observing the object placed at an uneven height, observing bright (shining) objects. Viewing computer screen or TV screen in improper way can also be considered as of Mithyayoga of Chakshurendriya.

**Table 2: Showing Doshas involved in Shushkaakshipaaka according to various Acharyas.**

<table>
<thead>
<tr>
<th>Doshas involved</th>
<th>Samhita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vata and Rakta[17]</td>
<td>Karala</td>
</tr>
<tr>
<td>Raktaja[18]</td>
<td>MN and BP</td>
</tr>
</tbody>
</table>

**Samprapti of Shushkaashipaka**

**Chart 1: Showing the Samprapti of Shushkaakshipaaka**

**Samprapti Ghataka**

**Table 3: Showing the Samprapthi Ghatakas of Shushkaakshipaaka**

<table>
<thead>
<tr>
<th>Dosha</th>
<th>Vata-Pitta and Rakta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dushya</td>
<td>Rasa-Rakta</td>
</tr>
<tr>
<td>Agni</td>
<td>Mandagni</td>
</tr>
<tr>
<td>Srotas</td>
<td>Rasa-Raktavaha Srotas</td>
</tr>
<tr>
<td>Srotodushti</td>
<td>Sanga</td>
</tr>
<tr>
<td>Rogamarga</td>
<td>Madhyama</td>
</tr>
<tr>
<td>Adhistana</td>
<td>All Netramandalas</td>
</tr>
</tbody>
</table>

**Purvarupa[20]**

Purvarupa are prodromal symptoms prior to disease felt by the patient.

**Table 4: Showing the Samanya Purvarupa of Netrarogas**

<table>
<thead>
<tr>
<th>Avilata</th>
<th>Blurred vision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sa Samrambham</td>
<td>Angry look</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Ashru</th>
<th>Watering</th>
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</thead>
<tbody>
<tr>
<td>Kandu</td>
<td>Itching</td>
</tr>
<tr>
<td>Upadeha</td>
<td>Coating</td>
</tr>
<tr>
<td>Guruta</td>
<td>Heaviness</td>
</tr>
<tr>
<td>Usha</td>
<td>Burning sensation</td>
</tr>
<tr>
<td>Toda</td>
<td>Pricking pain</td>
</tr>
<tr>
<td>Raga</td>
<td>Reddish discoloration</td>
</tr>
<tr>
<td>Vartmakosha Sula</td>
<td>Painful lids</td>
</tr>
<tr>
<td>Vartmakosha Sukapurnabha</td>
<td>Foreign body sensation in lids</td>
</tr>
<tr>
<td>Kriyaswakshiyathapura</td>
<td>Reduced movements like blinking</td>
</tr>
</tbody>
</table>

Few of the above Purvarupas are also present in prodromal symptoms of Shushkaakshipaaka like: Avilata (Eye strain and asthenopia), Sasamrambha (Foreign body sensations or atypical discomfort in eye), Kandu (Itching as a symptom because of eye strain), Guru (Eye fatigue), Usha (Burning sensation), Toda (Pain in eyes), Sashulamvartmakoshaishu (Pain in eye lids), Sukapurnabham (Foreign body sensation) can be considered as Purvarupa of Shushkaakshipaaka.

Lakshana

Shushkaakshipaaka is characterized by excessive closure and roughness in eye lids, associated with difficulty in lid movements, blurred vision, burning sensation.

Table 5: Showing the Lakshanas of Shushkaakshipaaka by different Acharyas.

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Garsha</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Toda</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rukshavartmakshi</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Darunavartmakshi</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Vikunana - + + - + + -
Vishushkata - + + - - - -
Sheethechha - + + - - - -
Sulapaka - + + - - - -
Daha - - - + + + +
Aviladarshanam + - - + + + +
Krishronmeelana - + + - - - -
Vilokanam + - - + - - +
Upadeha - + + - - - -

Upashaya

Signifies medicines, food items and activities which give feelings of well-being to the patient. Sheethechha[28] – Likeness for cold, it can be considered as the patient might feel better while washing the eyes with cold water.

Anupashaya

All the Nidanas can be considered as Anupashaya for Shushkaakshipaaka.

Sadhyasadhyata

Sarvagata Aushadha Sadhya Vyadh[

Chikitsa

Shushkaakshipaaka should be treated similar to Vataja Abhisyanda with Ghrita processed with Kulira Mamsa Rasa.[29] Seka with Ksheera and Saindhava is mentioned.[31]

Aschotana can be performed with Darvi, Prapaudarika Kwatha, Manjishta Kwatha, Mridweeka Kwatha or Chandanadi Kwatha.[32] Nasya Karma should be performed with Anu Taila or Sarivadi Taila. Aschotana and Putapaka is indicated with Snigdha and Jeevaneeyagan Dravya Samsiddha Ghrita. Anjana can be performed with Masi should be obtained by burning the hair dipped in ghee in Antardhuma Karma.[33]

Churnanjana prepared from Manjista, Triphala, Katankata, Loha Bhasma and Srotonjana can be
applied. Pindanjana prepared from mixing equal quantity of Tamra, Raja, Sahachara Pushpa, Pundarika, Madhuka, Kalanusari, Sariva with Aja-Dugdha. Sneha Anjana prepared from Anupa Mamsa Vasa with the powders of Shunti and Saindhava. Basti Karma with Ghrita Manda, Madhuka and Shatavari are specially indicated in the treatment of Shushkaakshipaaka.[34]

Disease Review - Modern Science

Dry Eye Syndrome[35]

Dry eye syndrome refers to a group of disorders of the tear film that are due to reduced tear production or excessive tear evaporation, associated with ocular discomfort and/or visual symptoms and possible disease of the ocular surface.

Etiology of Dry Eye Syndrome

1. Due to deficiency in tear film component.
2. Due to Impaired eye lid function.
3. Epitheliopathies.

Due to deficiency in tear film component

1. **Aqueous tear deficiency:** (Keratoconjunctivitis sicca.)
   - Congenital alacrimia
   - Paralytic hyposecretion
   - Primary and secondary Sjogren’s syndrome
   - Idiopathic hyposecretion.
2. **Mucin deficiency dry eye:** Occurs when goblet cells are damaged, as in Vitamin A deficiency. In cases of Conjunctivitis scarring diseases Such as Trachoma, chemical Burns, Radiations etc.
3. **Lipid deficiency abnormalities:** It has only been seen in some cases of congenital absence of meibomian glands Common in patients with chronic blepharitis and chronic meibomitis.
4. **Impaired eyelid functions:**
   - Bell’s palsy, Exposure keratitis
   - Symblepharon, Pterygium

Pathogenesis

The ocular surface and tear-secreting glands function as an integrated unit. Disease or dysfunction of this functional unit results in an unstable and poorly maintained tear film that causes ocular irritation symptoms and possible damage to the ocular surface epithelium. Dysfunction of this integrated unit may develop from aging, a decrease in supportive factors (such as androgen hormones), systemic inflammatory diseases (such as Sjögren syndrome or rheumatoid arthritis), ocular surface diseases (such as herpes simplex virus [HSV] keratitis) or surgeries that disrupt the trigeminal afferent sensory nerves (e.g., LASIK), and systemic diseases or medications that disrupt the efferent cholinergic nerves that stimulate tear secretion. Decreased tear secretion and clearance initiates an inflammatory response on the ocular surface that involves both soluble and cellular mediators.

Clinical Features

Symptoms of Dry Eye Include

- Irritation
- Foreign body (sandy) sensation
- Feeling of dryness
- Itching
- Non-specific ocular discomfort
- Chronically sore eyes

**Chart 3: Showing the classification of Dry Eye**

**Signs**

- Posterior blepharitis and meibomian gland dysfunction.
- Conjunctiva may show mild keratinisation and redness.

**Tear Film**

- In the normal eye, as the tear film breaks down, the mucin layer becomes contaminated with lipid but is washed away.
- In the dry eye, the lipid-contaminated mucin accumulates in the tear film as particles and debris that move with each blink.
- Froth in the tear film or along the eyelid margin occurs in meibomian gland dysfunction.

**Cornea**

- Punctate epithelial erosions that stain with fluorescein.
- Filaments consist of mucus strands lined with epithelium attached at one end to the corneal surface in case of severe dry eye conditions.

**Complications**

- Peripheral superficial corneal neovascularization
- Epithelial breakdown, melting, perforation and bacterial keratitis.

**Diagnosis**

**Tear Film Tests**

1. **Tear film break-up (BUT)**

   It is the interval between a complete blink and appearance of first randomly distributed dry spot on the cornea. It is noted after instilling a drop of fluorescein and examining in cobalt-blue light of a slit-lamp. BUT is an indicator of adequacy of mucin component of tears. Normal values of TBUT range from 15 to 35 seconds. Values less than 10 seconds imply an unstable tear film.

2. **Schirmer’s test**

   The Schirmer test is a useful assessment of aqueous tear production. The test involves measuring the amount of wetting of a special, 5 mm wide and 35 mm long. The test can be performed with or without topical anaesthesia. When performed with an anaesthetic (Schirmer 2 whereas without anaesthetic (Schirmer 1). The filter paper is folded 5 mm from one end and inserted at the junction of the middle and outer third of the lower lid. The patient is asked to keep the eyes gently closed. Less than 10 mm of wetting after 5 minutes without anaesthesia and less than 6 mm with anaesthesia is considered abnormal.

3. **Rose Bengal Staining Method**

   Rose Bengal is a dye that has an affinity for dead or devitalized epithelial cells that have a lost or altered mucous layer. Corneal filaments and plaques are also shown up more clearly by the dye and the use of a red-free filter may help visualization. A 1% solution of Rose Bengal or a moistened impregnated strip can be used.

**Other Tests**

- Lactoferrin test
- Phenol red thread test
- Tear meniscometry
Low doses of medications called tetracyclines can be used as anti-inflammatory agents for a minimum of three to four months, sometimes much longer.

Ciclosporine Eye Drops
Ciclosporine is a medication that suppresses the activity of the immune system and can be used in the treatment of dry eye syndrome.

Surgical Management
Punctal Occlusion
Punctal occlusion involves using small plugs called punctal plugs to seal tear ducts. Tears will not drain into the tear ducts and eyes should remain moist. Main aim is to restrict the loss of amount of normally secreted tear.

Salivary Gland Auto transplantation
Salivary gland auto-transplantation is an uncommon procedure that is usually only recommended after all other treatment options have been failed.

CONCLUSION
The eye is the main sense organ gifted by God to human beings. An individual who is blind, day and night are the same and this beautiful world is of no use to him even if he possesses a lot of wealth, so sincere efforts should be made by every individual to preserve his/her vision till the last breath of life. In spite of remarkable progress and advances in the field of modern ophthalmology, there are some limitations. Ayurveda, the ancient system of medicine gives valuable guide lines not only in treatment aspects but also in preventive line. Netra Kriyakalpa like Snehapana, Tarpaṇa, Putapaka, Nasya, Anjana are the local therapeutic procedures which if promptly used shows objective evidences of excellent responses. According to Ayurveda, dry eye is not merely an ocular surface disorder, rather this is one of manifestation of the deranged metabolism/depreciation of body tissues. Ashru (tear film) is the byproduct of Rasa, Meda, and Majja Dhatu and without normalizing / altering them we cannot treat dry eye syndrome optimally. Systemic and holistic approach to treat the disease Shushkaakshipaaka, (Sarvagata Vato-Pitta / Raktaja Netra Roga) and managing this humeral imbalance, along with local / topical therapeutical procedures, the condition could be managed well.
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