International Journal of Ayurveda and Pharma Research

Research Article

EFFECT OF AN AYURVEDIC MANAGEMENT IN COMPUTER VISION SYNDROME

Jinoop.P1*, C. S. Kannadas2, Dhanisha. B. K1

*1M.S Scholar, 2Professor, Dept of Shalakyatantra, Government Ayurveda College, Trivandrum, Kerala, India.

Article info	ABSTRACT
	Computer Vision Syndrome (CVS) is the new nomenclature to the visual, ocular, and systemic symptoms arising due to the long time and improper working on the computer and is emerging as a pandemic in the 21st century. On critical analysis of the symptoms of CVS, it seems to be a *Vata-Pitta* ocular cum systemic disease which needs systemic as well as topical treatment approach. *Shushkakshipaka* is a similar disease explained in *Sarvakshigatha roga*. The management includes *Anutaila nasya* and *Jeevaneya ghritha tarpana.* Hence an attempt is made to study the benefit of this therapy in CVS which is having similarity with *Shushkakshipaka*. Patients aged 20-50 diagnosed as CVS were selected for the study and 30 eyes were studied. Data was collected by case proforma, clinical examination and investigations such as Visual analysis, Schirmer's test, Tear break up time test. Then they were subjected to *Deepana- Pachana, Snehana* with *Jeevaneya gritha, Swedana, Kayasodhana* as *Virechana* with *Gandharva eranda taila, Marsa nasya* with *Anutaila, Tharpana* with *Jeevaneya gritha* and *Putapaka* with *Jeevaneya puatapaka rasa.* During the analysis of the distribution of symptoms there was significant improvement noted which sustained during follow up period also. *Nasya* gives *Bala* to *Uttamanga* thus preventing *Stanasamsraya* due to *Kha vaigunya*. Here *Vicharana snehapana* with *Jeevaneya gana gritha* and *Tarpana* with the same is done along with *Anutaila nasya*. *Jeevaneya gritha* is used for the *Snehana karma* and nourishes the eyes. *Gritha* itself is *Vatapitta sama* and helps to reduce the symptoms which are *Vatapitta* in nature.

INTRODUCTION

Eyes were greatly valued by ancient Indians and prime importance has been given for protection of eyes. Over periods, human societies have altered local ecosystem and modified regional environment. In this globalized world, human life style has been completely changed and is full of competition and advanced technologies. Now a day, use of computers, internet surfing, watching television, use of air conditioners, room heaters are the daily needs of a common man.

Computers – visual display units- have become the integral part of our day-to-day life as a result of technological advancement. Awareness about the health-related issue by computer is minimal even in highly educated population. In present scenario near work exceeds the normal ability of visual apparatus by the use of self-illuminating personal computers, mobile phones and the latest gadgets for accessing web world and quick computation. Prolonged use of these display units may lead to a cascade of reactions that can be put together as Computer Vision Syndrome (CVS).

Universally, computer vision syndrome is the leading occupational hazard of the 21st century and one of the main public health problems. According to global data, 60 million people suffer from CVS, with one million new cases reported each year. Furthermore, its symptoms affect nearly 70% of all computer customers.[1] In India as a part of Information Technology revolution, computer population stands between 15-20 million and they work long hours too. According to National Institute of Occupational Safety and health, CVS affects 90% of the people who spend 4hours or more a day at computers.[2] According to Indian studies, the prevalence of CVS is 69% in adults and 50% in children. Indian ophthalmologists discovered that computer-using and specialized ophthalmologists were more knowledgeable about symptoms and diagnostic indicators but were

uninformed about treatment options. The use of social media and multitasking is more prevalent among younger persons, with 87% of those aged 20-29 reporting the use of two or more digital devices concurrently.[3]

Eye cannot adapt with the new demands to work near in a new visual environment for extensive hours and in stressful environment. These populations include professionals of Information Technology, Business Process Outsourcing, accounting, banking, front office and students of all age group. The repetitive stress injury to visual system may cause clinical features as headaches, blurred vision, and difficulty in changing focus between far and near, dryness of eye, redness and associated symptoms as pain in neck, shoulder and backache.[4]

Upon critical and systemic review of CVS, its etiopathogenesis in view of the given guidelines regarding the new health problem seems to be a *Vata-Pitta* dominant nature. The specific symptoms of CVS *Visushkanetra, Roopadarsana asahyatha* suggests *Vata* predominant *Doshakopa* and *Avila darsana*, *Netra raga, Netradaha*, suggests *Pitta* predominant *Doshakopa*. So, CVS comprises of symptoms of *Vata-Pitta* predominant nature. *Shushkakshipaka* is a similar disease explained in *Sarvakshigatharoga*. In the initial phase it is a *Vata* predominant disease with *Pittanubandha*. But if not properly managed it can lead to *Pitta kopa* causing *Paka* of ocular tissue. This disease which initially attacks the ocular surface can cause damage to deeper structures if adequate intervention is not provided. The description of the disease in *Susruta Samhita* details it as a *Vata* predominant[5] while *Acharya Vagbhata* described it as a *Vata Pitta* entity.[6]

The present line of management of CVS is regular use of lubricant eye drops.[7] It provides only symptomatic relief for hours only and slowly the frequency of application has to be increased. Ayurveda envisage definite treatment for such clinical conditions. The management includes *Anutaila nasya* and *Jeevaneya ghritha tarpana*.[8] This study helps to analyze the benefit of this therapy in CVS which is having similarity with *Shushkakshipaka.*

Even though CVS is a recent addition in literature of human ophthalmology, the management principle for similar clinical condition described in Ayurveda can be mainstreamed. The role of *Marsa Nasya (Sodhana)* with *Anutaila*[9] in clinical conditions of the eye can be studied. The concept of *Tarpana* with *Jeevaneya gritha*[10] in conditions involving dryness of eye, defective tear secretion can also be studied and evaluated. This can be provided as a preventive measure in the community who are prone to develop CVS and the procedures are relatively safe.

The present objective is to evaluate the "Effect of an Ayurvedic Management in Computer Vision Syndrome". In order to gain acceptance in the present era, its efficacy has to be proved statistically, which is being tried here.

AIM OF STUDY

To evaluate effect of an Ayurvedic Management in Computer Vision Syndrome.

MATERIALS AND METHODS

Study Drugs

Anutaila and *Jeevaneeyagana gritha*

Study Design

Interventional study, pre and post evaluation without control.

Study Setting

Department of Shalakyathantra, Govt. Ayurveda College, Trivandrum

Study Population

Patients aged 20-50 diagnosed as Computer Vision Syndrome from OPD and IPD of Shalakyathantra, Govt. Ayurveda College, Trivandrum, fulfilling the inclusion and exclusion criteria.

Inclusion Criteria

Patients aged 20-50 diagnosed as Computer Vision Syndrome.

Exclusion Criteria

- Patients suffering from inflammatory and infective disease of eye and its appendages
- History of intra ocular surgery, ocular trauma, asthma, migraine.
- Patients on prolonged medication.
- Pregnant women and lactating mothers.
- Patients using diuretics, contraceptive pills, beta blockers such as propranolol, atenolol and Lubricant eye drops to treat other eye diseases.
- Patients not fit for *Marsa nasya* and *Tarpana.*

Sample size

30 eyes will be studied.

Sampling Technique

Consecutive cases satisfying inclusion and exclusion criteria till attaining sample size.

Data collection

Data were collected by case proforma, clinical examination and investigations.

Study tool

a. **Case Proforma**

b. **Investigations**

- Schirmer's test
- Tear break up time test
- Grading of headache
- Grading of redness of eye.

Examination of Patient

Thirty eyes were selected according to the inclusion criteria. The personal data, symptomatology and history of diseases were taken in detail and noted in clinical case proforma. General examinations and eye examinations were done.

Procedure

The patients diagnosed as having computer vision syndrome and registered in OPD or IPD of Shalakyatantra, Govt. Ayurveda College Hospital, Trivandrum, are selected as per inclusion and exclusion criteria. Then they will be subjected to *Deepana- Pachana, Snehana, Swedana, Kayasodhana, Marsa nasya, tarpana* and *Putapaka.*

Drug

The drugs *Anutaila* and *Jeevaneya gritha* were prepared according to the standard method of preparation of *Taila* and *Gritha* respectively as per *Snehapaka vidhi*. The details of interventions are enclosed in Table no 1.

Table 1: Interventions

No. of Days	Procedure	Medicine	Dose and Duration
2 days	*Deepana* and *Pachana*	*Vaiswanarachoorna* in hot water	12g-7am and 7pm
3-7 days	*Snehana* (*vicharana*)	*Jeevaneya gritha* with *Peya*	15g-7am and 4pm
3 days	*Swedana*	*Abhyanga* with *Balataila* followed by *Ushnambu snana*	
1 day	*Virechana*	*Gandharva eranda taila* with hot water	25ml at 6am
Samsarjanakriya – According to the number of *Vegas* observed			
7 days	*Marasa Nasya*	*Anutaila* *Talam* with *Rasnajambeeram* *Mukhabyanga* with *Balataila*	8 *Bindu* (4ml)
5 days	*Tarpana*	*Jeevaneya gritha*	8 minutes
1 day	*Putapaka*	*Jeevaneya puatapaka rasa*	2minutes

Minimum and maximum duration of intervention ranges from 22 days to 26 days respectively.

Administration of *Nasya*[11]

The procedure of *Marsa nasya* can be classified into the following three headings:

1) *Poorva karma* (Preparatory measures)
2) *Pradhana karma* (*Nasya* therapy)
3) *Paschat karma* (Post therapy measures)

Poorva karma

Before giving *Nasya*, prior arrangement of the material and equipment should be done.

Requirements

- A *Panchakarma* theatre room.
- Table measuring 3 feet in height and breadth, 6 feet in length and the foot end elevated by placing two 6 inches high wooden blocks beneath the legs of table.
- Pillow to elevate the chest thereby bending the head to 45°.
- Wide mouthed vessel for water bath.
- Small bowl for heating *Taila* indirectly over water bath.
- *Taila - Anutaila*
- Arrangements for *Swedana-* Pressure cooker without weight, long heat resistant flexible pipe.
- Cotton pad, gauze.

- Lotus petals to protect eyes while doing *Swedana.*
- *Gokarna*
- Lukewarm water for *Kabala*
- *Haridradi dhumavarti*
- Spittoon

Preparation of Patient

- The following things should be looked carefully to prepare the patient for *Nasya karma*.
- The procedure was briefly explained to the patient.
- Patient should have passed his natural urges like urine and stool.
- Should have completed his routine activities like tooth brushing, bath.
- *Rasna jambeera talam* was applied on the head.
- *Mridu abhyanga* (massage) should be done on scalp, forehead, face and neck for 3 to 5 minutes using *Bala taila* followed by *Sweda karma* (fomentation).
- Eyes should be bandaged with a clean gauze piece after placing lotus petals and cotton pads over the closed eyelids for protect the eyes from *Swedana.*
- Patient is made to lie in supine position with slightly elevated legs and head extended backwards at 45° from the table.

Pradhana Karma

The medicine *Anutaila* was mildly warmed over a water bath. The prescribed dose of *Taila* (*Madhyama matra* – 4ml) was taken in a *gokarna* and poured into either nostril closing the other In a continuous single stream. Immediately after the instillation of medicine mild massage was done over *Pani*, *Pada*, *Greeva* and *Skanda*. Patient was asked to inhale the medicine with moderate force and spit it through mouth turning head to either side alternatively without rising from the cot. Patient was made to lie in the same position for 100 *matra kala* (3-5 minutes). Meanwhile, patient was advised to slightly raise his hands to rub both the palms vigorously. *Mardana* was done over the palms, soles, shoulders and ears.

Paschat Karma

Dhumapana was done with *Haridradi varti* followed by kabala with warm water to attain to *Kanta sudhi*. *Talam* applied earlier was wiped off and fresh *Rasnadi churna* was applied. The patient was advised not to take any type of food or drinks for two hours after *Nasya*.

Administration of *Tarpana*[12]

Poorva Karma

- *Kaya shodhana*
- *Shira shodhana*
- *Sthanika shodana*

Pradhana Karma

Patient is made to lie in supine position in a room devoid of wind and sun. A ridge is made around the eye with *Yava* and *Masha* to a height of 2-3 inches (2 *Angulas*). *Jeevaneyagana grita* is warmed to body temperature and filtered, medicine is poured into the eye over *Kaneenika sandhi* on closed eyes. Medicine should be filled up to the tip of eye lashes and the eyes are opened and closed intermittently, and medicine is kept for 8min, later medicine is drained out by making a hole at *Apanga sandhi*.

Pashchath Karma

- Eyes should be cleaned with *Yava pisti*
- Wash with warm water
- *Dhupana* to prevent *Kaphaja* disorder
- Not to see bright objects

Assessment of the Patient will be made in the Following Schedule

Clinical evaluation and investigations will be done prior to the commencement of interventions and consecutive assessments will be made on 12th, 42nd & 72nd days after *Putapaka*.

Outcome variable

Change in Headache

Will be assessed by 4- point verbal rating scale

- 0 - No pain

- 1 - Mild pain
- 2 - Moderate pain
- 3 - Severe pain

Change in Redness of conjunctiva

- 0 - No redness
- 1 - Mild redness
- 2 - Moderate redness
- 3 - Severe redness

Change in Dryness of Eye

Dryness will be assessed by Schirmer's test: The Schirmer's test evaluates aqueous tear production. A unique filter paper (no. 41 Whatman) measuring 5mm wide and 35mm long is needed to perform a Schirmer's test. It is useful in determining whether surface dryness is caused by decreased tear production from the lacrimal glands or by another reason in individuals with signs and/or symptoms of dry eye (e.g. blepharitis, meibomitis, exposure).

Tear Break up Time test: Fluorescein 2% or an impregnated fluorescein strip moistened with non-preserved saline is instilled into the lower fornix to test TBUT, and the tear film is then examined under a slit lamp as the patient stops blinking until small dry spots appear. The tear film becomes more stable as it takes longer. A weak tear film is indicated by a quick tear break-up time. Generally, >10 seconds is thought to be normal, 5 to 10 seconds, marginal, and <5 seconds. An unstable tear film can explain dry eye symptoms in patients who have a normal quantity of tears. Unstable means that the composition of the tears is imbalanced, resulting in tears evaporating too quickly or not adhering properly to the surface of the eye.

Statistical Analysis

The results were recorded and analysed statistically. Paired comparison of ordinal variables was done using Wilcoxon Signed Rank test.

Ethical Considerations

- Consent from the patient
- NOC from institutional ethical committee (IEC No: AVC IEC 052046/2014)

RESULTS AND DISCUSSION

Data Related to Response of Treatment

### 1) Headache – Based on 4-point Verbal Rating Scale

During the analysis of the distribution of symptoms of headache among the groups during various stages of treatment, 73.3% patients had headache before treatment and it reduced to 13.3% after 2nd follow up. 40% and 6.7% of patients had moderate and severe headache respectively before treatment, it reduced to 0 after the 2nd follow up. The details are enclosed in Table no 2 and Figure 1.

Table 2: Data Related to Headache

Head ache	BT		AT		AF 1		AF 2	
	N	%	N	%	N	%	N	%
Grade 0	4	26.7	5	33.3	11	73.3	13	86.7
Grade 1	4	26.7	8	53.3	3	20.0	2	13.3
Grade 2	6	40.0	2	13.3	1	6.7	0	0.0
Grade 3	1	6.7	0	0.0	0	0.0	0	0.0
Total	15	100.0	15	100.0	15	100.0	15	100.0

During the analysis of the distribution of symptoms of headache among the groups during various stages of treatment, all three pairs taken for analysis were found to be statistically significant. p values obtained for BT-AT, BT-AF1 and BT-AF2 are 0.008, 0.002 and 0.003 respectively and hence the p values are much less than 0.05 they are very significant.

**Figure 1: Data related to Headache**
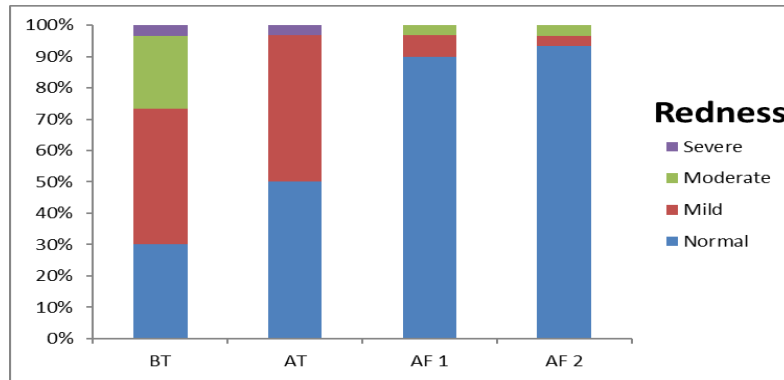
2) Redness

While considering redness of eyes 30% of eyes taken for study were showing no redness. After treatment 50% of eyes shows no sign of redness and after 2nd follow up 93.3% were normal. The details are enclosed in table no 3 and figure 2.

Table 3: Data related to Redness

Redness	BT		AT		AF 1		AF 2	
	N	%	N	%	N	%	N	%
Grade 0	9	30.0	15	50.0	27	90.0	28	93.3
Grade 1	13	43.3	14	46.7	2	6.7	1	3.3
Grade 2	7	23.3	0	0	1	3.3	1	3.3
Grade 3	1	3.3	1	3.3	0	0.0	0	0.0
Total	30	100.0	30	100.0	30	100.0	30	100.0

All three pairs taken for analysis obtained p values less than 0.001. As the p values are less than 0.05, the effect of treatment on redness was found to be statistically very significant.

**Figure 2: Data related to Redness**
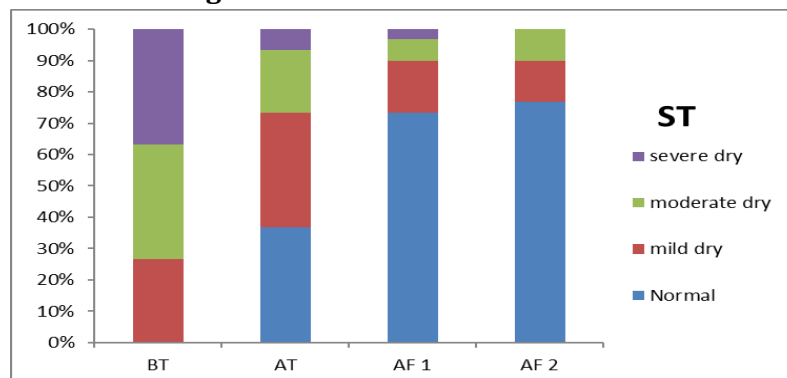
3) Schirmer's test

While comparing dryness of eyes by "schirmer's" test there were no eyes with normal values before treatment. After treatment 36.7% of eyes found to be normal and after 2nd follow up 76.7% shows normal values. The details are enclosed in table no 4 and figure 3.

Table 4: Data related to Schirmer's test

ST	BT		AT		AF 1		AF 2	
	N	%	N	%	N	%	N	%
Normal	0	0	11	36.7	22	73.3	23	76.7
Mild dry	8	26.7	11	36.7	5	16.7	4	13.3
Moderate dry	11	36.7	6	20.0	2	6.7	3	10.0
Severe dry	11	36.7	2	6.7	1	3.3	0	0.0
Total	30	100.0	30	100.0	30	100.0	30	100.0

BT-AT, BT-AF1 and BT-AF2 analysis obtained p values of less than 0.001 in Wilcoxon signed rank test. As the p values are less than 0.001, all of them are very significant.

**Figure 3: Data related to Schirmer's test**
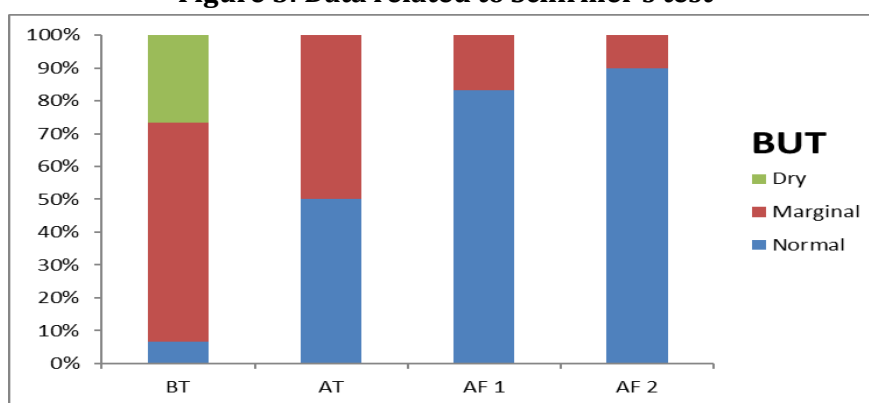
4) Tear Break up Time Test

Dryness of eyes also compared using "tear break up time test", it shows only 6.7% of eyes were normal before treatment, 66.7% had marginal dryness and 26.7% eyes were dry. After treatment 50% of eyes were normal and 50% shows marginal dryness. After the 2nd follow up 90% eyes show normal value and there was no dry eye, only 10% had marginal dryness. The details are enclosed in table no 5 and figure 4.

Table 5: Data related to Tear Break up Time Test

TBUT	BT		AT		AF 1		AF 2	
	N	%	N	%	N	%	N	%
Normal	2	6.7	15	50.0	25	83.3	27	90.0
Marginal	20	66.7	15	50.0	5	16.7	3	10.0
Dry	8	26.7	0	0	0	0	0	0
Total	30	100.0	30	100.0	30	100.0	30	100.0

Figure 4: Data related to Tear Break up Time Test
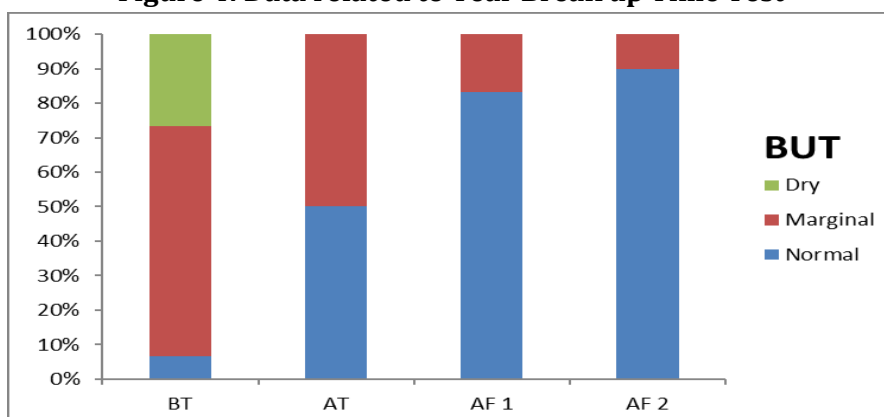
All three pairs for analysis which are BT-AT, BT-AF1, and BT-AF2 were found to be statistically significant as all p values obtained are less than 0.001 in Wilcoxon signed rank test. While considering the severity of symptoms, significant reduction in severity was observed on comparing before treatment and after each follow up. From this observation it can be stated that the sustaining action after intervention period is maintained for the follow up period.

Probable Mode of Action

As per *Susrutha Samhitha Shushkashipaka* is mentioned as *Vataja roga* and as per *Vagbhata* it is mentioned as *Vata pitta dosha vyadi*. So, the basic principle of *Vata samana* is *Sneha*, it can be either *Anthar snehana* or *Bahya snehana*.

The *Deepana pachana* done prior to the treatment reduces *Ama*, improves *Agni* and reduces *Kapha avarana*. *Virechana* relieves *Srotorodha*. The *Swedana* done during *Purvakarma* causes vasodilation and promote absorption. The *Nasya karma* acts on the *Sringataka marma* which is a *Sira marma* present in the middle of the confluence of *Siras* supplying nourishment to the nose, ears, eyes and tongue. *Acharya Charaka* says the *Sneha pradhana navana* drug get absorbed in the *Sringataka* region. The above references indicate that lipid soluble drugs are much more efficiently absorbed by nasal mucosa. *Sringataka Marma* can be considered as the middle cranial fossa and its structures. It is in connection with ethmoidal, sphenoidal sinuses, meningeal vessels, internal carotid artery, cranial nerves 3, 4, 5, 6 and 8, the optic chiasma, pituitary gland, pineal gland and hypothalamus. *Nasya karma* can stimulate the higher centers and regulate their function. Even though drug absorption may take place via. vascular pathway, lymphatics, neurological pathway and diffusion; more absorption occurs through vascular pathway due to rich blood supply of nasal mucosa. It may be due to this fact that, the formulation showed symptomatic relief as much absorption takes place in nasal mucosa and reduces the local inflammatory process.

The action of the formulation is not due to a single drug effect, but is the combined effect of the drugs along with specific action of *Nasya*. *Samskara* also has an important role in this. *Nasya* gives *Bala* to *Uttamanga* thus preventing *Stanasamsraya* due to *Kha vaigunya*.

Here *Vicharana snehapana* with *Jeevaneya gana gritha* and *Tarpana* with the same is done along with *Anutaila nasya*. *Jeevaneya gritha* is used for the *Snehana karma* and nourishes the eyes. *Gritha* itself is *Vatapitta sama* and helps to reduce the symptoms which are *Vatapitta* in nature.

CONCLUSION

The following conclusions can be drawn from the present study.

- The features of computer vision syndrome are similar to *Sushkakshipaka* since the majority had dryness of eyes.
- Most common aetiology of computer vision syndrome (CVS) is prolonged use of visual display units. Over usage of *Amlarasa, Kulatha, Masha, Sukta, Aranala* and *Viharas* like *Vegadharana manasika bhavas* like *Soka* and *Krodha*, improper *Dinacharya* and *Ritucharya* are also the precipitating factors. Causing *Chaya* followed by *Prakopa* and *Sthana samsraya* of *Vata* and *Pitta dosha*.
- In present study CVS was found more in IT professionals, students and individuals more indulged in using computer.
- All symptoms had significant relief after the treatment.
- There is no adverse effect reported during the treatment period.

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*Address for correspondence
Dr. Jinoop.P
M.S Scholar,
Dept of Shalakyatantra, Govt Ayurveda College, Trivandrum, Kerala, India.
Email: drjinunarayan@gmail.com
Cell: 7907459315