



IJCRR

Section: Healthcare

Sci. Journal Impact

Factor: 6.1 (2018)

ICV: 90.90 (2018)



Copyright@IJCRR

Management of Central Serous Chorioretinopathy Using Ayurvedic Outpatient Therapies: A Case Report

Parameswaran SN¹, Kumar A², Sukumaran K²

¹Chief Medical Officer and Secretary, Sreedhareeyam Ayurvedic Research and Development Institute Nelliakkattu Mana, Kizhakombu, Koothattukulam, 686662, Ernakulam, Kerala, India; ²Research Coordinator, Sreedhareeyam Ayurvedic Research and Development Institute, Nelliakkattu Mana, Kizhakombu, Koothattukulam, 686662, Ernakulam, Kerala, India

ABSTRACT

Introduction: Central serous chorioretinopathy (CSCR) is classified based on etiology into idiopathic and secondary varieties. Management options include observation in the initial stages, and LASER and anti-vascular endothelial growth factors (anti-VEGF) injection in advanced cases. The symptom of blurred vision may be correlated with *Timira*, a *Drishtigata Roga* (disease of vision) according to *Ayurveda*.

Case Presentation: A 48-year-old male presented with the blurring of vision, floaters, and curved vision. Management was on an outpatient basis over 3 years, during which oral medicines, ophthalmic drops, and external application of paste were administered.

Results: Improvement was noted in visual acuity. Optical coherence tomography (OCT) macula showed gradual absorption of sub-retinal fluid.

Conclusion: The main aim of management was to restore vision as much as possible while giving the patient a better quality of life. This study illustrates that cases of CSCR can be successfully managed using *Ayurveda*, and these treatments can be considered as an alternative option.

Key Words: Case report, Holistic approach, Out-patient medicines, *Timira*

INTRODUCTION

CSCR results from the accumulation of serous fluid in the sub-retinal space due to improper functioning of the retinal pigment epithelium. The condition is clinically more obvious in males (9.9/100,000) than females (1.7/100,000), with the male-to-female ratios ranging from 2.7:1 to 7:1.¹ The average age of occurrence is between 20-50 years.² Visual acuity (VA) is reduced to LogMAR 0.176-0.301 but may be corrected up to LogMAR 0 with a weak plus (+) lens.³ Optical coherence tomography (OCT) shows an optically empty neuro-sensory elevation. Early management is stressed based on clinical evidence that resolution of the neuro-epithelial detachments within 4 months of the onset of symptoms reduces the risk of retinal atrophy.⁴ Observation is usually the first line of management as 80% of cases spontaneously resolve within 3-6 months with VA of 6/9 or better. Long-standing cases require pan-retinal LASER photocoagulation and/or anti-VEGF injection.

METHODS

The efficacy of an *Ayurvedic* outpatient treatment protocol to manage CSCR was assessed in this report. It was prepared according to the Case Report (CARE) guidelines⁵ to ensure transparency and effectiveness in reporting. Institutional ethical clearance was not required for this study; however, written informed consent was obtained from the patient before detailing his case.

CASE PRESENTATION

A 48-year-old non-diabetic and non-hypertensive male presented with gradual deterioration of vision along with floaters and curved vision in the right eye (OD (oculus dexter) since January 2015. Vision gradually started deteriorating OD after January 2015, and soon after, he started experiencing floaters and curved vision. He was diagnosed with CSCR

Corresponding Author:

Dr. Aravind Kumar, M.S. (Ay), Sreedhareeyam Ayurvedic Research and Development Institute, Nelliakkattu Mana, Kizhakombu, Koothattukulam, Ernakulam Dt., Kerala 686662, India; Phone: 9400630608; Email: aravind@sreedhareeyam.in

ISSN: 2231-2196 (Print)

ISSN: 0975-5241 (Online)

Received: 13.06.2020

Revised: 19.08.2020

Accepted: 11.10.2020

Published: 12.11.2020

by an ophthalmologist and was prescribed allopathic treatment for 6 months, which provided no relief. At a further consultation, he was advised pan-retinal LASER photocoagulation, which he declined. He consulted Sreedhareeyam Hospital in July 2015 and has been under *Ayurvedic* outpatient treatment.

History of past illness is notable for hypothyroidism and hyperlipidemia. His immediate family members do not present with similar ophthalmic complaints. Bowel and micturition were normal, and sleep was sound. Appetite was decreased. He is not addicted to tobacco, alcohol, or caffeinated beverages. General physical examination and vital signs were within normal limits.

Unaided distant visual acuity (DVA) was LogMAR 0.602 in the right eye (OD) and LogMAR 0 in the left eye (OS (oculus sinister)). Pinhole examination showed no improvement in VA. As the patient did not wear spectacles, aided DVA was not recorded. Near visual acuity (NVA) was N6 in both eyes (OU (oculus uterque)). Intra-ocular pressure was 21mmHg OU. Confrontation visual fields and extra-ocular motility OU were intact. Anterior segment examination OU showed normal findings. The pupillary examination demonstrated normal responses to both direct and consensual reflexes OU.

Posterior segment examination at the initial consultation revealed a pinkish-coloured optic disc with a cup-to-disc ratio of 0.3 OU, healthy blood vessels with normal calibre emerging from the optic disc OU, and normal retinal periphery OU. Examination of the macula OD showed a dull foveal reflex OU due to accumulation of sub-retinal fluid.

Laboratory investigations showed a creatinine count of 1.67mg/dL, cholesterol count of 562mg/dL, and triglyceride count of 493mg/dL. Thyroid-stimulating hormone analysis was 131 IU/mL.

The patient's *Mutra* (urine), *Mala* (excretory products), *Jihva* (tongue), and *Sabda* (sound) were normal. *Sparsa* (touch) was *Sita* (cold). *Drk* (vision) was affected and *Akrti* (built) was normal. He had *Kapha-Vata Prakrti* (body constitution of *Kapha* and *Vata*), *Pravara Samhanana* (normal compactness of his body parts), *Sama Pramana* (symmetrical proportions of body parts), *Madhyama Sattva* (medium mental temperament), *Madhyama Satmya* (medium habitual intake of items), *Avara Ahara Sakti* (decreased digestive capacity),

and *Madhyama Vyayama Sakti* (medium strength). *Vaya* (age) was *Madhyama* (middle age).

A diagnosis of CSCR was made based on both the history and clinical examinations.

The patient was managed on an outpatient (OP) basis. He had a total of 20 consultations, with 5 in 2015; 7 in 2016; 4 in 2017; 3 in 2018; and 1 in 2019. Oral medicines such as *Kvatha* (decoction), *Vati* (tablet), and capsules were administered with warm water as a post-prandial drink. Local ophthalmic formulations included eye drops and *Anjana* (collyrium drops). External therapy comprised of *Lepa* (application of paste) with *Kalka* (wet bolus) over the forehead. These medicines are enlisted in Table 1.

He was advised to strictly avoid oily and deep-fried items, intake of curd, foods prepared from refined flour, sweet items, and excessively spicy foods. He was also advised to avoid emotional outbursts and stress, and direct exposure to sunlight, smoke, and wind.

The medicines were manufactured at Sreedhareeyam Farm-herbs India, Pvt. Ltd., the hospital's GMP-certified drug manufacturing unit.

RESULTS

DVA initially reduced to LogMAR 0.778 at the 3rd consultation but improved to LogMAR 0.602 at the 4th consultation. From the 10th visit, VA fluctuated between LogMAR 0.301 and LogMAR 0.176. OCT macula OD on March 10th, 2016, showed a dome-shaped elevation at the macular region and a hypo-reflective area within the dome, suggestive of macular oedema (Figure 1A). OCT macula has taken on December 8th, 2016 (Figure 1B) and February 9th, 2017 (Figure 1C) showed gradual absorption of sub-retinal fluid.

DVA improved to LogMAR 0.176 at the last consultation. Posterior segment examination at the last consultation showed a re-established foveal reflex. OCT macula on June 14th, 2018 showed complete absorption of subretinal fluid and re-establishment of the foveal contour (Figure 1D). Readings for laboratory investigations also returned to near-normal values.

A timeline of events for this case is presented in Table 2.

Table 1: Oral, Ophthalmic, and External Medications

Si. No.	Medicine	Dosage with Post-Prandial Drink	Duration
1	Eye Plus*	1 drop-in both eyes twice daily	5 months
2	<i>Pathya Shadanga</i> Tablet	1 tab twice a day after food with warm water	1 month
3	<i>Candraprabha Vati</i>	1 tab twice a day after food with warm water	18 months
4	<i>Guducyadi Kvatha</i>	15mL twice a day before food with warm water	8 months

Table 1: (Continued)

Si. No.	Medicine	Dosage with Post-Prandial Drink	Duration
5	Stressex Cap*	1 capsule twice a day before food with warm water	15 months
6	Candanadi Anjana	1 drop-in both eyes twice a day	2 months
7	Vinayakanjana*	1 drop-in both eyes twice daily	3 months
8	Mukulanjana*	1 drop-in both eyes twice daily	5 months
9	Guggulu Pancapala Tab	1 tablet twice a day after food with warm water	1 month
10	Netramrtam*	1 drop-in both eyes twice daily	6 months
11	Darsana*	1 drop-in both eyes twice daily	6 months
12	Sudarsanam Tab	1 tablet twice a day before food with warm water	3 months
13	Sunetra Regular*	1 drop-in both eyes twice daily	3 months
14	Lepa (herbal paste)	Apply over the forehead	4 months

*Patented medicines of Sreedhareeyam Ayurvedic Eye Hospital and Research Center

Table 2: Timeline of drug therapy

Dates	Events	Intervention
January 2015		Diagnosis of CSCR; the patient is put under allopathic management but gets no results.
June 2015	Experiences deterioration in vision along with floaters and seeing objects as curved.	Advised pan-retinal LASER photocoagulation, which he declines
Consultations at Sreedhareeyam Ayurvedic Eye Hospital and Research Center		
	Visual Acuity OD (LogMAR)	OCT Macula OD Medicines Administered
July 16 th , 2015	0.602	- Eye Plus* Lepa with Karutta Gutika and Rasnadi Curna
August 24 th , 2015	0.778	- Pathya Shadangam Tablet Candraprabha Vati Lepa with Karutta Gutika and Rasnadi Curna
October 1 st , 2015	0.602	- Candraprabha Vati Guducyadi Kvatha Stressex Cap* Candanadi Anjana Vinayakanjana* Lepa with Karutta Gutika and Rasnadi Curna
November 5 th , 2015	0.602	- Candraprabha Vati Guducyadi Kvatha Stressex Cap Vinayakanjana* Mukulanjana* Lepa with Karutta Gutika and Rasnadi Curna
December 10 th , 2015	0.602	- Candraprabha Vati Guducyadi Kvatha Stressex Cap Vinayakanjana* Mukulanjana* Guggulu Pancapala Tab
January 4 th , 2016	0.602	- Candraprabha Vati Guducyadi Kvatha Stressex Cap Mukulanjana* Netramrtam*

Table 2: (Continued)

Dates	Events	Intervention
March 10 th , 2016	0.477	Dome-shaped elevation with hypo-reflective area within the dome <i>Candraprabha Vati</i> <i>Guducyadi Kvatha</i> Stressex Cap <i>Vinayakanjana*</i> <i>Darsana*</i>
May 12 th , 2016	0.477	- <i>Candraprabha Vati</i> <i>Guducyadi Kvatha</i> <i>Mukulanjana*</i> <i>Netramrtam*</i>
July 7 th , 2016	0.477	- <i>Candraprabha Vati</i> Stressex Cap
August 18 th , 2016	0.301	- <i>Netramrtam*</i> <i>Darsana*</i> <i>Sudarsanam Tab,</i>
October 20 th , 2016	0.176	- Eye Plus*
December 8 th , 2016	0.176	Absorption of sub-retinal fluid <i>Candraprabha Vati</i> Stressex Cap <i>Darsana*</i> <i>Sudarsanam Tab,</i>
February 9 th , 2017	0.301	More absorption of subretinal fluid Eye Plus* <i>Candraprabha Vati</i> Stressex Cap <i>Darsana*</i>
April 20 th , 2017	0.301	- Eye Plus* <i>Candraprabha Vati</i> Stressex Cap <i>Netramrtam*</i>
August 3 rd , 2017	0.176	- <i>Candraprabha Vati</i> Stressex Cap
November 16 th , 2017	0.301	- Sunetra Regular*
March 15 th , 2018	0.176	- <i>Candraprabha Vati</i> Stressex Cap <i>Candanadi Anjana</i> <i>Netramrtam*</i> Sunetra Regular*
June 14 th , 2018	0.301	Complete absorption of subretinal fluid <i>Candraprabha Vati</i> Stressex Cap <i>Netramrtam*</i> Sunetra Regular*
October 25 th , 2018	0.301	- Eye Plus* <i>Candraprabha Vati</i> Stressex Cap Sunetra Regular*
February 16 th , 2019	0.176	- Eye Plus* Stressex Cap* <i>Candanadi Anjana</i>

*Patented medicines of Sreedhareeyam Ayurvedic Eye Hospital and Research Center

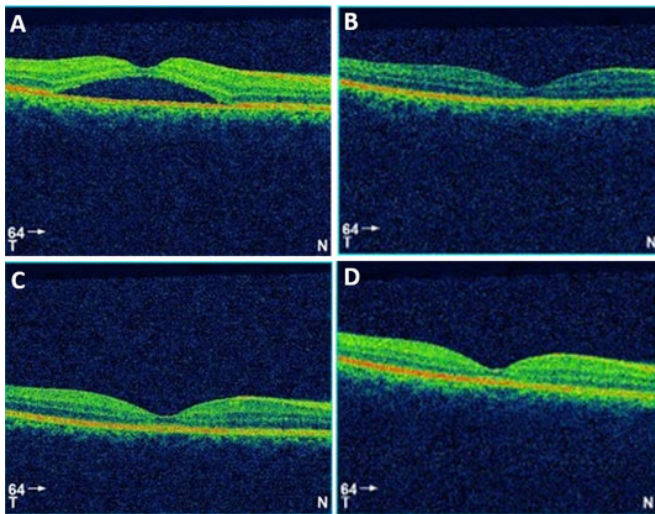


Figure 1: Represents the optical coherence tomography image of macula taken at different time points after therapy. **A.** Image taken on March 10th, 2016; **B.** image taken on December 8th, 2016; **C.** image taken on February 9th, 2017, **D.** image taken on June 14th, 2018.

DISCUSSION

Acarya Vagbhata explains that the factors enlisted under the pathological increase of *Doshas* in the first chapter of *Ash-tanga Hridaya Nidana Sthana* (section on diagnosis in the *Ash-tanga Hridaya*), particularly those that are non-conductive to the eye, are the causes for eye diseases. In this patient, these may have included intake of *Katu* (bitter), and *Svadu* (sweet) *Rasa* (taste), foods that are *Guru* (heavy) and *Ab-hishyandi* (secretive), and emotional outbursts of fear, grief, and anger. Another factor that may have played a role is the patient's *Prakrti* or body constitution. as it was made up of *Vata* and *Kapha*, he was more prone to getting afflicted by those two *Doshas*. These may have invaded the *Koshta* (alimentary tract) and resulted in *Mandagni* or impaired digestion.

Hypothyroidism and hyperlipidemia may have resulted from this *Mandagni*. The presence of *Ama* or toxic, undigested waste products caused the increased *Vata* and *Kapha* to cause pathological activity in the *Annavaha Srotas* (channels of digestion) and *Rasavaha Srotas* (channels of lymph) by diminishing *Pitta Dosh*. The patient's decreased appetite and increased cholesterol may be a result of the affliction of the *Annavaha Srotas*, as the diminished *Pitta* caused impaired digestion and metabolism. Intake of *Guru* and *Snigdha Aha-ra* (heavy and unctuous food) and over-worry indicate the involvement of *Rasavaha Srotas*.

This affliction of the *Srotas* resulted in the increased *Vata* and *Kapha* to traverse the *Urdhvavaha Sira* (vessels of the upper extremities) and lodge in the *Drishti Mandala* (area

of vision). The patient's temperament of slight anxiety may have increased *Vata* in the *Drishti Mandala*, resulting in a crack in the retina and the separation of layers by sub-retinal fluid. Increased *Kapha* may be equated with this sub-retinal fluid. Accumulation of *Kapha* and decrease of *Pitta* inhibited proper vision in this patient.

Diminished vision, floaters, and curved vision seen in this patient may be compared with the *Lakshanas* (clinical features) of *Vataja Timira* as per *Ayurveda Acharyas*. *Timira* is a condition in which the increased *Doshas* invade the 2nd *Patala* (layer) of the eye according to *Vagbhata* and the 3rd *Patala* according to *Susruta*. The floaters may be compared to the feature '*Jalani Kesan Masakan*' (perception of insects, hairs, and mosquitoes), and the curved vision may be comparable to '*Vyavidhamiva Pasyati*' (inability to see objects straight) according to *Vagbhata*.

A single case study in which CSCR was managed with *Tarpana* (retention of ghee in the eye)⁶ showed improvement in symptoms such as double vision and haziness. Another case study⁷ showed improvement in both vision and posterior segment examination.

The medicines administered to this patient performed the following actions: 1) increasing *Jatharagni* (digestive fire), 2) purifying the *Srotas*, 3) absorption of *Sotha* (edema), and 4) giving clarity to vision. The increase of *Jatharagni* was facilitated by *Dipana* (appetizing) and *Pacana* (digestive) actions. Once the *Jatharagni* was stimulated, *Sroto Suddhi* (purifying *Srotas*) could be done, thus opening the channels and enabling adequate nutrition to reach the eye and the site of the lesion. Alleviation of *Sotha* was done by drugs that absorbed the sub-retinal fluid from the macula. Maintenance of digestion and clear channels were simultaneously maintained. In the end, the medicines for *Drishti Prasadana* (clarification of vision) and *Ropana* (healing) were administered to promote vision and maintain the integrity of the retina.

The initial 7 consultations for this patient were aimed at treating CSCR and improving vision. OCT macula at the 7th consultation showed a subretinal fluid collection at the macula. From there, the vision gradually improved and subsequent OCT investigations showed gradual absorption of the sub-retinal fluid. In this way, not only was the condition treated but prevented from relapse.

Pathyashadanga Kvatha (administered in tablet form) is indicated in *Patalagata Netra Roga* (disorders of vision). *Candraprabha Vati* is *Balya* (energizing), *Vrshya* (aphrodisiac), and *Rasayana* (rejuvenating), and is indicated in *Netra Roga* (ophthalmic diseases), *Mandagni* (impaired digestion), and diseases of *Vata*, *Pitta*, and *Kapha*. *Guducyadi Kvatha* relieves *Kapha* and *Pitta* and stimulates *Agni* (gastric fire). *Guggulu Pancapala Curna* (administered in tablet form) is indicated in *Gulma* (abdominal enlargement – in this case,

for enhancing *Agni*). *Sudarsana Curna* (administered as a tablet) is *Tridoshahara* (alleviates the three *Doshas*).

Haritaki (*Terminalia Chebula* Retz.), *Vibhitaki* (*Terminalia Bellerica* Linn.), and *Amalaki* (*Emblica Officinalis* Gaertn.) are three of the common drugs present in most of the oral formulations. Taken together, they constitute *Triphala*, the ideal drugs for eye conditions. The effects of *Triphala* on eye disease are brought about by *Dipana* (appetizing), *Pacana* (digestion of undigested products), and *Anulomana* (moving products downward). These make the *Ahara Rasa* (nutrient fraction of food) easily bio-available and transformable, thus nourishing all types of *Pitta*, especially *Alocaka Pitta*, which is responsible for vision.⁸ Studies have validated several other potential uses of *Triphala* such as free radical scavenging, antioxidant, appetite stimulation, and anti-stress.⁹ Polyphenols derived from *Triphala* are transformed into bioactive metabolites that have the potential to prevent oxidative damage.¹⁰ It was also shown using animal models that *Triphala* could protect against different types of stress including cold-induced stress and stress-induced behaviours.¹¹ A human trial in patients with gastrointestinal disorders showed that *Triphala* reduced constipation, mucus, and flatulence.¹²

Guduci (*Tinospora cordifolia* Miers.), another common drug among the oral medicines, was shown to have anti-stress activity,¹³ which was proven by animal studies in mice using various extracts of the plant.¹⁴ A study conducted on Swiss albino mice reported that the anti-toxic activity of *T. cordifolia* by substantial elevation of hormones and enzyme activities were brought about by alkaloids of the plant.¹⁵ Various extracts have also shown antioxidant potential by scavenging free radicals.

Guggulu (*Commiphora Mukul* Hook.) was shown to significantly reduce serum cholesterol and prevent cholesterol-induced atherosclerosis in rabbits in a two-year study.¹⁶ Various other animal models were used to validate the hypolipidemic activity of *Guggulu*. Z-guggulsterone was demonstrative of thyroid stimulatory action of *Guggulu*, and the administration of isolated Z-guggulsterone in rats led to the significant increase in thyroid function parameters, especially enzymes that aid in thyroid hormone synthesis.¹⁷ *Guggulu* also enhanced the production of thyroxine and tri-iodothyronine, two hormones that by increasing carbohydrate metabolism and protein synthesis bring about lowered rates of lipid activity.¹⁸

The ingredients of Stresses Capsule are aimed at enhancing memory, relieving stress, and calming the mind. The anti-stress activity of *Withania Somnifera* Linn. has been demonstrated in several animal models.¹⁹ *Clitoria Ternatea* Linn. possesses antioxidant, antimicrobial, and central nervous effects.²⁰

The ingredients of *Chandanadi Anjana* are coolant and rough by nature; they absorb through the ocular tissues to reach the

retina. They then enhance absorption of subretinal fluid and bring about repair of the *Srotas*. *Vinayakanjana* possesses *Ropana* (healing) and *Brmhana* (nourishing) properties. By these two, the *Srotas* is cleared of its pathologic material and vision is improved by nourishment. *Mukulanjana*, with its mineral ingredients, penetrates deeper tissues and clear up residual pathology in the retina. These enable the vision to be enhanced by their sharp and cooling effects.

Eye Plus eye drops provide a cooling effect for the eye, reduces the accumulation of fluid, prevents entry of bacteria, and promotes healing by reforming the retina. The ingredients of *Netramrtam* possess *Sukshma Karma*, which enables them to enter the minute *Srotas* of within the macula and absorb the fluid, thus restoring and promoting healthy vision. *Darsana* eye drops are indicated in all *Drshdigata Rogas*. *Sunetra* Regular relieves strenuous activity of the eyes by relaxing and cooling it.

Candraprabha Vati, *Guducyadi Kvatha*, *Stresses*, *Vinayakanjana*, and *Chandanadi Anjana* were prescribed multiple times over the course of the management. In the initial stages, they aided in normalizing physiological activity of the body and reaching the retina to help absorb the subretinal fluid. After the initial correction of the pathology, these medicines were continued so as to maintain the homeostasis of the body and prevent further pathology in the retina. Herbal paste was not continued after the 4th consultation as the amount of fluid and stress had reduced to a state where it could be managed using other medicines. Medicines that were administered for only one month may have hastened healing to an extent that they were not required further.

Although this case was managed on an out-patient basis, the inclusion of some in-patient management such as *Pancakarma* (especially *Virecana* (therapeutic purgation) and *Nasya* (nasal medication)) and *Kriyakalpa* (local ocular therapeutics) would have hastened the recovery much more. *Virecana*, the indicated *Pancakarma* procedure in *Drshdigata Rogas*, would have brought about a faster improvement in vision by expelling toxins downward. Also, as it is a *Sodhana Karma* (purificatory therapy), it could correct the axis of thyroid dysfunction by enabling more of the hormones to be produced. *Nasya* would have expelled more *Kapha* from the head, thus relieving heaviness of the head and tension. *Kriyakalpas* employed would have been *Anjana* (collyrium) and *Tarpana* (retention of ghee in the eyes). *Anjana* by its judicious combination of herbs and minerals would be able to penetrate deeper tissues by subconjunctival injection. These can hasten the absorption of fluid and restoration of vision by bypassing the barriers of the eye. *Tarpana* could provide nourishment to the eye, thus enhancing vision.

Administration of *Ayurvedic* medicines may be considered as an alternative to observation, the accepted first line of management in CSCR, in that the medicines can expedite

more rapid absorption of sub-retinal fluid, preserve vision, and bring the entire body back to its physiological function.

CONCLUSION

The main challenge faced was maintaining vision while resolving the ocular pathology and returning of homeostasis. Repeated consultations brought about positive results in the patient. At the end of the consultations, the vision was almost normal, edema had completely resolved in the retina, and the hypothyroidism and hyperlipidemia were controlled. The results of this study may be validated using large-scale sample trials.

ACKNOWLEDGEMENT

The authors acknowledge Sreedhareeyam Ayurvedic Eye Hospital and Research Center, and Sreedhareeyam Farm-herbs India Pvt. Ltd., for their help in preparing this case report. The authors acknowledge the immense help received from the scholars whose articles are cited and included in references to this manuscript. The authors are also grateful to the authors/editors/publishers of all those articles, journals, and books from where the literature for this article has been reviewed and discussed.

Conflicts of Interest: None declared

Sources of Funding: None declared

Abbreviations:

CSCR: central serous chorioretinopathy

OCT: optical coherence tomography

DVA: distant visual acuity

NVA: near visual acuity

LogMAR: logarithm of the minimal angle of resolution

OD: oculus dexter

OS: oculus sinister

OU: oculus uterque

REFERENCES

- Nicholson B, Noble J, Forooghian F, Meyerle C. Central serous chorioretinopathy: update on pathophysiology and treatment. *Surv Ophthalmol* 2013;58(2):103-126.
- Yanoff M, Duker J, *Ophthalmology: 3rd Edition*, MOSBY, an imprint of Elsevier Inc., 2009, pg. 677
- Kanski JJ, *Clinical Ophthalmology: A Systematic Approach*, 5th Edition, Butterworth Heinemann, an imprint of Elsevier Science Limited, 2003: 421
- Daruich A, Mater A, Dirani A, Bousquet E. Central serous chorioretinopathy: recent findings and new pathophysiology hypothesis. *Progress in Retinal and Eye Research*, Elsevier, Ltd., Philadelphia, 2015: 82-118
- Gagnier J, Kienle G, Altman DG, Moher D, Sox H, Riley DS, CARE group. The CARE guidelines: Consensus-based clinical case-reporting guideline development. *Glob Adv Health Med* 2013;2(5):38-43.
- Upadhyay P, Jhakar P, Fiaz S, Treatment of Chronic Serous Retinopathy by Tarpana Therapy: A Case Study, *Int J Rec Scie Res* 2018;8(1):15171-15173.
- Shweta GR, Sreedhar SK, Ayurvedic Management of Central Serous Retinopathy - A Case Study. *Int J Appl Ayur Res*, 2017;3(3):573-577.
- Baliga MS, Meera S, Mathai B, Rai MP, Pawar V, Palatty PL. Scientific validation of the ethnomedicinal properties of the Ayurvedic drug *Triphala*: A review, *Chin J Integr Med* 2012; 18; 946-954.
- Gopinathan G, Dhiman KS, *Triphala in Eye Diseases: A Critical Review*, *Homeo Ayur Med* 2013;2(2):1-3.
- Oleennikov DN, Kashchenco NI, Chirikova NK, In-vitro bioaccessibility, human gut microbiota metabolites and hepatoprotective potential of chebulic ellagitannins: A case of Padma Hepaten® formulation. *Nutrients* 2015; 7; 8456-8477.
- Peterson CT, Denniston K, Chopra D. Therapeutic Uses of Triphala in Ayurvedic Medicine. *J Altern Complement Med* 2017; 23(8); 607-614.
- Pulok K, Mukherjee SR, Bhattacharyya S et al. Clinical study of 'Triphala'- A well-known phytomedicine from India. *Iran J Pharmacol Ther* 2005; 5:51-54.
- Singh, J., Sinha, K., Sharma, A., Mishra, N. P., Khanuja, S. P., Traditional uses of *Tinospora cordifolia* (Gudrucci). *J Med Aromat Plant Sci*, 2003, 25:748-51.
- Patil M, Patki P, Kamath HV, Patwardhan B. Anti-stress activity of *Tinospora cordifolia* (Willd.) Miers. *Indian Drugs*, 1997;34:211-215.
- Tiwari P, Nayak P, Prusty SK, Sahu PK. Phytochemistry and Pharmacology of *Tinospora cordifolia*: A Review. *Syst Rev Pharmacy* 2018;9(1):70-78.
- Sarup P, Bala S, Kamboj S. Pharmacology and Phytochemistry of Oleo-Gum Resin of *Commiphora wightii* (Guggulu). *Scientifica* 2015:138039.
- Tripathi YB, Malhotra OB, Tripathi SN. Thyroid-stimulating action of Z-guggulsterone obtained from *Commiphora Mukul*. *Planta Medica*, 1984;50(1):70-80.
- Panda S, Kar A, Guggulu (*Commiphora Mukul*) induces triiodothyronine production: possible involvement of lipid peroxidation. *Life Scie* 1999;65(12):137-141.
- Singh N, Bhalla M, de Jager P, Gilca M. An Overview on Asvagandha: A Rasayana (Rejuvenator) of Ayurveda. *Afri J Tradit Complement Altern Med* 2011;8(5):208-213.
- Al-Snafi AE. Pharmacological importance of *Clitoria ternatea*- A review. *IOSR J Pharmacy* 2016;6(3):68-83.