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Ayurvedic Management of Serous Pigmentary Epithelial Detachment Associated with Cystoid Macular Edema: A Case Report

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ABSTRACT

Background: Pigmentary epithelial detachment is classified based on its contents into drusenoid, serous, vascularized, or mixed. It may have ocular and/or systemic involvement. Management options in modern medicine have not been proven effective, hence alternative options may be sought.

Case Report: A 70-year-old male who presented with the blurring of vision in his right eye (OD) and diminished vision in his left eye (OS), and who was previously diagnosed with serous PED and who had undergone multiple rounds of LASER photocoagulation, is presented here. He reported for eight rounds of inpatient *Ayurvedic* management, which involved administering oral medicines and external therapies for both eyes and the head.

Results: Improvement in visual acuity fundus photography and optical coherence tomography scanning was noted throughout the eight courses of treatment.

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 serous PED with cystoid macular oedema can be successfully managed using *Ayurveda*, and these treatments can be considered as an alternative option.

Keywords: Case report, holistic approach, *Kriyakalpa*, *Timira*

INTRODUCTION

Physiological forces that maintain adhesion between the retinal pigment epithelium (RPE) and the inner layer of the Bruch's membrane are disrupted in the different types of PED.¹ Long-standing cases have the predilection to develop choroidal neovascularization (CNV), the recognition of which is a major concern secondary to its increased risk for vision loss.² Serous PED, though having a sometime association with exudative age-related macular degeneration, has a favourable prognosis.³ Blurred vision seen in this variety of PED may be associated with induced hyperopia in some cases.⁴ Patients over 60 years tend to have a poor prognosis, although variation in the speed of deterioration is demonstrable. No treatment has been proven effective for serous PED, neither have recommendations been established. Although injection of anti-vascular endothelial growth factors (anti-

VEGF) may stabilize vision, it carries a 10% risk of RPE tear.⁵ Cystoid macular oedema and macular scarring occur independently of PED. In light of the above, management in the realms of complementary and alternative medicine (CAM), including *Ayurveda*, may be sought.

METHODOLOGY

The efficacy of an *Ayurvedic* protocol to manage serous PED with cystoid macular oedema and macular scar in a 70-year-old male is described in this case report. The report adheres to the Case Report (CARE) guidelines to ensure transparency and efficacy in reporting.⁶ Institutional Ethics Committee clearance was not required for the study; however, written informed consent was obtained from the patient before documenting his case.

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CASE REPORT

The patient presented with the blurring of vision in his right eye (OD – oculus dexter) for 8 years and diminished vision in his left eye (OS – oculus sinister) since 1993. In 1993, he contracted malaria, for which he was prescribed Lariam mefloquine. Blurring of vision OS commenced soon after this, but as it neither increased nor decreased, the patient did not seek ophthalmic consultation. In 2007, he experienced the blurring of vision with floaters OD and deterioration of vision OS. He was diagnosed with pigment epithelial detachment and macular scarring and was prescribed anti-VEGF injection. He underwent 3 rounds of injection but got no relief. His history is notable for cardiac problems and gouty arthritis, for which he is under medication. His immediate family members do not present with similar complaints. Personal history readings were normal. Review of systems and vital signs were normal.

He was taking Simvastatin (1 tablet at bedtime), Ramipril (1 tablet in the morning), Aspirin (1 tablet in the morning), and Ibuprofen (1 tablet as and when needed) when he was admitted for his first two courses of treatment. Ibuprofen was halted before admission for the third course, and all medicines except Ramipril were halted before the fourth course of treatment. Ramipril was continued throughout the remainder of the treatments. The patient had started Benzbromazone (1 tablet at night) before admission for his fifth course. Brilique (1 tablet at night), Atorvastatin (1 tablet at night), and Metoprolol (1 tablet at night) were being consumed when the patient came for his sixth course of treatment and was continued through the seventh and eighth courses. (Table 1)

Unaided distant visual acuity (DVA) was LogMAR 0.778 OD and LogMAR 1.778 OS, aided DVA was LogMAR 0.477 OD and LogMAR 1.778 OS, and near visual acuity (NVA) was N18 in both eyes OU (oculus uterque). Anterior segment examination showed normal findings OU. Direct and consensual pupillary reflexes were normal OU. Posterior segment examination by ophthalmoscopy demonstrated a sharply-delineated elevation and a “honeycomb” formation at the macula OD, and a dense macular scar, elevation at the macula, and a few small haemorrhages OS.

Laboratory investigations conducted at the first course of treatment were haemoglobin percentage, erythrocyte sedimentation rate, and lipid profile analysis, which included total cholesterol, triglycerides, high-density lipoproteins, low-density lipoproteins, and very-low-density lipoproteins. (Table 2)

*Ashta Sthana Pariksha*⁷ demonstrated normal *Nadi* (pulse), *Mutra* (urine), *Mala* (excreta), and *Sabda* (sound), *Anuplipa Jihva* (non-coated tongue), *Anunshna Sita Sparsha* (lukewarm touch), abnormal vision, and normal *Akrti* (stature). *Dasavidha Pariksha*⁸ demonstrated a *Prakrti* (somatic

constitution) of *Kapha* and *Vata*, normal *Sara* (the essence of tissues), *Samhanana* (compactness), and *Pramana* (measurement), medium *Sattva* (psyche) and *Satmya* (habituation), low *Ahara Sakti* (digestion) and *Vyayama Sakti* (exercise capacity), and *Jirna Vaya* (advanced age).

A diagnosis of serious pigment epithelial detachment, cystoid macular oedema, and the macular scar was made based on the findings. Comparison to *Timira* (blurring of vision), a *Drishtigata Roga* (disease of vision) as per *Ayurveda* was made due to the patient’s symptom of blurring of vision matching with the feature of inability to see distant objects as described in *Timira*.⁹

Vulnerability Assessments administered before all treatments grouped the patient in the geriatric cohort. Fall Risk Assessment determined that the patient has a visual deficit and no disorientation, self-care deficit, problems with motility, history of a fall, or impaired judgment. Psychological assessment determined that the patient was calm and could carry out his day-to-day activities without assistance.

The patient underwent 8 courses of *Ayurvedic* in-patient therapy. Two rounds were done in 2013, and one round every year from 2014-2019. His tailored *Ayurvedic* protocol included oral medicines (Table 3) and external therapies for both the eyes (*Kriyakaalpa*) and the head (Table 4). He was also advised to continue his allopathic oral medicines at the appropriate times. *Panchakarma* (bio-purification), generally a requisite in the management of *Drishtigata Roga*, was not attempted for this patient because of his advanced age.

All medicines were manufactured by Sreedhareeyam Farmherbs India, Pvt. Ltd., the hospital’s GMP-certified drug manufacturing unit.

OUTCOME MEASURES AND RESULTS

The assessment was done by unaided and aided DVA, posterior segment examination, and optical coherence tomography (OCT) scanning. Initial posterior segment examination was done by ophthalmoscopy. In-house fundus photography and OCT scanning were done at admission before the fifth and sixth courses of treatment; at both admission and discharge of the seventh course; and at discharge after the eighth course of treatment.

Unaided and aided DVA and NVA was maintained from the end of the first course till discharge after the third course of treatment. Unaided DVA improved to LogMAR 0.602 OD and LogMAR 1.477 OS and aided DVA improved to LogMAR 0.301 OD and LogMAR 1.477 OS at admission for the fourth course of treatment and was maintained till discharge after the seventh course. Unaided and aided DVA OD improved to LogMAR 0.477 and LogMAR 0.176 with the maintenance of the other values at admission for the eighth

course. The same readings were reported at discharge after the eighth course of treatment.

Laboratory investigations were conducted at all courses of treatment, except the third course. The results of these are described in **Table 4**.

Posterior segment examination at discharge after the first course of treatment demonstrated gradual reduction and eventual resolution of the “honeycomb” lesion at the macula OD. Complete resolution of the lesion with the persistence of the raised pigmented elevation OU and macular scar OS was demonstrable at the end of the second course of treatment.

An OCT macular scan brought by the patient at admission for his 4th course of treatment showed a dome-shaped elevation at the macula with multiple cystoid lesions with areas of hypo-reflectivity within them OU (**Figures 1a and 1b**).

Fundus photography started at the 4th course of treatment, demonstrated a gradual reduction in the pigmented epithelial elevation OU, although macular scarring OS persisted. (**Figures 2a, 3a, 3b, 4a, and 4b**).

OCT macular scanning demonstrated gradual reduction and ultimate resolution of the cystoid lesions and macular oedema. (**Figures 2b, 3c, 3d, 4c, and 4d**).

A timeline of events for this case is provided in **Table 5**.

DISCUSSION

The patient’s ocular symptoms started shortly after a course of Lariam mefloquine, a medication used for chemo-prophylaxis against malaria. Maculopathy and optic neuropathy have been described in single cases as side effects to mefloquine chemo-prophylaxis.¹⁰ A drug safety study demonstrated pseudo-vitiliform macular dystrophy, central serous retinopathy, macular scarring, and bilateral maculopathy in 9 patients out of 23 cases of retinal disease.¹¹ This patient’s blurred vision could be due to macular scarring as a result of lariam mefloquine.

Timira is a dreadful condition that warrants immediate management to prevent it from progressing to *Kaca* (diminished vision) and *Linganasa* (blindness).¹² It encompasses a wide range of symptoms from indistinct vision (*AvyaktaRupa*) to *Andha* (total blindness). The pathology of *Timira* and all *Drishtigata Rogas* (diseases of vision) revolves around the *Patalas* or layers of the eye. *Susruta* describes *Timira* when the *Doshas* settle in the third *Patala*,¹³ while *Vagbhata* describes it when the second *Patala* is afflicted.¹⁴

The scarring of the macula was due to excess *Kapha* lodging in the retina. Cystoid macular oedema was the result of *Vata* being aggravated at the macula resulting in a crack in the tissue. The accumulation of sub-retinal fluid at the macula was due to excess *Kapha* seeping through the crack. Detachment

of the pigmented epithelium was due to aggravation of *Vata*, resulting in the tissue’s detachment.

Oral medicines were prescribed with special care to not cause any untoward reactions with the patient’s concomitant allopathic medication. The medicines were instrumental in normalizing metabolism, maintaining homeostasis among the three *Doshas*, and augmenting the effects of the allopathic medication. Medicines with *Guduci* (*Tinosporacordifolia* Miers.) were additionally aimed at gouty arthritis, as *Guduci* is the ideal medicine for gout as per *Ayurveda*. Another medicine specifically indicated for gouty arthritis was the *Kokilakshakam* Tablet, described by *Ashtanga Hridaya* in the management of *Vatarakta*, the *Ayurvedic* correlation of gout. Other medicines were aimed at reducing the oedema, normalizing retinal metabolism, and improving vision. The discharge medicines augmented the effects of the inpatient prescriptions.

Kriyakalpas such as *Anjana*, *Tarpana*, and *Putapaka* are indicated after complete *Suddhikara* (purification) of both the *Kaya* (body) and *Siras* (head). However, the dominance of *Kapha* in this patient warranted the initial application of *Anjana* from the course of treatment onward. This is echoed in the management of *Kaphaja Abhishyandaby Acarya Susruta*, in which *Kriyakalpas* such as *Anjana* and *Putapaka* may be initially administered.¹⁵ *Netra Dhara* and *Bidalaka* facilitated more rapid expulsion of toxins from the eyes by acting on the eyelids. The use of *Tarpana* at certain intervals of treatments was to prevent the untoward increase of *Vata*, the prime *Dosha* in *Vridhdhavastha*. As *Timira* is a *Nanatmaja Vikara* (unique disease) of *Vata*, its management with *Tarpana* is warranted. The head treatments augmented the effects of the *Kriyakalpa* and enabled absorption of the essential elements through the scalp to reach the target tissues of the retina. *Sirodhara* was done with oil at the first course of treatment and with decoction at the sixth and seventh courses. This was due to stabilizing the *Doshas* in the head.

The majority of the ingredients have the property of *Rasayana* or rejuvenation. It is a *Karma* that reinvigorates the *Rasadi Dhatus* (seven tissue elements) and nourishes them to health.¹⁶ *Acarya Caraka* explains that advanced age and conditions due to it warrant some form of *Rasayana*. This property is affected by not only plants such as *Guduci* (*Tinosporacordifolia* Miers.), *Guggulu* (*Commiphoramukul* Linn.), *Pippali* (*Piper longum* Linn.) and *Triphala* (*Terminalia chebula* Retz., *Terminalia bellerica* Linn., and *Embliscaofficinalis* Gaertn.), but also by mineral ingredients such as bitumen, iron, copper, and sulfur.

CONCLUSION

Two challenges in this case were to maintain vision and improve retinal findings. A concerted effort made by the oral

medicines and external treatments resulted in improvements in both vision and retinal findings. Despite these, the retinal scar still persisted. However, the patient felt comfortable with the results of his treatment and was pleased to report for further courses. Multiple rounds of treatment garnered positive results; it reflects the multiple times that treatment needs to be administered in *Drishtigata Rogas* as per *Vagbhata*. The results of this report may be analyzed by large-scale sample trials.

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ABBREVIATIONS

PED: pigmentary epithelial detachment
 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

Previous Publications in the International Journal of Current Research and Review

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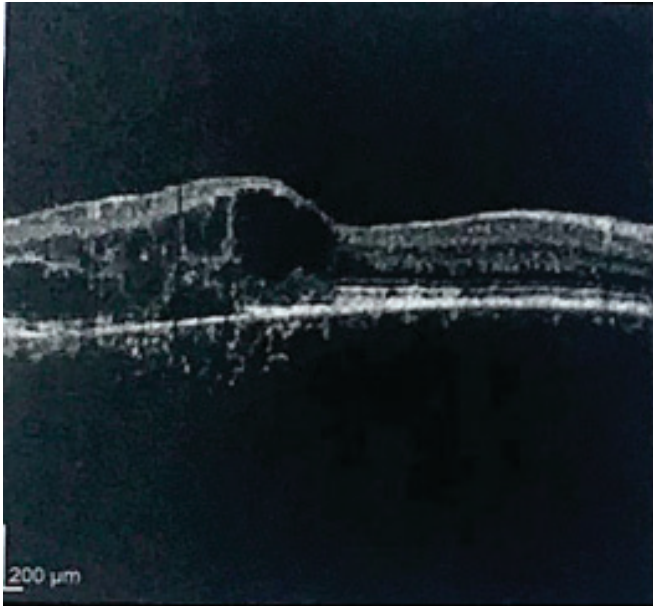


Figure 1a: OCT macula OD at the 4th course of treatment.

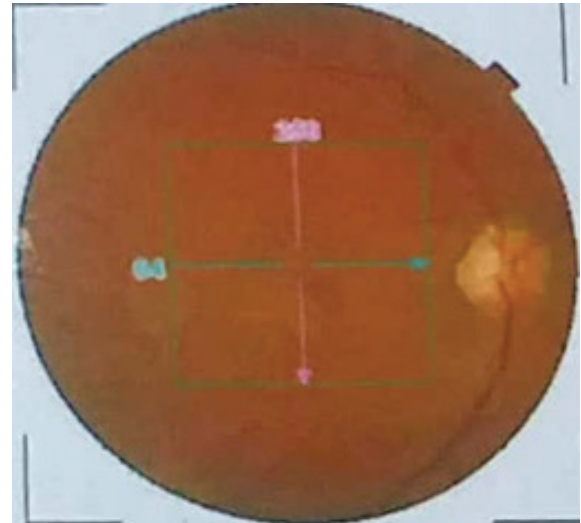


Figure 2a: Fundus photo OD at the 5th course of treatment.

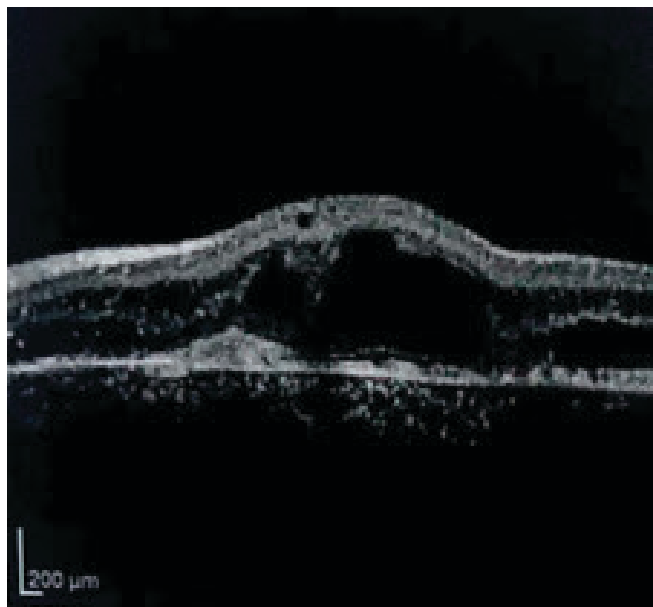


Figure 1b: OCT macula OS at the 4th course of treatment.

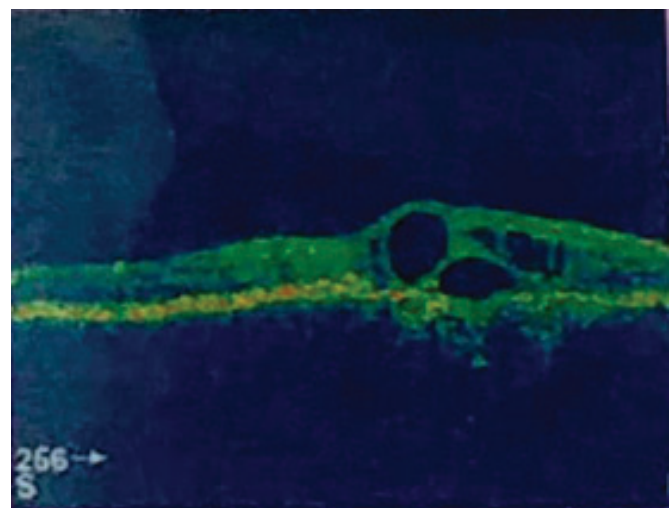


Figure 2b: OCT macula OD at the 5th course of treatment.

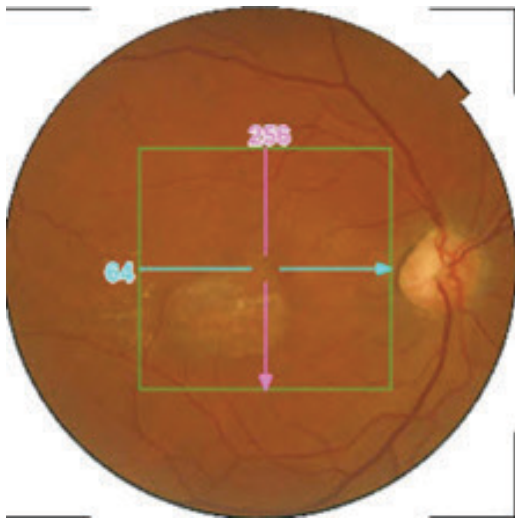


Figure 3a: Fundus photo OD at admission before the 8th course of treatment.

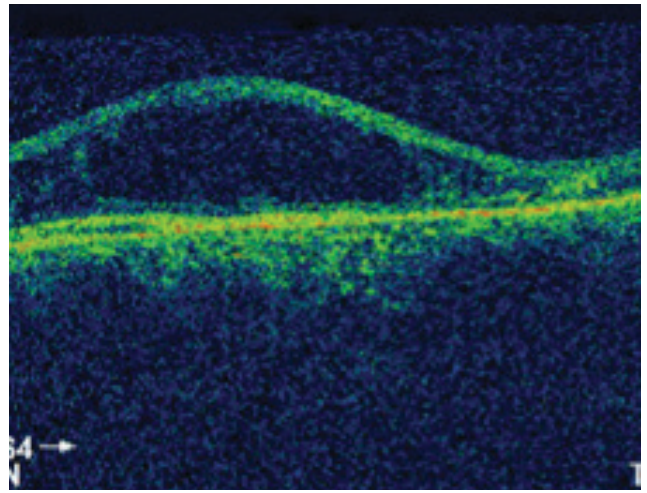


Figure 3d: OCT macula OS at admission before the 8th course of treatment.

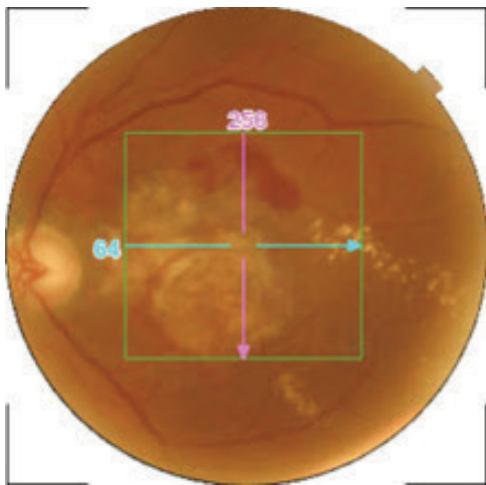


Figure 3b: Fundus photo OS at admission before the 8th course of treatment.

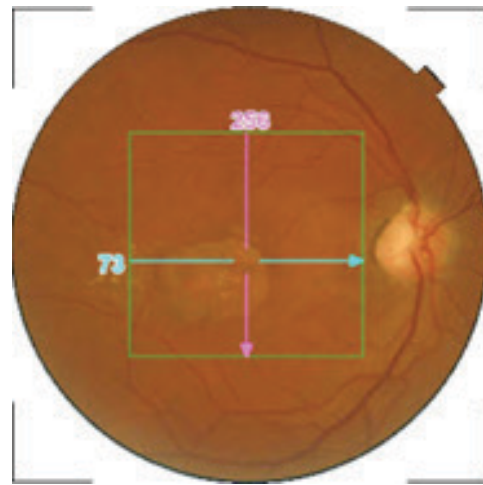


Figure 4a: Fundus photo OD at discharge after the 8th course of treatment.

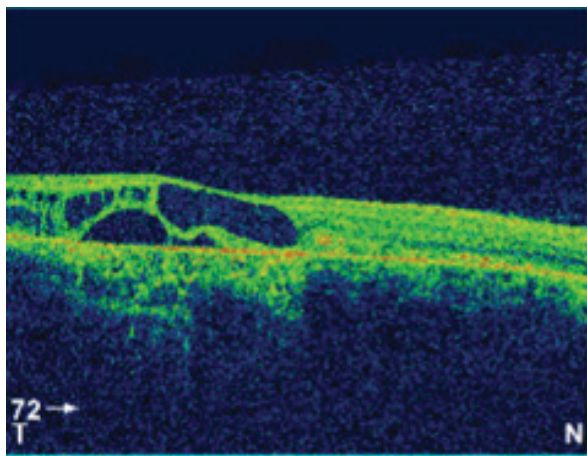


Figure 3c: OCT macula OD at admission before the 8th course of treatment.

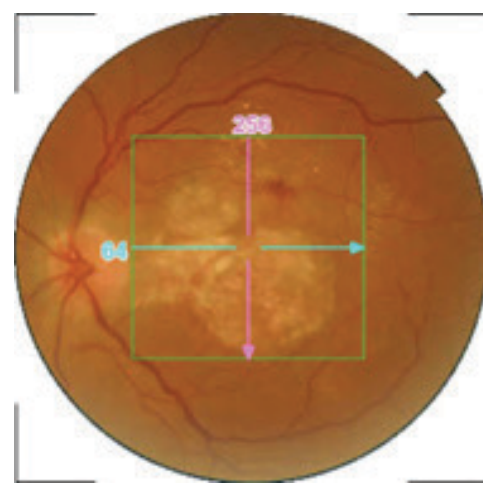


Figure 4b: Fundus photo OS at discharge after the 8th course of treatment.

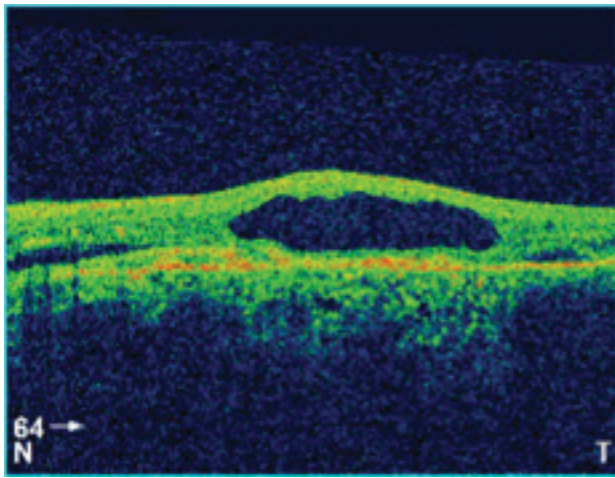


Figure 4c: OCT macula OD at discharge after the 8th course of treatment.

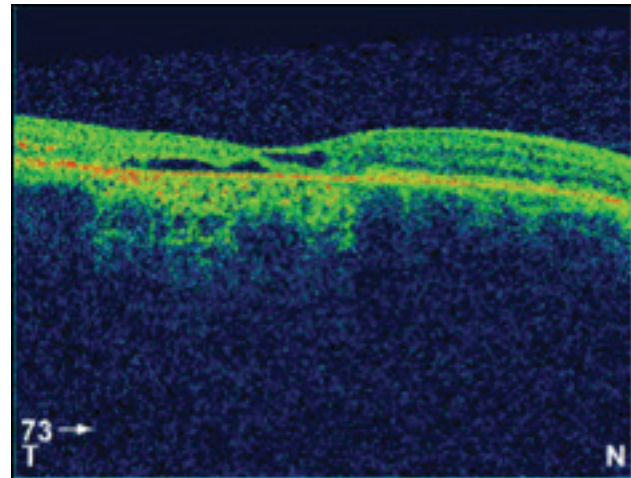


Figure 4d: OCT macula OS at discharge after the 8th course of treatment

Table 1: Concomitant Allopathic Medication

Medicine	Dosage and Time	Courses of Treatment							
		1	2	3	4	5	6	7	8
Simvastatin	1 tablet at bedtime	+	+	+	-	-	-	-	-
Ramipril	1 tablet in the morning	+	+	+	+	+	+	+	+
Aspirin	1 tablet in the morning	+	+	+	-	-	-	-	-
Ibuflam	1 tablet as and when needed	+	+	-	-	-	-	-	-
Benzbromazone	1 tablet at night	-	-	-	-	+	+	+	+
Brilique	1 tablet at night	-	-	-	-	-	+	+	+
Atrovastatin	1 tablet at night	-	-	-	-	-	+	+	+
Metoprolol	1 tablet at night	-	-	-	-	-	+	+	+

Table 2: Laboratory Investigations

Parameter	10/02/2013	05/09/2013	07/02/2015	02/10/2016	04/08/2017	05/10/2018	02/08/2019
Hemoglobin %	15.7%	10.6%	14.6%	14.1%	14%	-	-
Erythrocyte Sedimentation Rate	45mm/hr	30mm/hr	15mm/hr	15mm/hr	15mm/hr	14mm/hr	14mm/hr
Fasting Blood Glucose	-	119mg/dL	103mg/dL	105mg/dL	90mg/dL	-	-
Random Blood Glucose	-	-	-	-	-	107mg/dL	94mg/dL
Total Cholesterol	130mg/dL	155mg/dL	150mg/dL	174mg/dL	124mg/dL	-	-
Triglycerides	113mg/dL	-	134mg/dL	156mg/dL	148mg/dL	-	-
High-Density Lipo-proteins	40mg/dL	-	55mg/dL	48mg/dL	-	-	-
Low-Density Lipo-proteins	68mg/dL	-	77mg/dL	95mg/dL	-	-	-
Very Low-Density Lipo-proteins	22mg/dL	-	20mg/dL	31mg/dL	-	-	-

Table 3: Oral Inpatient and Discharge Medicines

Medicine	Dosage	Adjuvant	Time of Administration	Course	Prescription	Duration
<i>Samirapan-cakam Kvatha*</i>	60mL	Lukewarm water	Twice a day before food	1	Inpatient	15 days
				2	Discharge	2 months
				2	Inpatient	2 days
				3	Discharge	2 months
				5	Inpatient	22 days
				6	Discharge	2 months
<i>Siva Gutika</i>	1 tablet	<i>Saptamrta Lauha</i>	Twice a day before food	8	Inpatient	17 days
				1	Inpatient	15 days
<i>Gorocanandi Gutika</i>	1 tablet	Lukewarm water	Twice a day after food	1	Discharge	2 months
				3	Inpatient	15 days
<i>Svarasa prepared from Tulasi, Haridra, and Sunthi</i>	20mL	-	Morning	3	Discharge	16 days
				1	Inpatient	15 days
<i>Bilvadi Gutika</i>	1 tablet	Lukewarm water	Twice a day after food	2	Inpatient	10 days
				5	Discharge	2 months
<i>Maha Manjishtadi Kvatha</i>	30mL	Lukewarm water	Twice a day before food	2	Inpatient	14 days
				2	Inpatient	14 days
<i>Punarnavadi Kvatha</i>	30mL	Lukewarm water	Twice a day before food	3	Inpatient	16 days
				8	Inpatient	17 days
				8	Discharge	2 months
				2	Inpatient	14 days
<i>Kaisora Guggulu</i>	1 tablet	<i>Manjishtadi Kvatha</i>	Twice a day before food	3	Inpatient	16 days
				4	Inpatient	18 days
				5	Inpatient	22 days
<i>Amrtottaram Kvatha</i>	30mL	<i>Punarnavadi Kvatha</i>	Twice a day before food	5	Discharge	2 months
				3	Inpatient	16 days
<i>Vasa Sree*</i>	2 tablets	Lukewarm water	Twice a day after food	4	Inpatient	18 days
				3	Inpatient	16 days
<i>Kumari Svarasa</i>	20mL	-	Morning	3	Discharge	2 months
				7	Inpatient	18 days
<i>Kamadudha Rasa</i>	1 tablet	Lukewarm water	Twice a day after food	3	Inpatient	16 days
				3	Inpatient	16 days
<i>Guduci Sattva</i>	1/2 tablespoon	Lukewarm water	Twice a day after food	3	Inpatient	16 days
				3	Discharge	2 months
				7	Inpatient	21 days

Table 3: (Continued)

Medicine	Dosage	Adjuvant	Time of Administration	Course	Prescription	Duration
<i>Manjishtadi Kvatha</i>	60mL	Lukewarm water	Twice a day before food	4	Inpatient	18 days
				5	Inpatient	22 days
				5	Discharge	2 months
				6	Inpatient	18 days
<i>Saptamrta Lauha</i>	1 tablet	Lukewarm water		4	Discharge	2 months
		<i>Samirapan-cakam Kvatha*</i>	Twice a day before food	5	Inpatient	22 days
		Lukewarm water		6	Discharge	2 months
<i>Guducyadi Kvatha</i>	60mL	Lukewarm water	Twice a day before food	7	<i>Pathya Shadanga Kvatha</i>	21 days
				2	Discharge	2 months
<i>Shaddharana Gutika</i>	1 tablet	<i>Guducyadi Kvatha</i>	Twice a day before food	6	Inpatient	18 days
				6	Inpatient	18 days
<i>Vara Churna</i>	5g	Lukewarm water	Twice a day after food	6	Inpatient	18 days
<i>Vasa Svarasa</i>	20mL	-	Twice a day before food	7	Inpatient	21 days
<i>Pathyashadanga Kvatha</i>	60mL	Lukewarm water	Twice a day before food	7	Inpatient	21 days
<i>Kokilak-shakam Tablet</i>	1 tablet	Lukewarm water	Twice a day after food	7	Inpatient	8 days
				7	Discharge	2 months
<i>Hinguvacadi Gutika</i>	1 tablet	Lukewarm water	Twice a day after food	7	Inpatient	17 days
<i>Akshabijadi Capsule*</i>	1 capsule	Lukewarm water	Twice a day after food	1	Discharge	2 months
<i>Catropa Capsule*</i>	1 capsule	Lukewarm water	Twice a day after food	2	Discharge	2 months
<i>Candraprabha Vati</i>	1 tablet	Lukewarm water	Twice a day after food	3	Discharge	2 months
<i>Dhanadarasnadi Kvatha*</i>	60mL	Lukewarm water	Twice a day before food	4	Discharge	2 months
<i>Livo Sree*</i>	1 tab;et	Lukewarm water	Twice a day after food	4	Discharge	2 months
<i>Saptamrta Kvatha*</i>	60mL	Lukewarm water	Twice a day before food	5	Discharge	2 months
<i>Arogya Vardhini Vati</i>	1 tablet	Lukewarm water	Twice a day after food	5	Discharge	2 months

**Proprietary medicines of Sreedhareeyam Farmherbs India Pvt. Ltd.*

Table 4: External Inpatient and Discharge Therapies

Treatment and Procedure	Medicine	Course	Prescription	Duration
Anjana The semisolid medicine was applied onto the edge of a <i>Salaka</i> (application rod). This was applied on the lower bulbar conjunctiva from the inner canthus to the outer canthus and vice versa.	<i>Candanadi Anjana*</i>	1	Inpatient	11 days
		1	Discharge	2 months
		2	Inpatient	10 days
		2	Discharge	2 months
		3	Discharge	15 days
	<i>Mukulanjana*</i>	4	Discharge	2 months
		5	Inpatient	10 days
		7	Inpatient	15 days
		1	Inpatient	5 days
		2	Inpatient	3 days
	<i>Vinayakanjana*</i>	3	Inpatient	6 days
		4	Discharge	2 months
		6	Inpatient	5 days
		1	Inpatient	11 days
		1	Discharge	2 months
Ascyotana Two drops of the medicine were instilled into the sub-conjunctival sac at the inner canthus.	<i>Netramrtam*</i>	2	Inpatient	11 days
		3	Inpatient	16 days
		3	Discharge	2 months
		4	Inpatient	11 days
		6	Inpatient	9 days
	<i>Sunetra Senior*</i>	7	Inpatient	22 days
		7	Discharge	2 months
		6	Inpatient	9 days
		7	Inpatient	15 days
		5	Discharge	2 months
Netra Dhara The lukewarm liquid was poured in a thin, continuous stream over the eyes. The patient was asked to blink during the procedure.	<i>Eye Plus*</i>	6	Discharge	2 months
		7	Discharge	2 months
		8	Inpatient	13 days
		8	Discharge	2 months
		1	Inpatient	5 days
	<i>Jatavedha Ghrta*</i>	5	Inpatient	7 days
		8	Inpatient	12 days
		5	Inpatient	6 days
		1	Inpatient	11 days
		3	Inpatient	15 days
<i>Lodhradi Kvatha</i>	8	Inpatient	10 days	
	2	Inpatient	7 days	
	4	Inpatient	11 days	
	5	Inpatient	8 days	
	7	Inpatient	15 days	
Bidalaka A paste prepared from the medicines was applied over the eyelids while obviating the eyelashes.	<i>Mrdvikadi Kvatha</i>	2	Inpatient	2 days
		3	Inpatient	14 days
		2	Inpatient	2 days
		2	Inpatient	2 days
		2	Inpatient	2 days
Tarpana Two circular fences prepared from gram flour were constructed around the orbits. The lukewarm lipid medicine was filled into the cavities and the patient was asked to slowly blink.	<i>Kasyapa Ghrta</i>	2	Inpatient	4 days
		4	Inpatient	7 days
		6	Inpatient	5 days

Table 4: (Continued)

Treatment and Procedure	Medicine	Course	Prescription	Duration
Bandhana The flowers were placed with their stems facing upward on the closed eyes. A cloth band was tied on the eyes for a period of time.	Jasmine flowers	2 3 6	Inpatient Inpatient Inpatient	3 days 6 days 7 days
	<i>Vasa, Laksha, Amalaki, and Yashtimadhu in Nirgundi Vasakadi Svarasa</i>	1	Inpatient	7 days
	<i>Laksha, Musta, Vasa, and Usirain Vasa Kvatha</i>	2	Inpatient	10 days
Talapoticchil A paste prepared from the ingredients was applied on a plantain leaf and placed over the head and tied down.	<i>Laksha, Musta, Vasa and Haritaki in Vasa Triphaladi Kvatha</i>	3	Inpatient	14 days
	<i>Haritaki, Musta, Amalaki, Kaccuradi Curna, and Jatamayadi Curna in Vasa Guducyadi Kvatha</i>	7	Inpatient	7 days
Picu The oil was placed in a piece of gauze and placed over the bregma.	<i>Sasanka Taila*</i>	2	Inpatient	3 days
Sirodhara The patient lay supine and a rounded wooden bowl with a small hole in the center of its bottom was suspended over the head. The lukewarm medicine was poured over the head and prevented from flowing over the face by tying a cloth band over the forehead.	<i>Vasa Guducyadi Kvatha in Nimbamrtadi Eranda</i>	1 6	Inpatient Inpatient	5 days 7 days
	<i>Triphala Guducyadi Kvatha</i>	7	Inpatient	4 days
	<i>Vasa, Laksha, Musta, and Yashti in Vasa Triphaladi Kvatha</i>	3 4 5	Inpatient Inpatient Inpatient	14 days 3 days 2 days
Thalam A paste prepared from the ingredients was applied to the bregma.	<i>Kaccuradi Curna in Nimbamrtadi Eranda</i>	7	Inpatient	3 days
	<i>Kaccuradi Curna and Karutta Gutika in Nimbamrtadi Eranda</i>	8	Inpatient	1 day
Siroveshtana A semisolid paste was smeared over a Cora cloth and applied to the head (area with the paste facing inwards). One end of the cloth was anchored above the right ear. The cloth was wrapped over the forehead above the eyebrows and towards the left ear. From the left ear, the cloth was wrapped around the back of the head and brought upwards around the head while the vertex is avoided. The other end of the cloth was applied to the top of the head. Any leftover paste was applied to the uncovered portion of the head.	<i>Vasa, Laksha, Yashti, Karutta Gutika</i>	6	Inpatient	2 days
	<i>Vidari, Laksha, Kaccuradi Curna</i>	6	Inpatient	5 days
	<i>Musta, Amalaki, Haritaki, and Karutta Gutika in Vasa Triphala Kvatha</i>	8	Inpatient	9 days

Table 5: Time Line of Events

Date	Events			
1993 - 2007	Patient experiences blurring of vision OS after undergoing a course of Lariam mefloquine for treating malaria Vision neither deteriorates nor improves; the patient ignores it to take care of other duties			
2007-2013	The blurring of vision OD with floaters occurs Vision OU gradually deteriorates. Diagnosis of pigmentary epithelial detachment with cystoid macular oedema and macular scar Undergoes injection of Lucentis anti-VEGF 3 times; does not provide relief.			
Consultations and Treatments at Sreedhareeyam Hospital				
Duration of Treatment	Events	Admission	Inpatient Treatments	Discharge
		Ocular Examination	Oral Medicines	Ocular Examination
		DVA (unaided): LogMAR 0.778 OD, LogMAR 1.778 OS DVA (aided): LogMAR 0.477 OD, LogMAR 1.778 OS NVA: N18 OU Posterior Segment: sharply-delineated elevation and a “honey-comb” lesion at the macula OD; dense macular scar, elevation at the macula, hemorrhages OS Laboratory Investigations (10/02/2013) Hemoglobin: 15.7% ESR: 45mm/hr Cholesterol: 150mg/dL Triglycerides: 113mg/dL HDL: 40mg/dL LDL: 68mg/dL VLDL: 22mg/dL	<i>Samirapan-cakam Kvatha*</i> <i>Siva Gutika</i> <i>Gorocanadi Gutika</i> Tulasi, Sunthi, Haridra Svarasa	External Therapies <i>Netra Dhara</i> <i>Ascyotana</i> <i>Anjana</i> <i>Talapoticchil</i> <i>Picu</i>
09/02/2013 - 24/02/2013	Initial Consultation			Discharge DVA (unaided): LogMAR 0.778 OD, LogMAR 1.778 OS DVA (aided): LogMAR 0.477 OD, LogMAR 1.778 OS NVA: N18 OU Posterior Segment: macular scar and maintenance of elevation OS; pigmentary epithelial detachment and “honey-comb” formation at the macula OD Medicines <i>Samirapan-cakam Kvatha*</i> <i>Siva Gutika</i> <i>Akshabijadi Capsule</i> <i>Candanadi Anjana</i> <i>Netramrtam</i>
		Ocular Examination		Ocular Examination
		DVA (unaided): LogMAR 0.778 OD, LogMAR 1.778 OS DVA (aided): LogMAR 0.477 OD, LogMAR 1.778 OS NVA: N18 OU Posterior Segment: maintenance of macular scar and elevation OS; resolution of the “honey-comb” lesion OD Laboratory Investigations (05/09/2013) Hemoglobin: 10.6% ESR: 30mm/hr Cholesterol: 155mg/dL FBS: 119mg/dL	<i>Samirapan-cakam Kvatha*</i> <i>Bilvadi Gutika</i> <i>Maha Man-jishtadi Kvatha</i> <i>Punarnavadi Kvatha</i> <i>Kaisora Guggulu</i>	External Therapies <i>Netra Dhara</i> <i>Ascyotana</i> <i>Anjana</i> <i>Bidalaka</i> <i>Tarpana</i> <i>Bandhana</i> <i>Talapoticchil</i> <i>Picu</i>
04/09/2013 - 21/09/2013	-			Discharge DVA (unaided): LogMAR 0.778 OD, LogMAR 1.778 OS DVA (aided): LogMAR 0.477 OD, LogMAR 1.778 OS NVA: N18 OU Posterior Segment: elevation at the macula and maintenance of macular scar OS; reduced macular elevation OD Medicines <i>Catropa Capsule*</i> <i>Candanadi Anjana</i>
		Ocular Examination		Ocular Examination
		DVA (unaided): LogMAR 0.778 OD, LogMAR 1.778 OS DVA (aided): LogMAR 0.477 OD, LogMAR 1.778 OS NVA: N18 OU Posterior segment: slight reduction in pigmentary epithelial detachment OU, macular scar OS Medicines <i>Samirapan-cakam Kvatha</i> <i>Gorocanadi Gutika</i> <i>Vasa Sree</i> <i>Guduci Sattva</i> <i>Candraprabha Vati</i> <i>Candanadi Anjana</i> <i>Netramrtam</i>	<i>Gorocanadi Gutika</i> <i>Amrtottaram Kvatha</i> <i>Punarnavadi Kvatha</i> <i>Vasa Sree*</i> <i>Kamadudha Rasa</i> <i>Guduci Sattva</i>	External Therapies <i>Netra Dhara</i> <i>Ascyotana</i> <i>Anjana</i> <i>Bidalaka</i> <i>Bandhana</i> <i>Thala</i> <i>Talapoticchil</i>
07/09/2014 - 28/09/2014	-			

Table 5: (Continued)

Date	Events			Ocular Examination	
05/02/2015 - 23/02/2015	Reduced vision and visual clarity in dim light	<p>Ocular Examination</p> <p>DVA (unaided): LogMAR 0.602 OD, LogMAR 1.477 OS</p> <p>DVA (aided): LogMAR 0.301 OD, LogMAR 1.477 OS</p> <p>NVA: N18 OU</p> <p>Posterior segment: macular scar OS and reduced pigmentary epithelial detachment OU</p> <p>OCT: dome-shaped elevation at the macula with multiple cystoid lesions OU</p> <p>Laboratory Investigations (07/02/2015)</p> <p>Haemoglobin: 14.1%</p> <p>ESR: 15mm/hr</p> <p>FBS: 105mg/dL</p> <p>Cholesterol: 174mg/dL</p> <p>Triglycerides: 156mg/dL</p> <p>HDL: 55mg/dL</p> <p>LDL: 77mg/dL</p> <p>VLDL: 20mg/dL</p>	<p><i>Kaisora Guggulu</i></p> <p><i>Amrtottaram</i></p> <p><i>Kvatha</i></p> <p><i>Manjishtadi</i></p> <p><i>Kvatha</i></p>	<p><i>Netra Dhara</i></p> <p><i>Ascyotana</i></p> <p><i>Anjana</i></p> <p><i>Tarpana</i></p> <p><i>Thala</i></p>	<p>Ocular Examination</p> <p>DVA (unaided): LogMAR 0.602 OD, LogMAR 1.477 OS</p> <p>DVA (aided): LogMAR 0.301 OD, LogMAR 1.477 OS</p> <p>NVA: N18 OU</p> <p>Posterior segment: reduction in pigmentary epithelial detachment OU, macular scar OS</p> <p>Medicines</p> <p>Saptamrta Lauha</p> <p>Dhanadarasnadi Kvatha</p> <p>Candanadi Anjana</p> <p>Vinayakanjana</p>
01/10/2016 - 24/10/2016	Dimness of vision	<p>Ocular Examination</p> <p>DVA (unaided): LogMAR 0.602 OD, LogMAR 1.477 OS</p> <p>DVA (aided): LogMAR 0.301 OD, LogMAR 1.477 OS</p> <p>NVA: N18 OU</p> <p>Posterior segment: Pigmentary epithelial detachment OU, macular scar OS</p> <p>OCT: cyst-like lesions at the macula with hypo-reflectivity within the lesions OS</p> <p>Laboratory Investigations (02/10/2016)</p> <p>Haemoglobin: 14.6%</p> <p>ESR: 15mm/hr</p> <p>FBS: 103mg/dL</p> <p>Cholesterol: 15mg/dL</p> <p>Triglycerides: 134mg/dL</p> <p>HDL: 48mg/dL</p> <p>LDL: 95mg/dL</p> <p>VLDL: 31mg/dL</p>	<p><i>Samirapan-cakam Kvatha</i></p> <p><i>Kaisora Guggulu</i></p> <p><i>Manjishtadi</i></p> <p><i>Kvatha</i></p> <p><i>Saptamrta Lauha</i></p>	<p><i>Netra Dhara</i></p> <p><i>Ascyotana</i></p> <p><i>Anjana</i></p> <p><i>Tala</i></p>	<p>Ocular Examination</p> <p>DVA (unaided): LogMAR 0.602 OD, LogMAR 1.477 OS</p> <p>DVA (aided): LogMAR 0.301 OD, LogMAR 1.477 OS</p> <p>NVA: N18 OU</p> <p>Posterior segment: reduction in pigmentary epithelial detachment OU, macular scar OS</p> <p>Medicines</p> <p><i>Bilvadi Gutika</i></p> <p><i>Kaisora Guggulu</i></p> <p><i>Manjishtadi Kvatha</i></p> <p><i>Saptamrta Kvatha</i></p> <p><i>ArogyaVardhini Vati</i></p> <p>Eye Plus*</p>
03/08/2017 - 20/08/2017	-	<p>Ocular Examination</p> <p>DVA (unaided): LogMAR 0.602 OD, LogMAR 1.477 OS</p> <p>DVA (aided): LogMAR 0.301 OD, LogMAR 1.477 OS</p> <p>NVA: N18 OU</p> <p>Posterior segment: Pigmentary epithelial detachment OU, macular scar OS</p> <p>Laboratory Investigations (04/08/2017)</p> <p>Haemoglobin: 14%</p> <p>ESR: 15mm/hr</p> <p>FBS: 90mg/dL</p> <p>Cholesterol: 124mg/dL</p> <p>FBS: 148mg/dL</p>	<p><i>Guducyadi</i></p> <p><i>Kvatha</i></p> <p><i>Shaddharana</i></p> <p><i>Gutika</i></p> <p><i>Vara Churna</i></p>	<p><i>Ascyotana</i></p> <p><i>Anjana</i></p> <p><i>Tarpana</i></p> <p><i>Bandhana</i></p> <p><i>Sirodhara</i></p> <p><i>Siroveshtana</i></p>	<p>Ocular Examination</p> <p>DVA (unaided): LogMAR 0.602 OD, LogMAR 1.477 OS</p> <p>DVA (aided): LogMAR 0.301 OD, LogMAR 1.477 OS</p> <p>NVA: N18 OU</p> <p>Posterior segment: reduction in pigmentary epithelial detachment OU, macular scar OS</p> <p>Medicines</p> <p><i>Samirapan-cakam Kvatha*</i></p> <p><i>Saptamrta Lauha</i></p> <p>Eye Plus*</p>

Table 5: (Continued)

Date	Events			
05/10/2018 - 27/10/2018	Reduction in clar- ity while reading	Ocular Examination		
		DVA (unaided): LogMAR 0.602 OD, LogMAR 1.477 OS DVA (aided): LogMAR 0.301 OD, Log- MAR 1.477 OS NVA: Ni8 OU Posterior Segment: Pigmentary epithelial detachment OU, macular scar OS Laboratory Investigations (05/10/2018)	<i>Vasa Sree*</i> <i>Vasa Svarasa</i> <i>Guduci Sattva</i> <i>Pathya Shadan- gam Kvatha</i> <i>Kokilak- shakam</i> Tablet	<i>Netra Dhara</i> <i>Ascyotana</i> <i>Anjana</i> <i>Talapoticchil</i> <i>Sirodhara</i> <i>Tala</i>
02/08/2019 - 18/08/2019	Gradual reduction in vision OD	ESR: 14mm/hr RBS: 107mg/dL		
		Ocular Examination		
		DVA (unaided): LogMAR 0.477 OD, LogMAR 1.778 OS DVA (aided): LogMAR 0.477 OD, LogMAR 1.778 OS NVA: Ni8 OU Posterior Segment: Pigmentary epithelial detachment OU, macular scar OS OCT: cyst-like lesions at the macula OS Laboratory Investigations (02/08/2019)	<i>Samirapan- cakam Kvatha*</i> <i>Punarnavadi Kvatha</i>	<i>Netra Dhara</i> <i>Ascyotana</i> <i>Anjana</i> <i>Tala</i> <i>Siroveshtana</i>
		ESR: 14mm/hr RBS: 119mg/dL		
				Ocular Examination DVA (unaided): LogMAR 0.602 OD, LogMAR 1.477 OS DVA (aided): LogMAR 0.301 OD, LogMAR 1.477 OS NVA: Ni8 OU Posterior segment: reduction in pigmentary epithelial detachment OU, macular scar OS Medicines <i>Kokilakshakam Kvatha</i> <i>Netramrtam</i> Eye Plus*
				Ocular Examination DVA (unaided): LogMAR 0.477 OD, LogMAR 1.477 OS DVA (aided): LogMAR 0.176 OD, LogMAR 1.477 OS NVA: Ni8 OU Posterior segment: reduction in pigmentary epithelial detachment OU, macular scar OS OCT: Resolution of cystoid lesions OS Medicines <i>Punarnavadi Kvatha</i> Eye Plus*