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EXPLORING THE ROLE OF AYURVEDA IN DIABETIC MACULAR EDEMA: A CLINICAL CASE STUDY

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ABSTRACT
Diabetic macular edema (DME) is a vision-threatening complication of diabetic retinopathy resulting from chronic hyperglycemia-induced microvascular damage and increased retinal vascular permeability. Although intravitreal anti-VEGF therapy is the standard management, its long-term response may be variable, highlighting the need for supportive therapeutic approaches. In Ayurveda, DME can be clinically correlated with Pramehajanya Timira, a condition involving vitiation of Kapha and Pitta doshas with secondary involvement of Vata due to Dhatu Kshaya and Raktavaha srotodushti. A 48-year-old female with a 15-year history of type 2 diabetes mellitus presented with progressive, painless diminution of vision in both eyes for four years along with black spots in front of vision for eight months. She had previously received multiple intravitreal injections without satisfactory visual improvement. Fundoscopic examination and optical coherence tomography (OCT) revealed severe non-proliferative diabetic retinopathy (NPDR) with DME in both eyes. The patient was managed with an integrative Ayurvedic treatment protocol over 11 months, including Kriyakalpa procedures such as Nasya, Seka, Tarpana, Putapaka, and Takradhara, along with appropriate internal medications. The treatment was planned to achieve Samprapti-vighatana through dosha pacification, reduction of inflammation, and improvement of retinal microcirculation. Following three treatment sessions, improvement in visual acuity and a significant reduction in central macular thickness, average macular thickness, and total macular volume on OCT were observed. No adverse events were reported. This case suggests that Ayurvedic ocular therapies may serve as a supportive approach in the management of diabetic macular edema.

KEYWORDS – *OCT, NPDR, DME , DR*

INTRODUCTION
Shalakya Tantra focuses on disorders related to the supraclavicular region (*Urdhwajatru*), including the eyes, ears, nose, throat, and head. Among the five sensory organs, the eyes (*Netra*) are regarded as the most vital. This is emphasized by the saying *"Sarvendriyaanam Nayanam Pradhanam"* meaning the eyes are the foremost among all sense organs. The eyes are responsible for vision (*Darshana Shakti*), and any dysfunction or abnormality (*Vikriti*) in vision indicates the presence of an eye disorder.

Diabetic Retinopathy (DR) is a vision-threatening microvascular complication of Diabetes Mellitus (DM). Diabetic macular edema (DME), a severe complication of DR that occurs specifically as a result of inadequately treated DM, has overtaken proliferative DR as the most common cause of vision impairment in individuals with DM.[1] DME is manifested as retinal thickening caused by the accumulation of intraretinal fluid, primarily in the inner and outer plexiform layers. It is believed to be a result of hyperpermeability of the retinal vasculature. DME can be present with any level of diabetic retinopathy.[2] In Ayurveda, such a condition can be identified as *Timira.* This condition is primarily associated with the predominance of *Kapha dosha.* The vitiation of both *Kapha* and *Pitta* doshas significantly contributes to the development of oedema. Additionally, an increase in *Vata dosha* occurs due to the depletion of bodily tissues (*Dhatu Kshaya*) and the disturbance in the *Rakta Vaha Srotas* (channels carrying blood), ultimately leading to damage in the retinal blood vessels.[3]

The longer a person lives with uncontrolled diabetes, the greater their risk of developing Diabetic Retinopathy (DR). Prolonged high blood sugar levels damage the blood vessels in the retina over time, increasing the likelihood and severity of this complication. Nearly 90% of Diabetic Retinopathy (DR) cases can be prevented if the condition is detected early and appropriate treatment is initiated in the initial stages of the disease. Timely intervention and regular eye check-ups play a crucial role in preserving vision and preventing complications.[4]

CASE DESCRIPTION
Date- 10/09/2024
Age- 48 years
Gender- Female

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Occupation- Housewife
Place- Dehradun, Uttarakhand

CHIEF COMPLAINTS

1. Gradual progressive & painless vision loss in both eyes since 4 years.
2. Black Spots in front of vision since Jan, 2024.

History of Present Illness

The patient reports experiencing blurred and reduced vision and has been using spectacles for the past 25 years. In 2021, she visited Jolly Grant Hospital in Dehradun for a routine eye examination, where she was diagnosed with macular edema in her right eye, while the left eye showed no signs of the condition at that time. As per the ophthalmologist's recommendation, she underwent a course of intravitreal injections—one per month for three months. However, the treatment did not yield significant improvement. In 2022, macular edema was also detected in her left eye, for which she received one intravitreal injection. Yet again, she did not experience satisfactory relief. By January 2024, she began noticing black spots appearing in front of vision. Seeking better outcomes, she visited our Eye OPD of Patanjali Ayurved Hospital, Haridwar. The patient has been a known case of type 2 diabetes mellitus for the past 15 years. Her current medications include:

- Tab Glimipride and Metformin, one tablet in the morning
- Dapagliflozin & Metformin, one tablet before lunch
- Tab Metformin 500 mg, one tablet in the evening

She has also been diagnosed with Hypertension for the past 2 to 2.5 years and has been taking Mukta Vati regularly for its management. No positive family history was noticed. She had no history of any other ocular disorder.

CLINICAL FINDINGS

Personal history indicated a reduced appetite, while bowel movements were regular. The patient reported normal urination frequency—approximately 5 to 6 times during the day and 0 to 1 time at night and sound sleep.
On examination, her pulse rate was 81 beats per minute, respiratory rate was 20 breaths per minute, blood pressure measured at 140/82 mmHg, and body temperature was 98.6°F. Both cardiovascular and respiratory system assessments revealed no abnormalities.

DIAGNOSTIC ASSESSMENT

The patient's visual acuity was evaluated using a Snellen chart, and intraocular pressure (IOP) was measured with NCT. The following readings were recorded:

Table 1: Visual Acuity (logMAR) Before Treatment

	RIGHT EYE	LEFT EYE
VISUAL ACUITY	1.30	1.00
VA WITH PIN HOLE	1.30	0.18
VA WITH GLASS	1.30	0.18
IOP (mm Hg)	14.0	13.0

Based on findings from fundoscopy and OCT, the case was diagnosed as Severe Non-Proliferative Diabetic Retinopathy (NPDR) with Diabetic Macular Edema (DME) in both eyes.

TIMELINE

The patient first visited the Eye OPD at Patanjali Ayurved Hospital on 10th September 2024 and was admitted to the inpatient department (IPD) for treatment on the same day. Over a period of 10 months, the patient underwent a total of three IPD treatment sessions. Each admission lasted for 7 days, after which the patient was discharged with advice to return for a follow-up after three months.

THERAPEUTIC INTERVENTION

The patient was advised an Ayurvedic regime which is mentioned in table 2, 3 & 4 of all the three visits.

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Table 2: First Visit (10/09/2024)

DATE	THERAPEUTIC INTERVENTION	NAME OF DRUGS USED	DURATION
10/09/2024 TO 14/09/2024	• MARSHA NASYAM	Anu taila	5 Days
	• SEKA	Triphala + Yashtimadhu	5 Days
	• TAKRADHARA	Amalaki kwath+Takra	5 Days
13/09/2024 TO 16/09/2024	TARPAN	Patoladi Ghrita	4 Days
15/09/2024 TO 16/09/2024	PUTPAKA	Triphala+Neem Patra+Giloy+Mulethi+madhu	2 Days

Table 3: Second Visit (17/03/2025)

DATE	THERAPEUTIC INTERVENTION	NAME OF DRUGS USED	DURATION
17/03/2025 TO 19/03/2025	• MARSHA NASYAM	Anu taila	3 Days
	• SEKA	Triphala + Yashtimadhu	3 Days
	• TAKRADHARA	Amalaki kwath+Takra	3 Days
20/03/2025 TO 23/03/2025	• TARPAN	Patoladi Ghrita	4 Days
	• PUTPAKA	Triphala+Neem Patra+Giloy+Mulethi+madhu	4 Days

Table 4: Third Visit (23/08/2025)

DATE	THERAPEUTIC INTERVENTION	NAME OF DRUGS USED	DURATION
23/08/2025 TO 25/08/2025	• MARSHA NASYAM	Anu taila	3 Days
	• SEKA	Triphala + Yashtimadhu	3 Days
23/08/2025 TO 29/08/2025	PINDI	Majishtha+ Lodhra,+Raktachandan+Giloy+ Yashtimadhu+Punarnava+Dashmool	7 Days
26/08/2025 TO 29/08/2025	TARPAN	Patoladi Ghrita	4 Days
28/08/2025 TO 29/08/2025	PUTPAKA	Triphala+Neem Patra+Giloy+Mulethi+madhu	2 Days

At the start of each treatment session, the patient underwent a comprehensive evaluation, including Visual Acuity test and Fundoscopy. Upon discharge after each session, an oral medication regimen, detailed in Table No. 5, was prescribed. The patient was also given strict instructions to maintain a balanced diet, refrain from all forms of addiction, and avoid spicy, oily, and fast foods.

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Table 5: Oral Medications Prescribed During Total 10 Months

Name of drug	Dose, Route, Frequency, Time of administration & Anupana
1. CHIRAYTA KWATH **2.** GILOY KWATH	40-40 ml BD twice a day before meal.
3. VASAGULUCHYADI KASHAYAM	1 Teaspoon with lukewarm water before meal.
4. PHYTER TABLET (Haritaki, Vibhitaki, Amalaki)	2-2 tablets twice a day after meal with lukewarm water.
5. MADHUNASHINI VATI (Giloy, Haritaki, Vibhitaki, Amalaki, Gokhru, Haridra, Neem patra, Chirayta, Kutaki, Praval pishti, Vang Bhasm, Lauha bhasma)	2-2 tablets twice a day before meal with lukewarm water.
6. EYEGRIT EYEDROPS (Amalaki, Tulsi, Haridra, Vidarikand, Punarnava, Nirgundi, Sahjan, Raktachandan, Nimb, Mukta pishti, Kapur, Saindhav Lavana)	Instill 1-1 drops in each eye twice daily.
7. PATOLADI GHRITA	1 teaspoon with lukewarm milk after meal.

RESULTS

After undergoing three treatment sessions combined with sustained medical therapy over 11 months, the patient exhibited significant improvement in visual acuity in both eyes, detailed in Table 5. OCT findings revealed a substantial reduction in macular average thickness, central macular thickness, and total volume [Table 6], indicating a positive therapeutic response and improved macular health. No adverse events were reported during or after the treatment.

Table 6: Visual Acuity (logMAR) After Treatment

	10/09/2024 (On 1st visit)		**23/03/2025 (On 2nd visit)**		**23/08/2025 (On 3rd visit)**	
	RIGHT EYE	**LEFT EYE**	**RIGHT EYE**	**LEFT EYE**	**RIGHT EYE**	**LEFT EYE**
VISUAL ACUITY	1.30	1.00	1.18	1.08	1.30	1.00
VA WITH PINHOLE	1.30	0.18	1.18	0.04	1.00	0.18
VA WITH GLASSES	1.30	0.18	1.18	0.04	1.00	0.06

Table 6: Variations Observed in OCT Parameters

	RIGHT EYE		**LEFT EYE**	
	BEFORE TREATMENT	**AFTER TREATMENT**	**BEFORE TREATMENT**	**AFTER TREATMENT**
AVERAGE MACULAR THICKNESS (μm)	326.8	283.6	288.5	285.2
CENTAL THICKNESS (μm)	195	182	152	161
TOTAL VOLUME (mm^3)	9.24	8.02	8.16	8.06

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Figure 1 : Oct Macula Before Treatment

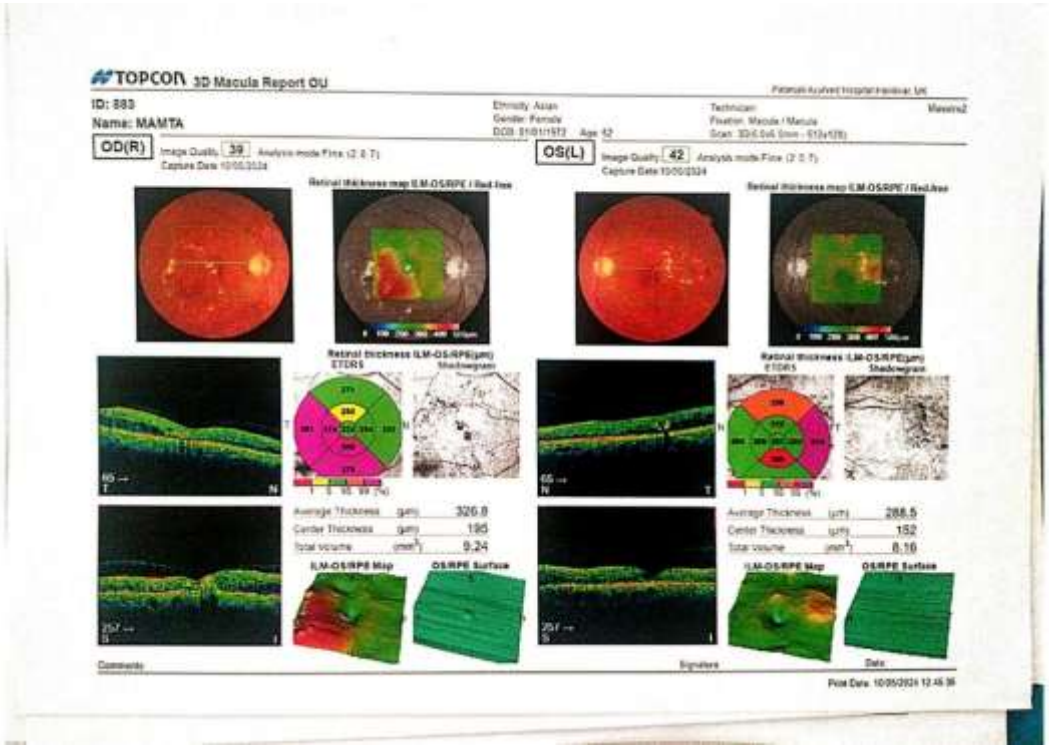
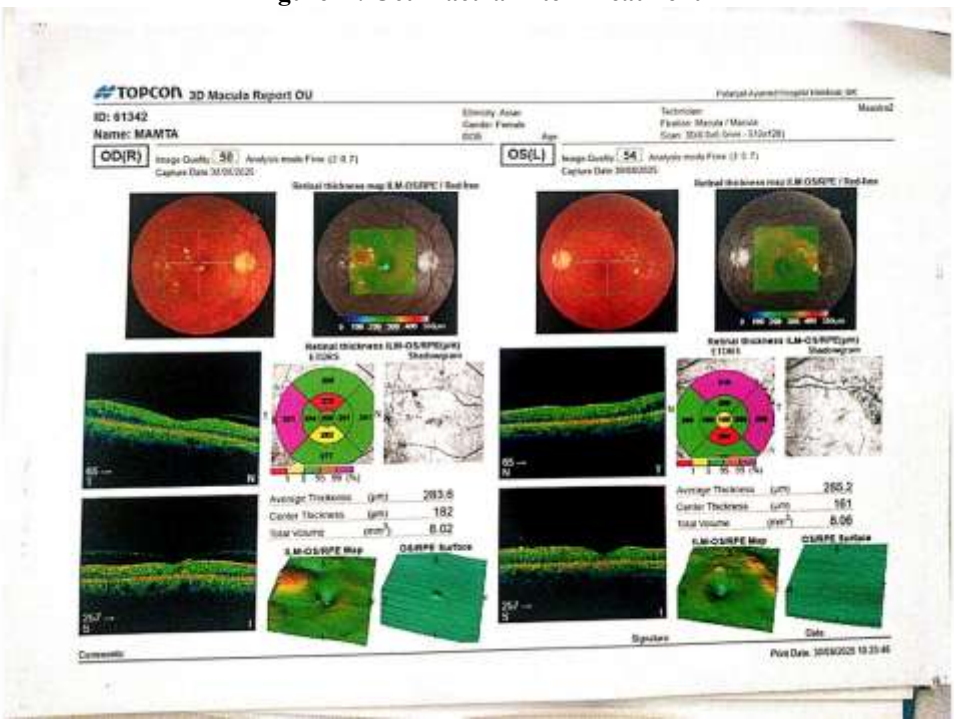


Figure 2 : Oct Macula After Treatment



DISCUSSION

DR is a progressive condition with microvascular alterations that lead to retinal ischemia, retinal permeability, retinal neovascularization and macular edema. If left untreated, patients with DR can suffer severe visual loss.[5] According to Ayurvedic principles, Diabetic Retinopathy (DR) can be interpreted as *Pramehajanya Timira*, a vision disorder arising as a complication of *Prameha* (diabetes). The clinical features of this condition suggest a predominance of Pitta and Kapha doshas in its pathogenesis.[6] Normal retinal circulation is unique: retinal capillaries are non-fenestrated and capillary endothelial cells have tight junctions; normal capillaries do not leak fluid or blood. There is no lymphatic system in the retina, so in the presence of retinal pathology,

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leaking fluid can accumulate and cause edema or swelling. Retina responds to ischemia by stimulating growth factors to produce new vessels (called neovascularization).

DME is the result of microvascular changes in diabetes leading to incompetence of vessels, edema. Hypoxic state stimulate VEGF causing more edema.[7]

Nasya is considered the principal therapeutic procedure for Urdhvajatrugata disorders, as the nasal route provides direct access to the head region. The drug administered through the nose reaches the Shringataka marma and spreads to the ocular structures through siras and dhamanis.By eliminating vitiated doshas from the head, mainly Vata and Kapha, Nasya facilitates srotoshodhana.This action improves the functional integrity of Netravaha srotas and supports the management of various ocular diseases.[8]

Triphala is rich in vitamin A, vitamin C, β-sitosterol, glycine, cystine, and glutathione, which aid in cellular regeneration and support the integrity of the tear film. It also possesses notable anti-inflammatory and antibacterial properties.**Yashtimadhu** contains flavonoids that act as potent antioxidants, along with terpenoids known for their anti-inflammatory activity.[9] Considering the inflammatory and oxidative stress–mediated pathogenesis of diabetic macular edema.[10] Both Triphala and Yashtimadhu are described in Ayurvedic literature as **Chakshushya dravyas**, indicating their beneficial effect on ocular tissues and visual function. Thus, Seka with Triphala and Yashtimadhu may help in reducing ocular inflammation, counteracting oxidative damage, and supporting retinal tissue health, thereby contributing to the overall management of diabetic macular edema.

Tarpana procedure in posterior segment diseases of eye like DME is of great importance as most of the drug permeation to intraocular tissues occurs through the cornea to the aqueous humor and ciliary vessels. As retinal pigment epithelium is continued as the non pigment epithelium of ciliary body, the drugs get absorbed through cornea may reach to the inner 3/4th retinal layers and outer 1/4th layers of retina gets from choroidal vessels from systemic route.[11] Hence, it was done using Patoladi Ghrita, as the Ghrita helps alleviate hemorrhagic signs through its Raktapitta-shamaka, Ropaka, and Rasayana properties, thereby enhancing the therapeutic effect of Tarpana.[12]

The Putapāka method reduces particle size and increases the potency of the herbal extract. This allows penetration into deeper ocular tissues, including the retina.[13] The drugs used in Putapāka have been shown to reduce pathological neovascularization, particularly relevant in Diabetic Retinopathy and Wet AMD.[14]

CONCLUSION

Diabetic macular edema is a vision-threatening complication of long-standing diabetes mellitus resulting from complex microvascular changes, retinal ischemia, inflammation, and increased vascular permeability. Conventional management often requires repeated intravitreal injections, which may not always provide sustained benefit and can pose economic and procedural limitations. In the present case, an integrative Ayurvedic approach comprising *Nasya, Seka, Pindi, Tarpana, Putapaka,* etc along with appropriate internal medications demonstrated significant clinical improvement. The therapeutic regimen effectively addressed the underlying Ayurvedic pathogenesis of Pramehajanya Timira by pacifying vitiated doshas, improving srotas patency, reducing inflammation, stabilizing retinal microvasculature, and promoting tissue nourishment and regeneration. Objective improvements in visual acuity and marked reduction in macular thickness and volume on OCT indicate reversal of macular edema and restoration of retinal health. The combined local and systemic interventions acted synergistically to achieve *Samprapti-vighatana* at multiple levels, highlighting the importance of Kriyakalpa therapies in posterior segment disorders of the eye.
This case suggests that Ayurvedic ocular procedures, particularly Tarpana , Pindi , Ropana Putapaka, when supported with appropriate internal medications, may serve as a safe and effective therapeutic option in the management of diabetic macular edema. However, larger clinical trials with long-term follow-up are required to further validate these findings and establish standardized treatment protocols.

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