



THERAPEUTICS OF DIABETIC MACULAR EDEMA THROUGH THE LENS OF AYURVEDA: A CASE REPORT.

Sanika Abhay Virkar^{1*}, Pallavi Jagtap², Mayur Shiralkar³, Chandana Virkar⁴, Madhav Madhukar⁵

^{1*}PG scholar, Dept. Of Shalakya Tantra, Dr. D. Y. Patil College Of Ayurved And Research Centre, Dr. D.Y. Patil Vidyapeeth (Deemed to be university) Pune- 411018 Maharashtra, India.

²Professor, Dept. Of Shalakya Tantra, Dr. D. Y. Patil College Of Ayurved And Research Centre, Dr. D.Y. Patil Vidyapeeth (Deemed to be University) Pune- 411018 Maharashtra, India.

³Professor, Dept. Of Shalakya Tantra, Dr. D. Y. Patil College Of Ayurved And Research Centre, Dr. D.Y. Patil Vidyapeeth (Deemed to be university) Pune- 411018 Maharashtra, India.

⁴Professor, Dept. Of Shalakya Tantra, College of Ayurveda and research centre, Akurdi, Pune- 411044 Maharashtra, India.

⁵PG scholar, Dept. Of Shalakya Tantra, Dr. D. Y. Patil College Of Ayurved And Research Centre, Dr. D.Y. Patil Vidyapeeth (Deemed to be university) Pune- 411018 Maharashtra, India.

***Corresponding Author:** Sanika Abhay Virkar

*PG scholar, Dept. Of Shalakya Tantra, Dr. D. Y. Patil College Of Ayurved And Research Centre, Dr. D.Y. Patil Vidyapeeth (Deemed to be university) Pune- 411018 Maharashtra, India.

Abstract: Prevalence of Diabetes Mellitus (DM) has increased drastically. Diabetic Retinopathy (DR) is associated complication which causes vision loss. Vascular leakage leads to fluid built up in macular region of retina causing Diabetic Macular Edema. Diabetic Macular Edema (DME) is a dreadful complication of Diabetic Retinopathy. According to ayurveda, tridosha along with rakta, sapta dhatu in association with drishtigata patala are involved in manifestation of prameha janya timira. current management approaches for ayurvedic treatment modalities for Diabetic Macular Edema.

Objective: To rescue patient's vision and provide symptomatic relief by ayurvedic management in diabetic macular edema.

Material and Method: 63 year old male patient, visited shalakyatantra OPD on 8th may 2018, with diminished vision, black spots in front of left eye since 13 days, known systemic history of diabetes mellitus since 11 years was diagnosed as prameha janya timira and treated accordingly. **Result:** Blood sugar level was reduced and controlled. Marked symptomatic relief on subjective as well as objective parameters were noted.

Discussion: Ayurvedic management in Diabetic Macular Edema offers a promising alternative for significant relief in symptoms, visual improvement and to slow down the disease advancement.

Keywords: Ayurvedic management, Diabetic macular edema, Prameha janya timir.

Introduction:

Diabetes mellitus is a metabolic disorder which causes damage to retina. It leads to visual disability. Prevalence rate of diabetic macular edema in diabetic patients is 5.5%.¹ If blurring of central vision is observed in patient; it could be indicative of diabetic retinopathy with potential complication of Diabetic Macular Edema (DME).²

Diabetes mellitus leads to diabetic retinopathy which is chronic, progressive, sight threatening disease. Sustained hyperglycaemia causes high intracellular level of glucose. Free radicals formation leads to oxidative stress and disruption of Blood Retinal Barrier (BRB). Protein kinase C activation (PKC $\uparrow$) along With glycation leads to diabetic retinopathy and maculopathy.

Increased Vascular permeability induces inflammatory processes causing increased Vascular Endothelial Growth Factor (VEGF) and progression of macular edema.

Diabetic macular edema can occur in any stage of diabetic retinopathy, commonly in advanced stages of Non-Proliferative Diabetic Retinopathy (NPDR) or Proliferative Diabetic Retinopathy (PDR)³; diabetic macular edema is characterised by reduced visual acuity, floaters, metamorphopsia and altered colour perception.

In ayurveda, prameha is included under ashtoumahagada (8 major diseases). According to ayurvedic netra parikshana, diabetic macular edema can be correlated with prameha janya timir. Diabetic macular edema can be considered as tridosha krita sannipataja vyadhi (disease caused by vitiation of all three doshas)⁴ Predominance of kapha dosha causes kleda vardhan leads to prameha janya timir and shotha. vata causes dhatu kshaya, rakta and pitta prakopa causes rakta strava (haemorrhage).⁵ Vata dushti of vyana and prana leads to neo vascularization.

Prameha janya timir vyadhi, lakshana like vihwala drushti, makshika mashaka kesha jala pasliyat, tamasa darshana and nasa akshi yuktani viparitani vikshate are observed.⁶

Vataja timir, tejojalashrita patala gata timir causes symptoms like blurring of vision, micropsia, metamorphopsia, erythropsia. Pitta vataja timir, dwitiyapatala gata, mamsashrita timir leads to colour vision defect, scotoma, smoky vision (vihwala drushti). Repeated and long term injections of Anti-VEGF (vascular Endothelial Growth factor)⁷, Laser photocoagulation, Intra vitreal steroid injection, vitreous surgery in vitreo - macular traction is advised as treatment for diabetic macular edema.

These treatments are expensive and having side effects. So developing ayurvedic treatment protocol as an alternative is necessary. Ayurvedic treatment aims on encountering disease pathogenesis from the root. In prameha janya timir; ayurvedic treatment like deepana, pachana, anulomana along with local treatments like kriyakalpa are advised.

Prameha hara internal medication along with shodhana (purification) with panchakarma and kriyakalpa (local treatment) nourishes capillaries like sira, reduces shotha and enables self maintenance of system.

Aims and Objective:

This case report aims at developing ayurvedic treatment protocol to treat diabetic macular edema. objective of this case report is to study the mode of action and potential role of ayurvedic therapeutics in treatment of prameha janya timir.

Material & method:

A 63 year old male patient; visited shalakya tantra OPD on 8th May 2018 with complaints of diminished vision of bilateral eyes for near and distant. Presence of black spots and floaters occasionally in left eye since 13 days. on and off headache since 8 days. severe burning and Sweating of both feet since 7 days.

Past History: History of Diabetes mellitus since 11 years. Patient is on regular medication for the same.

Drug History: patient is on regular medication for diabetes mellitus Rx: Zavamet 500, 1 tablet daily before breakfast (vildagliptin and metformin hydrochloride 50/500)
No history of any drug allergy known till date.

Family History: Maternal history-diabetes mellitus, which could be a potential factor for contributing patient's condition.

History of present illness: Diminished vision for both near & distant was developed. occasional presence of black spots and floaters in left eye since 13 days. Severe burning and sweating of both feet since 7 days and headache on and off since 8 days with these complaints patient approached nearby ophthalmologist.

Clinical findings: Patient was advised to investigate Blood Sugar Level (BSL), which was high, random blood sugar was 320 mg/dl. Optical Coherence Tomography (OCT) was done and from reports he was diagnosed with clinically significant left eye Diabetic Macular Edema (DME). He was advised course of intravitreal injection. Patient took one intravitreal bevacizumab (0.5mg) injection before approaching ayurvedic hospital. No major symptomatic relief was experienced by patient hence he approached ayurvedic treatment modality.

General Examination:

- Pulse-76/min
- Blood pressure- 130/90 mmHg
- Temperature- 98.2°F
- Respiratory rate- 17/ minute
- Appetite- Good
- Sleep- Disturbed
- Bowel- once a day
- Micturition- 4-6 times/day

Ashtavidha Pariksha:

- Nadi: 76/min
- Mala: samyak
- Mutra: 4-6 times/day
- Jivha: Ishata sama.
- Shabda: samyak
- Sparsha: Anushnasheeta
- Druk: Vikruti
- Akruti: Madhyam

Ocular Examinations:

Table 1: Visual acuity for distant

Distant vision	Right eye	Left eye
Without glasses	6/18	6/60 P
With glasses	6/9	6/36
Pinhole improvement	6/9	6/36 P

Table 2: Visual acuity for near

Near vision	Right eye	Left eye
Without glasses	N12	N18
With glasses	N6	N18

Table 3: Refraction

	Spherical	Cylindrical	Axis	Best corrected visual acuity (BCVA)
Right eye		-0.50	100°	6/9
Left eye	-4.50	-0.75	90°	6/36
Near addition	Add bilaterally +2.75 for near vision.			

Table 4: slit lamp biomicroscopic examination

Ocular examination	Right eye	Left eye
Eye lid	Normal in size, shape Without any anomaly	Normal in size, shape Without any anomaly
Conjunctiva	Normal without any papillae, follicles or concretions	Normal without any papillae, follicles or concretions
Cornea	Normal curvature and sheen	Normal curvature and sheen
Sclera	Normal	Normal
Anterior chamber	Normal in depth without any cells or flares	Normal in depth without any cells or flares
Iris	Normal, brown in colour	Normal, brown in colour
Pupil	Round regular reactive to light	Round regular reactive to light
Lens	Pseudophakia	Immature senile cataract (IMSC)

Table 5: confrontation visual field test

	Right eye	Left eye
Above (superior)	60° (normal)	60° (normal)
Below (inferior)	75° (normal)	75° (normal)
Medial (nasal)	60° (normal)	60° (normal)
Lateral (temporal)	90° (normal)	90° (normal)

Table 6: Amsler grid test

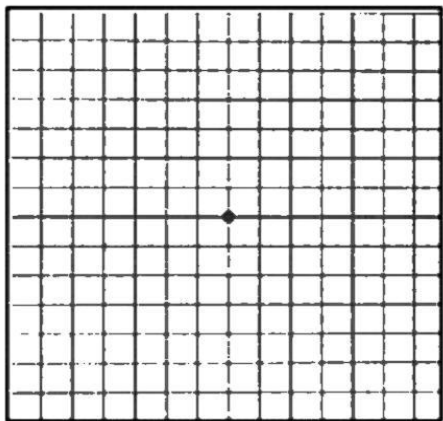
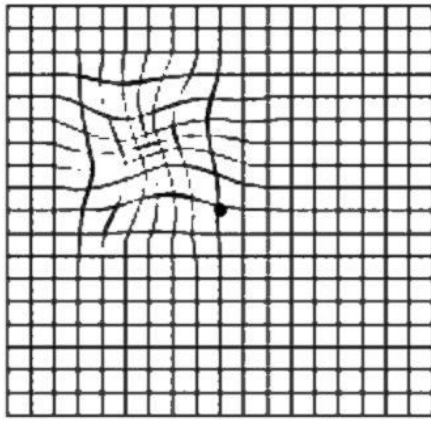
Right eye	Left eye
Normal	Wavy distorted lines in right upper quadrant
	

Table 7: fundoscopic examination

Fundus Examination	Right eye	Left eye
Pupil dilatation	8 mm	8 mm
Media	Pseudophakia	IMSC
Cup disc ratio	0.4:1	0.4:1
Shape	Peri papillary atrophy	Peri papillary atrophy
Margin	Clear	Clear
Neuro retinal rim	Within normal limit	Within normal limit

	(WNL)	(WNL)
Macula	Dull	Dull
Foveal reflex	Dull, fixation normal	Dull, sub foveal elevation
Vessels	Microaneurysm	Microaneurysm
Other findings		Hard exudates, dot blot haemorrhages

Table 8: other examinations

Examination	Right eye	Left eye
Intra ocular pressure (IOP)	17.3 mmHg	21 mmHg
Sac syringing	Patent	Patent

Table 9: Optical Coherence Tomography (OCT) macular thickness um

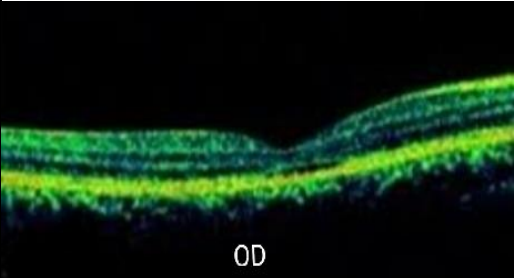
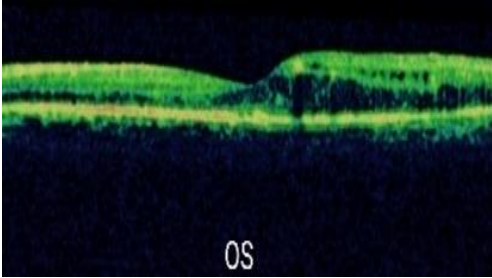
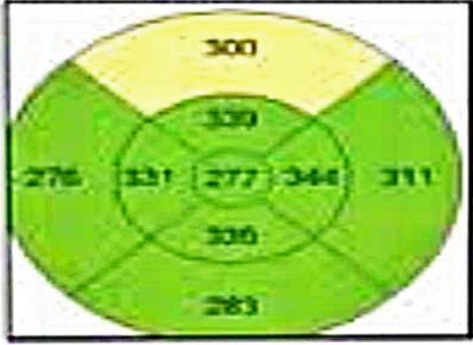
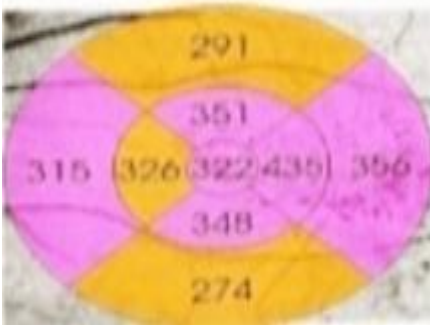
	Right eye	Left eye
Macular thickness	277	322 (increased macular thickness)
OCT report		
Internal Limiting Membrane (ILM) to Retinal Pigment Epithelium (RPE) thickness		

Table 10: Laboratory assessment of blood sugar level

Date	BSL Random	Fasting BSL	Post prandial	HbA1C
08/05/2018	320			
11/05/2018		180	220	9%
27/05/2018		163	217	
16/06/2018		154	215	
03/07/2018		150	212	
10/07/2018		152	217	
04/08/2018		147	215	8.3%
15/09/2018		145	212	
16/10/2018	172			
03/11/2018		138	210	
04/12/2018		130	202	7.5%

Diagnostic Assessment

History of systemic metabolic disorder of diabetes mellitus along with chief complaints were clearly suggestive of diabetic macular edema. Ocular examination and laboratory investigation confirmed the diagnosis. No challenges were faced to confirm the diagnosis.

Ayurvedic therapeutic intervention

Patient was advised dietary modulation to control diabetes mellitus. Administration of nidana parivarjana (avoiding disease causing factors) like looking at bright light, sleeping at day time, not consuming fatty carbohydrate rich food. Lifestyle modification, following a balance diet, regular exercise along with medication to control diabetes mellitus in association with panchakarma and local treatment like kriyakalpa contributed to manage the disease prognosis.

Detailed ayurvedic treatment plan given is mentioned in table 11.

Table 11: Ayurvedic therapeutic intervention with duration and dosage

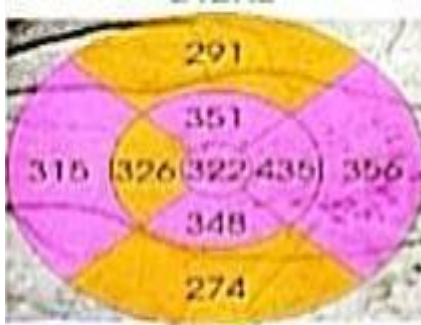
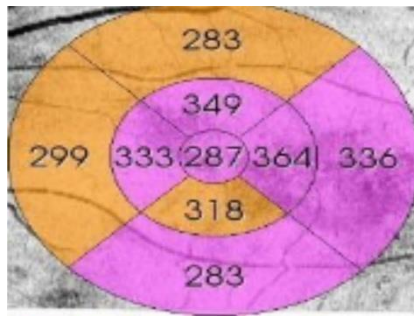
Date of visit	Treatment	Medication	Dosage	Duration
08/05/2018	Deepana (Appetites digestive fire)	Musta shunthi kwatha	Kwatha prepared with 10 gm musta and 5 gm shunthi in 2.5 lit water. Reduced to 2 lit and consumed in a day. 2 BD	3 days
	Pachana (Digestive medicine)	Amapachaka vati	3 gm HS with lukewarm water	3 days
	Anulomana (Purgative and carminative)	Avipattikara churna ⁸		3 days
11/05/2018	Prameha hara (Anti diabetic)	Mehantaka vati	2 BD	2 month
	Shotha hara (Anti inflammatory)	Nishakatakadi kashaya	15 ml BD along with lukewarm water 3 gm BD with lukewarm water 2BD	2 month
	Kriyakalpa (Local treatment)	Pathya punarnavadi churna Chandraprabha vati	Once a day in kriyakalpa unit	15 days
		Netra dhavana- triphaladi kashaya Netra tarpana- jeevantyadi ghrita Pinda sweda- shali shashti		15 days
19/05/2018	Basti (Enema)	Madhu tailika basti	Once a day in panchakarma unit	7 days
05/06/2018	Rakta mokshana (Blood letting)	Jalauka vacharana	Once a day in panchakarma unit	8 days
16/06/2018	Nasya (Trans nasal medication)	Durvadi ghrita ⁹	Once a day in panchakarma unit	1 day
	Takra dhara ¹⁰ (Medicated butter milk strea therapy)	Musta, amalaki siddha takra		5 days
10/07/2018	Prameha hara (Anti diabetic)	Mehantaka vati Vasanta kusumakara rasa Nisha amalaki churna	2 BD 1 BD 3 gm each BD with lukewarm water	1 month
	Chakshyushya (Rejuvenates eyes)	Saptamruta lauha	1 OD	15 days
	Symptomatic relief was observed, macular thickness was reduced in OCT along with reduced BSL.			1 month
04/08/2018	Kriyakalpa (Local treatment)	Netra dhavana- triphaladi kashaya ¹¹ Netra tarpana- jeevantyadi ghrita	Once a day in kriyakalpa unit	7 days
15/09/2018	Basti (Enema)	Madhu tailika basti	Once a day in panchakarma unit	8 days
16/10/2018	Prameha hara (Anti diabetic)	Mehantaka vati Nisha amalaki churna	2 BD 3 gm each BD with lukewarm water	1 month
03/11/2018	Visual acuity was improved in follow up.			
04/12/2018	HbA1C was reduced to 7.5 Symptomatic relief achieved.			

Result

Ayurvedic therapeutic intervention was administered for 3 months. Marked visual improvement with symptomatic relief, reduction in blood sugar level and macular thickness in OCT cumulatively resulted in elimination of diabetic macular edema.

Result was obtained by assessment of subjective and objective criteria before treatment and after treatment as mentioned in table 12.

Table 12: Assessment criteria

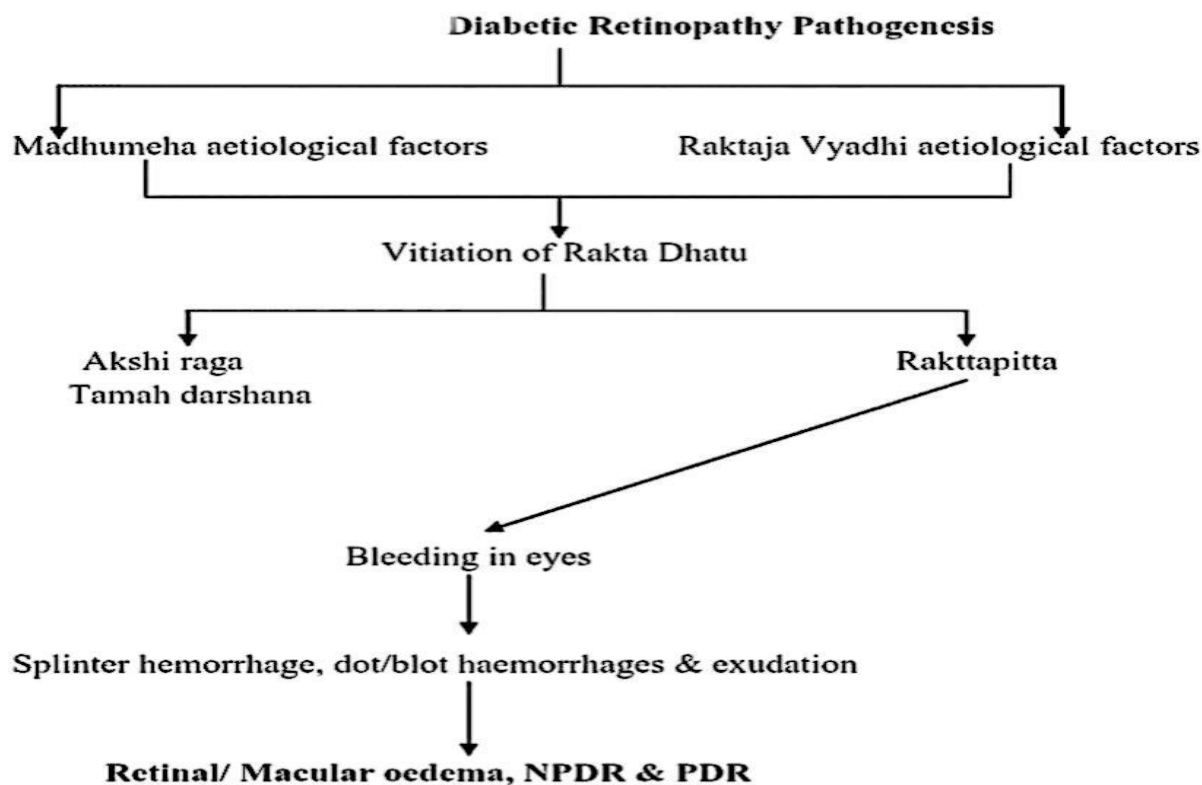
Symptoms	Before treatment	After treatment
Diminished vision	Severe	Mild
Visual acuity		
Distant	6/60 P	6/18
Distant with glasses	6/36	6/9 P
Near with glasses	N18	N8
Floaters in left eye	Present	Occasional
Headache	Severe	Absent
Burning sensation	Severe	Absent
Wavy distorted vision in left eye	Severe	Absent
OCT macular thickness of left eye	322 	287 
Fasting blood sugar level	180	130
Post prandial	220	202
HbA1C	9%	7.5%

Discussion

Ayurvedic treatment was given for 3 months regularly and follow up was taken in the month of July and December. By understanding pathogenesis of disease; reversal of pathology by ayurvedic treatment achieved. Strength of this article is OCT macular thickness report was taken before treatment and after treatment which depicts marked improvement in diabetic macular edema. All the subjective and objective assessment criteria contribute to resolution of diabetic macular edema in left eye.

Root cause of this condition is metabolic disease diabetes mellitus. This systemic disease was well treated by lifestyle modification, dietary modulation along with regular exercise and medication.

- Pathogenesis of prameha janya timir



• Mode of action according to ayurveda

Vitiated kapha along with tridosha causes sannipataja netra roga; prameha janya timir. Considering disease pathogenesis prameha hara, tridosha shamana, shotha hara and rakta pitta prasadana treatment is prescribed.

- Musta shunthi kwatha- ignites the dhatvagni (digestive fire)
- Amapachaka vati- digestion of ama (digestion of toxins)
- Avipattikara churna- anulomana (purgative)
- Mehantaka vati- prameha hara (anti diabetic)
- Nishakatakadi kashaya- prameha hara (anti diabetic)
- Pathya punarnavadi churna- shotha hara (alleviates swelling)
- Chandraprabha vati- kapha pitta hara (alleviates kapha, pitta dosha)
- Saptamruta lauha- chakshushya rasayana (eye rejuvenation)

Conclusion

Timely intervention to prevent further visual loss in diabetic macular edema by ayurvedic treatment was achieved. Root cause of disease was well treated by ayurvedic treatment. Marked improvement in visual acuity with reduction in clinical symptoms were noticed within period of 7 months. Further complications were prevented. However further studies should be carried out to establish potential ayurvedic treatment protocol for management of diabetic macular edema.

Patient perspective

“I was experiencing vision loss, headache, wavy distorted vision in left eye. Ophthalmologist examined eyes and concluded that I had developed complication of diabetes; retinopathy changes in my left eye. Doctor recommended injection for visual improvement. I underwent this costly procedure. One injection was administered but it did not improve my condition. Re- administration of injection with no assurance was advised. So I approached ayurveda.

Doctor prescribed me few ayurvedic medicines to cure my diabetes. Local eye treatments, enema was performed. Special dietary modulation along with ayurvedic treatment was continued for 7 months.

My headache was reduced in first month of treatment. After 3 months my reports suggested marked improvement. Vision test after 5 months revealed improvement. I regained my vision. Other complaints were reduced during the course of treatment. I am thankful to God and doctor for treating me well and giving back my vision.

Informed written consent

Informed written consent was taken from patient for publication of case report. It is made available for verification by editor of journal.

Abbreviations

BCVA- best corrected visual acuity
BSL- blood sugar level
DM- diabetes mellitus
DME- diabetic macular edema
HbA1C – hemoglobin A1C
IMSC- immature senile cataract
OCT- optical coherence tomography

Author contribution

All authors have equally contributed in treating this patient, documentation work and development of manuscript.

Conflict of interest

To the best of our knowledge; all authors declare that this study was carried out in absence of any reason that could create potential conflict of interest.

Source of funding

None.

References

1. <https://doi.org/10.1016/j.survophthal.2022.01.009>
2. Oshitari T. The pathogenesis and therapeutic approaches of diabetic neuropathy in the retina. *Int J Mol Sci* (2021) 22:9050. Doi: 10.3390/ijms22169050
3. A K Khurana, comprehensive ophthalmology, 5th edition. New age international (P) ltd. Reprint 2014 P-275.
4. Paradakara HS. Astanga hridaya of vagbhata, uttarsthana. 9th Ed. Ch.12 vers 10 Varanasi: Chaukhamba Orientalia publication; 2010 P. 817,157.
5. Shanti, K., & Remya, R. S. (2022). Ayurvedic Management of Diabetic Macular Oedema — DME — A Case Report. *Journal of Natural Remedies*, 22(3), 363–370. <https://doi.org/10.18311/jnr/2022/28782>
6. Shastri A Editor, Hindi commentary ayurveda tattva sandipika, sushruta samhita uttar tantra, drishtirogavigyaniya, Varanasi: Chaukhamba Orientalia publication; 2016 P 41.
7. Penn JS, Madan A, Caldwell RB, Bartoli M, Caldwell RW, Hartnett ME. Vascular endothelial growth factor in eye disease. *Prog Retin Eye Res* (2008) 27:331–71. Doi: 10.1016/j.preteyeres.2008.05.001
8. Harishastri P, editor. Ashtanga Hridayam of Vagbhata, Kalpasiddhi Sthana. Reprint 10th Edition. Varanasi: Chowkhamba Surabharati Prakashan; 2011. P. 743. Ch. 2, Ver. 21-23.
9. Krishnan V, Pillai G, editors. Sahasrayoga, Ghrita Yoga. 26th ed. Kerala: Vidyarambham Publishers; 2006. P. 337.
10. Krishnan V, Pillai G, editors. Sahasrayoga, Sudhikrama. 26th ed. Kerala: Vidyarambham Publishers; 2006. P. 475.

11. Lu K, Chakroborty D, Sarkar C, Lu T, Xie Z, Liu Z, et al. Triphala and its active constituent chebulinic acid are natural inhibitors of vascular endothelial growth factor – A mediated angiogenesis. PLoS One. 2012;7:e43934.