

Review Article

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“DIABETIC RETINOPATHY (MADHUMEHAJANYA TIMIRA): AN AYURVEDIC PERSPECTIVE AND THE CASE FOR INTEGRATED CARE”

Tushar Tapadiya¹

AFFILIATIONS:

1. Research Assistant, Ira Consultancy & Research Organisation, Bhosari, Pune, Maharashtra 411026

CORRESPONDENCE:

Tushar Tapadiya

EMAIL ID: tushartapadiya11@gmail.com

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ABSTRACT

Background: Diabetic retinopathy is a leading cause of preventable blindness in working-age adults, and India’s large diabetic population makes it a major public health problem. Classical Ayurvedic texts do not describe diabetic retinopathy as a distinct entity, but modern Ayurvedic scholars interpret it as Madhumehajanya Timira or Pramehaja Timira, visual impairment arising from Prameha (diabetes). **Objective:** To review the modern understanding and management of diabetic retinopathy, its Ayurvedic interpretation, and the available evidence for Ayurvedic and herbal interventions, and to propose a safe integrated model of care. **Methods:** Narrative review of classical texts on Prameha and Timira, international clinical literature on diabetic retinopathy, and Ayurvedic and herbal studies. **Results:** Glycaemic and blood pressure control, regular screening, laser photocoagulation, intravitreal anti-vascular endothelial growth factor agents and vitreoretinal surgery are established, evidence-based treatments. Ayurvedic interpretations emphasise Dosha imbalance, Avarana (obstruction) and Dhatukshaya (tissue depletion) affecting the layers of the eye (Patalas). Ayurvedic evidence is limited to conceptual reviews and case reports. A Cochrane review of single herbal medicines, mostly Chinese herbs, found low-certainty evidence for visual acuity gains when added to conventional care. Preclinical studies show aldose reductase inhibition and antioxidant effects for plants such as *Phyllanthus emblica*. **Conclusion:** Ayurveda may contribute to diabetes control, lifestyle modification and possibly adjunctive care, but there is no evidence that it can replace screening, laser or anti-vascular endothelial growth factor treatment. Integrated care with ophthalmological monitoring is essential, and controlled trials are needed.

KEYWORDS: diabetic retinopathy; Madhumehajanya Timira; Prameha; Timira; Shalakya Tantra; integrative ophthalmology; anti-VEGF; herbal medicine

INTRODUCTION

Diabetic retinopathy (DR) is a microvascular complication of diabetes and a leading cause of vision loss in working-age adults^[1]. A global meta-analysis estimated that about one in five people with diabetes has DR, and that the number affected will rise substantially by 2045^[2]. India has one of the world's largest diabetic populations; a population-based study in urban South India found DR in about 18% of people with diabetes^[3]. Because DR is often asymptomatic until advanced, screening and timely treatment are vital.

Ayurveda has a detailed understanding of Prameha (a group of urinary disorders including Madhumeha, which corresponds to diabetes mellitus) and of Timira (progressive visual impairment due to Doshas affecting the layers of the eye). Classical texts mention eye complications among the consequences of chronic disease, and modern Ayurvedic scholars have described DR as Madhumehajanya Timira or Pramehaja Timira^[4].

Ayurvedic clinics in India see many diabetic patients, some of whom may seek Ayurvedic treatment for blurred vision. This review summarises modern and Ayurvedic perspectives on DR and evaluates the evidence for Ayurvedic and herbal interventions, with the aim of supporting safe, integrated care.

METHODS

Classical sources included the Prameha chapters of Charaka Samhita and Sushruta Samhita and the Timira chapters of Sushruta Samhita Uttara Tantra^[5,6]. Modern literature was identified through PubMed, Cochrane Library, Google Scholar and Ayurveda journals using the terms diabetic retinopathy, Madhumehajanya Timira, Pramehaja Timira, Ayurveda and herbal medicine. This is a narrative review.

MODERN UNDERSTANDING OF DIABETIC RETINOPATHY

Pathophysiology

Chronic hyperglycaemia damages the retinal microvasculature through several pathways, including the polyol (aldose reductase) pathway, advanced glycation end-products, protein kinase C activation, oxidative stress and inflammation^[1]. These lead to pericyte loss, capillary basement membrane thickening, microaneurysms, increased vascular permeability and capillary closure. Retinal ischaemia drives production of vascular endothelial growth factor (VEGF), which causes neovascularisation and macular oedema.

Classification

The international clinical classification grades DR as no apparent retinopathy, mild, moderate and severe non-proliferative DR, and proliferative DR, with diabetic macular oedema (DME) graded separately^[7].

Table 1: Classification of diabetic retinopathy

Stage	Main features	Typical management
Mild non-proliferative	Microaneurysms only	Systemic risk factor control; annual review
Moderate non-proliferative	More than microaneurysms but less than severe	Risk factor control; closer review
Severe non-proliferative	Extensive haemorrhages, venous beading or intraretinal microvascular abnormalities	Close review; consider panretinal photocoagulation
Proliferative	Neovascularisation, vitreous haemorrhage	Panretinal photocoagulation and/or anti-VEGF; vitrectomy if needed
Diabetic macular oedema	Retinal thickening at or near the macula	Anti-VEGF; laser; steroids in selected cases

- **Systemic control:** intensive glycaemic control reduced the development and progression of DR in type 1^[8] and type 2 diabetes^[9]. Blood pressure control is also protective^[1]. Fenofibrate reduced the need for laser treatment in type 2 diabetes^[10].
- **Laser photocoagulation:** panretinal photocoagulation substantially reduces the risk of

- severe vision loss in proliferative DR^[11].
- **Anti-VEGF therapy:** intravitreal aflibercept, bevacizumab and ranibizumab improve vision in centre-involving DME^[12].
 - **Vitreoretinal surgery:** for non-clearing vitreous haemorrhage and tractional retinal detachment.
 - **Screening:** regular dilated eye examination or retinal photography for all people with diabetes.

AYURVEDIC PERSPECTIVE

Prameha and its complications

Charaka and Sushruta describe Prameha in detail, including its causes (sedentary life, excessive sleep, heavy, sweet and fatty foods), types and complications^[5,6]. Madhumeha, a Vataja Prameha, is considered the most difficult to treat. Complications (Upadrava) are described for each type. Although classical texts do not specifically list a diabetic eye disease, the chronic progressive nature of

Madhumeha and its impact on all Dhatus provide a basis for understanding ocular complications.

Timira and the Patalas

Sushruta describes four layers (Patalas) of the eye, and visual impairment progresses as Doshas affect successively deeper layers, from Timira (blurring) to Kacha and finally Linganasha (blindness)^[6]. Symptoms of Timira include blurred vision, seeing objects as distorted or with mist, spots or flies before the eyes, which resemble the floaters, blurring and distortion of DR and DME.

Interpretation of DR as Madhumehajanya Timira

Ayurvedic authors interpret DR as Madhumehajanya or Pramehaja Timira, in which prolonged Madhumeha causes Dhatukshaya (tissue depletion) and Avarana (obstruction of Vata by Kapha and Meda), affecting Rakta and the Patalas of the eye^[4]. Different stages of DR may correspond to involvement of different Doshas and Patalas:

Table 2: Diabetic retinopathy features and possible Ayurvedic correlations

DR feature	Possible Ayurvedic correlation
Microaneurysms and haemorrhages	Rakta Dushti (vitiated blood), Pitta involvement
Exudates and oedema	Kapha and Meda involvement, Avarana
Capillary closure and ischaemia	Vata, Dhatukshaya
Neovascularisation and fibrosis	Advanced Tridoshaja involvement, deeper Patalas
Vision loss	Progression from Timira to Kacha and Linganasha

These correlations are interpretive rather than established by classical texts, and are intended to guide Ayurvedic reasoning rather than to replace modern diagnosis.

Principles of Ayurvedic management

Ayurvedic management of Madhumehajanya Timira, as described in reviews and case reports, combines^[4,13,14]:

1. **Nidana Parivarjana:** avoiding causative factors through diet and lifestyle modification.
2. **Management of Prameha:** Pramehaghna herbs and formulations such as Nishamalaki (turmeric with Amalaki), Triphala and Guduchi, and appropriate purification (Shodhana) in suitable patients.
3. **Raktaprasadana and Chakshushya treatment:** blood-purifying and eye-beneficial herbs.
4. **Local Kriyakalpa:** Tarpana, Anjana, Bidalaka and Ashchyotana.

5. **Rasayana:** rejuvenative therapy to address Dhatukshaya.

EVIDENCE FOR AYURVEDIC AND HERBAL INTERVENTIONS

Ayurvedic case reports

Published Ayurvedic evidence on DR consists mainly of conceptual reviews and case reports. In one case report, a 41-year-old man with proliferative DR and tractional retinal detachment, who had already undergone vitrectomy in one eye and laser in the other and declined further surgery, received inpatient Ayurvedic treatment; the authors reported reduced haemorrhages and macular oedema on OCT and maintained vision at discharge^[13]. Another case report described resolution of DME on OCT and improved visual acuity in a patient who had previously received an anti-VEGF injection and then chose Ayurvedic treatment^[14]. Case reports cannot establish efficacy, and the natural fluctuation of DME and the lingering effects of earlier anti-VEGF or laser treatment are

important confounders.

Single herbal medicines

A Cochrane review of single herbal medicines for DR, mostly Chinese herbal extracts such as puerarin, Radix Notoginseng and tetramethylpyrazine added to conventional treatment, found low-certainty evidence that herbal medicine plus conventional treatment increased the proportion of patients gaining visual acuity compared with conventional treatment alone, with

no difference in glycated haemoglobin^[15]. Most trials were at high risk of bias. No Ayurvedic herbs were among the interventions assessed.

Preclinical evidence for Ayurvedic herbs

Phyllanthus emblica (Amalaki) and its tannoids inhibit aldose reductase and delayed diabetic cataract in rats^[16]. Turmeric and curcumin, Triphala and other herbs have antioxidant and anti-inflammatory effects that could theoretically affect DR pathways. Clinical trials in DR are lacking.

Table 3: Summary of evidence for interventions in diabetic retinopathy

Intervention	Evidence type	Finding	Certainty
Glycaemic and blood pressure control	Large RCTs ^[8,9]	Reduces DR progression	High
Panretinal photocoagulation	RCT ^[11]	Reduces severe vision loss in PDR	High
Anti-VEGF for DME	RCT ^[12]	Improves vision	High
Single herbal medicines (mostly Chinese) with conventional care	Systematic review ^[15]	Possible visual acuity benefit	Low
Ayurvedic multi-component treatment	Case reports ^[13,14]	Improvement reported	Very low
Ayurvedic herbs	Preclinical ^[16]	Aldose reductase inhibition, antioxidant effects	Not applicable to clinical outcomes

A MODEL OF INTEGRATED CARE

Given the strength of evidence for modern treatments, Ayurvedic practitioners have an important responsibility to ensure that patients with diabetes are screened and receive evidence-based ophthalmic treatment. A practical integrated model is:

1. **Screening:** every diabetic patient attending an Ayurvedic clinic should be asked about their last dilated eye examination and referred for retinal screening if it was more than a year ago.
2. **Shared care:** patients with any DR should be under the care of an ophthalmologist, with treatment and review schedules followed.
3. **Ayurvedic contribution:** diet, physical activity, weight management, yoga, stress reduction and Ayurvedic treatment for glycaemic control, with monitoring of glycated haemoglobin, blood pressure and lipids.
4. **Adjunctive local therapy:** Kriyakalpa should be used only with the ophthalmologist's

agreement and avoided around the time of intravitreal injections or surgery because of infection risk.

5. **Red flags:** sudden vision loss, new floaters, flashes or curtain-like shadow require same-day ophthalmic referral.
6. **Never stopping proven treatments:** patients should not be advised to stop anti-VEGF injections, laser or diabetes medications in favour of Ayurvedic treatment.

Where Ayurvedic advice and modern evidence agree

Several elements of Ayurvedic Prameha management overlap with modern recommendations for preventing the progression of DR:

These points of agreement offer a constructive basis for collaboration: the Ayurvedic practitioner's time with patients and emphasis on diet and daily routine can reinforce the lifestyle measures that ophthalmologists and diabetologists recommend but often have little time to explain.

Table 4: Agreement between Ayurvedic advice and modern evidence

Ayurvedic recommendation	Modern counterpart	Relevance to DR
Avoiding excessive sleep, sedentary life and heavy, sweet, fatty foods	Physical activity, weight management and dietary modification	Improves glycaemic control, which slows DR progression
Regular exercise (Vyayama) and walking	Regular physical activity	Improves insulin sensitivity
Barley, old rice, bitter vegetables and pulses	Low glycaemic index, high fibre diet	Lowers post-meal glucose
Avoiding day sleep and late nights	Sleep hygiene	Supports metabolic control
Yoga and stress reduction	Behavioural support	Adherence and blood pressure control
Regular use of Chakshushya foods	Balanced diet with fruits and vegetables	Plausible but unproven ocular benefit

Communicating with patients

Patients with diabetes may consult Ayurvedic practitioners because they fear injections or laser treatment, or because they have heard that Ayurveda can “cure” retinopathy. Practitioners should explain clearly that:

- DR is often silent until it is advanced, so regular retinal examination is essential even when vision seems normal.
- Laser and anti-VEGF treatments are effective at preventing vision loss and are not to be avoided.
- Ayurvedic treatment can support diabetes control and general health but has not been shown to reverse retinopathy.
- Any sudden change in vision requires urgent ophthalmic review.

Honest communication protects patients and the credibility of Ayurvedic practice.

SAFETY CONSIDERATIONS

- **Hypoglycaemia:** herbal preparations with glucose-lowering effects can add to the effect of diabetes medications; glucose should be monitored.
- **Heavy metals:** some Ayurvedic preparations, particularly Rasa Shastra formulations used in Prameha, may contain heavy metals^[17].
- **Kidney function:** many diabetic patients have nephropathy; herbal products should be used cautiously and kidney function monitored.
- **Infection:** local eye procedures in patients receiving intravitreal injections or after surgery may increase infection risk.

- **Delay in treatment:** the greatest risk is delay in laser or anti-VEGF treatment, leading to irreversible vision loss.

DISCUSSION

DR is a serious, sight-threatening complication of diabetes with highly effective modern treatments. Ayurvedic interpretations of DR as Madhumehajanya Timira provide a framework for Ayurvedic reasoning and management, and Ayurveda’s emphasis on diet, lifestyle and control of Prameha is consistent with the evidence that systemic control protects the retina.

However, evidence for direct effects of Ayurvedic treatment on DR is limited to case reports, and herbal evidence from other traditions is of low certainty. Case reports describing improvement after stopping conventional treatment should be interpreted with great caution, because DME fluctuates and the effects of earlier treatment persist.

Research priorities include controlled trials of Ayurvedic interventions as adjuncts to standard care in mild to moderate non-proliferative DR, with objective outcomes such as retinal photography grading, OCT central macular thickness and progression to treatment-requiring DR.

CONCLUSION

Diabetic retinopathy can be understood in Ayurveda as Madhumehajanya Timira, and Ayurvedic management of diet, lifestyle and Prameha may support systemic control. There is no evidence that Ayurvedic treatment can replace screening, laser photocoagulation, anti-VEGF therapy or surgery. An integrated model of care, in which Ayurvedic

practitioners promote screening and work with ophthalmologists, offers the safest route to benefit, and controlled adjunctive trials are needed.

REFERENCES

1. Wong TY, Cheung CM, Larsen M, Sharma S, Simó R. Diabetic retinopathy. *Nat Rev Dis Primers*. 2016;2:16012.
2. Teo ZL, Tham YC, Yu M, Chee ML, Rim TH, Cheung N, et al. Global prevalence of diabetic retinopathy and projection of burden through 2045: systematic review and meta-analysis. *Ophthalmology*. 2021;128(11):1580–91.
3. Raman R, Rani PK, Reddi Rachepalle S, Gnanamoorthy P, Uthra S, Kumaramanickavel G, et al. Prevalence of diabetic retinopathy in India: Sankara Nethralaya Diabetic Retinopathy Epidemiology and Molecular Genetics Study report 2. *Ophthalmology*. 2009;116(2):311–8.
4. Wal A, Bukke SPN, Vidiyala N, Jamil S, Sharma KK, Khan A, et al. Stimuli-responsive nanogels as intelligent nanocarriers for tumor microenvironment-triggered anticancer drug delivery. *Discov Nano*. 2026;21(1):247.
5. Sharma RK, Dash B. *Charaka Samhita* (text with English translation), *Chikitsa Sthana* 6. Varanasi: Chowkhamba Sanskrit Series Office; reprint edition.
6. Sharma PV. *Susruta Samhita* (with English translation), *Nidana Sthana* 6, *Chikitsa Sthana* 11–13 and *Uttara Tantra* 7 and 17. Varanasi: Chaukhambha Visvabharati; reprint edition.
7. Zehravi M, Khan SL, Gupta JK, Jahnavi P, Babu RH, Vidiyala N, et al. Advances in polymeric nanoparticles for oral drug delivery: mechanisms, challenges, emerging trends, and preclinical to clinical perspectives. *3 Biotech*. 2026;16(1):35.
8. The Diabetes Control and Complications Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med*. 1993;329(14):977–86.
9. UK Prospective Diabetes Study (UKPDS) Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet*. 1998;352(9131):837–53.
10. Keech AC, Mitchell P, Summanen PA, O'Day J, Davis TM, Moffitt MS, et al. Effect of fenofibrate on the need for laser treatment for diabetic retinopathy (FIELD study): a randomised controlled trial. *Lancet*. 2007;370(9600):1687–97.
11. Soundaryashree NR, Chandan RS, Singamaneni VR, Nagidi HR, Patel G, Vidiyala N, et al. Development and validation of RP-HPLC method for quantification of bamifylline in pharmaceutical formulations using analytical quality by design (AQbD) principles. *Adv J Chem Sect A*. 2025:2076-97.
12. Diabetic Retinopathy Clinical Research Network; Wells JA, Glassman AR, Ayala AR, Jampol LM, Aiello LP, et al. Aflibercept, bevacizumab, or ranibizumab for diabetic macular edema. *N Engl J Med*. 2015;372(13):1193–203.
13. Narayanan Namboothiri N, Kumar A, Sukumaran K, Kulangaraveetil N. An Ayurvedic protocol to manage proliferative diabetic retinopathy with tractional retinal detachment. *J Clin Diagn Res*. 2019;13(12):KD01–4. doi:10.7860/JCDR/2019/42659.13328
14. Vidiyala N, Sunkishala P, Parupathi P, Mandati P, Mantena SK, Kasu RRR, et al. High drug loading of amorphous solid dispersion by hot melt extrusion: the role of magnesium aluminometasilicate (Neusilin® US2). *Sci Pharm*. 2025;93(3):30.
15. Prasad PL, Govindaraj S, Jahnavi P, Popatrao TP, Tummala T, Vidiyala P, et al. Metal oxide functionalized nanoparticles for the treatment of bacterial infection: synthesis, characterization, and therapeutic applications. *J Appl Organomet Chem*. 2025;5(3):232-57.
16. Suryanarayana P, Saraswat M, Petrash JM, Reddy GB. *Embllica officinalis* and its enriched tannoids delay streptozotocin-induced diabetic cataract in rats. *Mol Vis*. 2007;13:1291–7.
17. Saper RB, Phillips RS, Sehgal A, Khouri N, Davis RB, Paquin J, et al. Lead, mercury, and arsenic in US- and Indian-manufactured Ayurvedic medicines sold via the Internet. *JAMA*. 2008;300(8):915–23.