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OCULAR MANIFESTATION IN DIABETES: AN AYURVEDIC VIEW

Dr. Deepa S.*[1], Dr. Sujathamma K.[2]

[1]Post Graduate Scholar, Department of PG Studies in Shalakya Tantra, Sri Kalabyraveshwara Swamy Ayurvedic Medical College, Hospital and Research Centre, Vijayanagar, Bengaluru, Karnataka, India.
[2]Professor, HOD, Department of PG Studies Shalakya Tantra, Sri Kalabyraveshwara Swamy Ayurvedic Medical College, Hospital and Research Centre, Vijayanagar, Bengaluru, Karnataka, India.

***Corresponding Author: Dr. Deepa S.**

Post Graduate Scholar, Department of PG Studies in Shalakya Tantra, Sri Kalabyraveshwara Swamy Ayurvedic Medical College, Hospital and Research Centre, Vijayanagar, Bengaluru, Karnataka, India.

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ABSTRACT

Diabetes mellitus (*Madhumeha*), a chronic metabolic disorder, significantly affects multiple organ systems, with ocular complications posing a major threat to vision. In Ayurveda, the pathogenesis of diabetic eye diseases is attributed to the vitiation of *Vata*, *Pitta*, and *Kapha doshas*, along with the depletion of *Rasa* and *Rakta dhatus*. Clinical manifestations such as diabetic retinopathy, cataract, and glaucoma are interpreted through Ayurvedic concepts like *Drishti Gata Roga*, *Timira*, and *Adhimantha*. Management approaches focus on systemic regulation of *Madhumeha* includes *Snehapana*, *Virechana*, Nasya *Karma* along with ocular therapies such as *Netra Tarpana*, *Anjana* supported by *Shamana aushadis* such as *Triphala*, *Guduchi*, and *saptamritha loha* etc. Integrating Ayurvedic interventions offers a holistic and preventive strategy for managing diabetic ocular complications, promoting ocular health and enhancing overall patient well-being.

KEYWORDS: Madhumeha, Diabetic Retinopathy, *Drishti gata roga*, *Adhimantha.*

INTRODUCTION

The incidence of detected diabetes in India is rapidly rising and is likely to emerge as a leading cause of ocular disease. India today is set to emerge as the "Diabetes Capital of the World". Diabetes affects various organs and of these perhaps one of the most important is its ocular manifestations. Diabetes mellitus, described as *Madhumeha* in the Ayurvedic classics, is one of the major disorders categorized under *Prameha*. Prameha is told one among the *ashta mahagada* by *acharya charaka* and is characterized by excessive urination with sweet taste (*Madhu* = honey, *Meha* = urination), When *prameha* is left untreated it causes *madhumeha*, which is *asadya* and manifest diseases in all major organs of the body. *Madhumeha* is primarily considered a *Vataja Prameha* that results from derangement of all three *doshas*, especially *Vata* and *Kapha*, and the impairment of *Ojas* (vital essence). Ocular complications are among the severe consequences of diabetes. Ayurveda regards the *Netra* (eyes) as a crucial sense organ dominated by *Alochaka Pitta*, responsible for perceiving visual impressions. Any disturbance in *Pitta*, compounded by the vitiation of *Rasa* and *Rakta dhatus* due to *Madhumeha*, predisposes the eye to various disorders. As there is no reference of *netra roga* due to *madhumeha* in ayurvedic classical texts, few clinical features can be understood that *netra rogas* can be caused due to *prameha or madhumeha* through this article. *Abhishyanda* is considered as causative factor for all the eye diseases which indicates importance of *abhishyanda* which must be controlled immediately by a wise physician other wise it leads to severe eye diseases.[1] All the diseases of *urdwajatru* are due to *syanda*.[2] The *srotas* which are present all around the eye will get obstructed and starts oozing, the one which will initiate oozing is called *abhishyanna strotas*.[3] *Acharya vagbhata* while explaining about *abhishyanda* he have mentioned that all *syanda* (srava/ oozing) is due to *kapha*, by this we can understand that in *prameha*, *kledaka kapha* will be vitiated, which in turn causes vitiation of *kapha* and may lead to *abhishyanda*.[4] Netra is *tejomaya* and has a risk of being affected by *kapha*, so

in *prameha* there will be *kapha pradana tridosha prakopa*, indirectly it may cause *netra vikara*.[5] According to *Yoga ratnakara*, In *prameha* there will be involvement of *jala mahabhuta pradhana dosha* and *dushya* which will precipitates the *purva rupa* as *upadeha* in *netra*.[6] While explaining *prameha pidaka chikitsa*, *Acharya sushrutha* have mentioned there will be *rasayani dourbalya* in *urdhwa shareera*, In commentary, *dalhana* have told *rasayani* as *rasa*, *pitta*, *kapha shonithavahanaam dhamaninaam*…. So there may be obstruction and causes *syanda* in the *dhamani* of *netra*, as *netra* is one among the *pratyanga* of *urdhwa shareera*.[7] In *ashtanga sangraha*, while explaining the *samprapti* of *netra roga*, he have mentioned due to *nidana sevana*, *achakshushya viharas*, there will be *jataragni mandya* and *ama* which leads to *prakopa* of *pitta* in *koshta* which spreads upwards through the *siras* and gets lodged either in *vartma*(lids), *sandhi*(fornices), *sita*(sclera), *Krishna*(cornea), *drushti* (pupil/lens/ retina),or in the entire eye and produces disease,similarly during the explanation of *prameha samprapti*, it is been told that there will be *ama* because of *jataragni mandya* and *dhatwagni mandya* which causes *kapha pradana tridosha prakopa* which can indirectly be a cause for *netra roga*.[8] *Sushruta Samhita* elaborates on seventy-six types of *Netra Rogas* (eye diseases), many of which bear clinical resemblance to diabetic ocular manifestations. In Ayurveda as there is no direct reference for ocular manifestation in diabetes, few *lakshanas* of *timira* can be correlated to clinical manifestations of diabetic retinopathy based on *lakshanas* such as *vyavidamiva pasyati*[9] - Hazy, spotty, blurry vision, *Jalanikeshanmashakan Rashminchopekshite*[10] - Floaters in the form of dark spots, Spider web appearance, *Aditya khadyotha pasyati*[11] - flashes of light, *Pasyed sukshmapytyrthaha*[12] - difficulty in visualising near objects. *Dhoomadhoomranichekshathe*[13] as smoky vision. *Raktani tamansi vividhani…chekshate*[14] as Erythropsia . *Chakshurindriya nashi*[15] as Complete loss of vision in PDR stage. The pathogenesis involves *dosha dushti* (vitiation), *dhatu kshaya* (tissue depletion), and obstruction of *srotas* (micro-channels), leading to degenerative and inflammatory changes in the ocular structures. Early Ayurvedic intervention focuses on addressing the root cause through *Dosha Shamana* (pacification of doshas) and *Dhatu Pushti* (nourishment of tissues). Therapeutic measures outlined for ocular afflictions include systemic purification therapies such as *Virechana* (therapeutic purgation) for *Pitta* imbalance, *Basti* (medicated enema) for *Vata* regulation, and specialized ophthalmic procedures like *Netra Tarpana*, *Putapaka*, and *Aschyotana*. Medicines like *Triphala Ghrita*, *Saptamrita Lauha*, *Guduchi*, and *Amalaki* play a pivotal role in maintaining ocular and systemic health. Thus, the Ayurvedic view of diabetic ocular manifestations offers a comprehensive and preventive approach, emphasizing the importance of maintaining systemic doshic balance to preserve the health and function of the eyes. This article aims to explore the classical correlations of diabetic ocular complications and to present the Ayurvedic management principles as a holistic strategy for contemporary diabetic eye care.

MATERIALS AND METHODS

All Literature review was done from Ayurvedic classics, Contemporary textbook and Modern Literatures including the Websites and journals to gather information about the disease, treatment procedures and formulations.

Madhumeha And *Prameha* In Ayurveda

Madhumeha is classified under *Vataja Prameha* in Ayurveda and is considered as a result of *Kapha* aggravation in the initial stages, ultimately leading to a predominant *Vata* disorder .It is characterized by excessive, turbid, sweet urine and the gradual depletion of vital tissues (*dhatu kshaya*), particularly affecting *Rasa*, *Rakta*, *Mamsa*, and *Ojas*. The systemic impact of Madhumeha, including its effects on sensory organs, is described elaborately in classical texts. *Charaka* and *Sushruta* emphasize that untreated *Prameha* can affect *Drishti* (vision) due to tissue depletion of *dhatu* and imbalance of *doshas*.

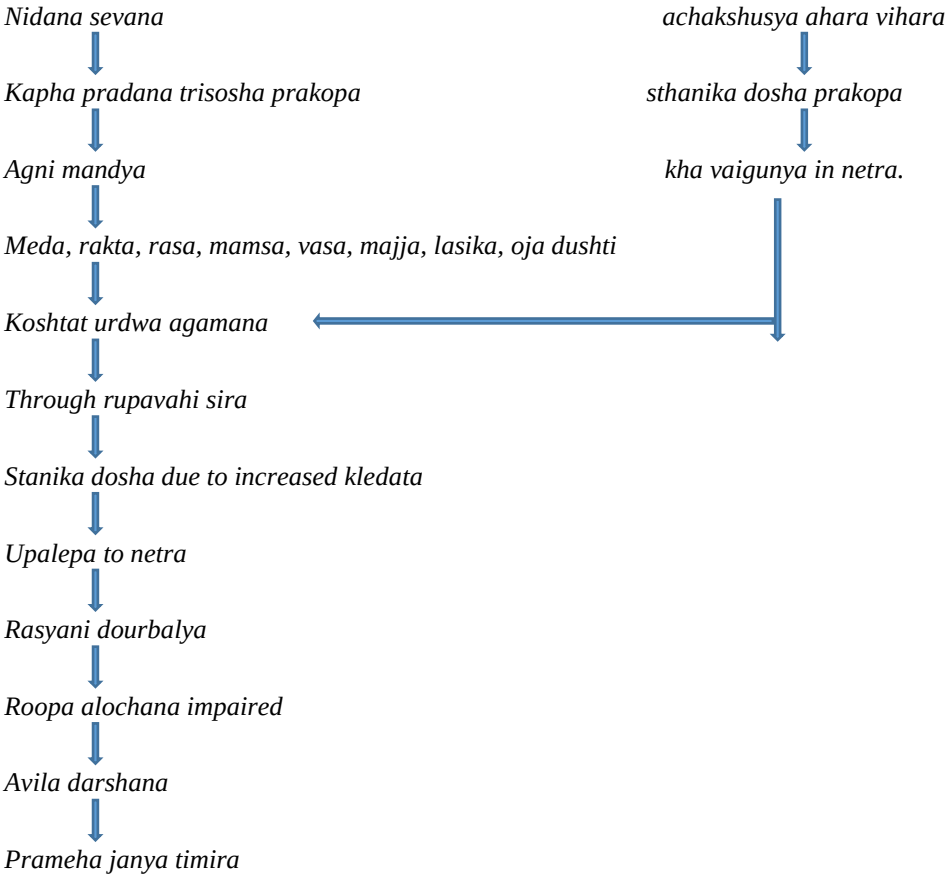
The Eye (*Netra*) in Ayurvedic Anatomy And Physiology

According to *Sushruta Samhita*, the eye is governed primarily by *Alochaka Pitta*, supported by the proper nourishment from *Rasa* and *Rakta dhatus*. Any derangement in these dhatus, particularly due to systemic diseases like *Madhumeha*, predisposes the eye to degenerative changes. Ayurvedic texts classify seventy-six types of eye diseases (*Netra Rogas*), categorized based on the involvement of anatomical layers (*Patala*) and doshic predominance. These layers correlate broadly with the anatomical structures of the modern eye, like cornea, retina, and optic nerve.

Samanya *Nidana* Between *Prameha* And *Timira*

- *Madhura rasa* - if taken in excess amount does *kleda vriddi*, *drava vriddi*, *adya dhatu shaitilya* and cause *prameha*. *athi madhura sevana* causes *abhishyanda* which leads to *netra roga*
- *Shuktaaranala* – does *drava-kledavriddi* which precipitates *prameha*. Due to its *amla vipaka* it causes *kapha pitta prakopa* and cause *netra roga* as *Pitta prakopa* initiates *syanda*.
- *Masha* – due to its *guru- snigda guna, madhura rasa, madhura vipaka* it leads to *prameha*, as *masha* causes *kapha pitta prakopa* it causes *netra roga* as *Pitta prakopa* initiates *syanda*.

Understanding The *Samprapti* Of *Prameha Janya Timira*



DISCUSSION

Diabetic Ocular Complications: Modern Perspectives

Diabetic retinopathy, cataract, and glaucoma are recognized as the leading ocular complications associated with diabetes. Diabetic retinopathy is one of the most common causes of blindness worldwide, primarily due to prolonged hyperglycemia leading to vascular changes in the retina, including microaneurysms, hemorrhages, and retinal detachment. Cataract formation, which typically occurs in diabetic patients at an earlier age, is a result of lens opacity caused by oxidative stress and glycation. Glaucoma, particularly secondary glaucoma in diabetes, is due to increased intraocular pressure and can lead to irreversible vision loss. Additional to this Diabetics are more at risk of recurrent hordeolum due to high blood sugar levels, xanthalasma are creamy yellow plaque- like leasions which frequently involve the skin of upper and lower eye lids near the inner canthus are more common in diabetic patients, Diabetics are at increased risk of developing conjunctival bacterial infections including acute infectious conjunctivitis. During the study of change in tear film and ocular surfaces in diabetes by Yoon KC, Im SK, Seo MA. In Korean J ophthalmology in 2004, Pathological changes in the conjunctiva were noted in up to 86% of diabetic patients. These changes included a significant increase in squamous metaplasia and a reduction in goblet cell density.[16] Tortuosity associated with diabetes among conjunctival capillaries mirrors established vessel changes observed in the retina.[17] Microaneurysms in the bulbar conjunctiva were also reported to be more common in diabetics, with their incidence approaching 64%.[18] The reported prevalence of Dry eye syndrome in diabetes is 15-33% in those over 65years of age and increases with age and is 50% more common in women than in men. The incidence of dry eye is correlated with the level of glycated hemoglobin: higher the level of glycated hemoglobin, the higher the incidence of dry eye. Diabetes mellitus associated dry eye may be tear deficient or evaporative dry eye. Dry eye symptoms like gritty sensation, soreness, decreased visual acuity, photophobia, itching, decreased corneal sensitivity are typically severe in the patients with diabetes whose glycemic control is poor. Those with longer duration of diabetes may report fewer dry eye symptoms and increased tear osmolarity is negatively correlated with symptoms. Lack of symptoms may result from a reduction in corneal sensitivity caused by diabetic peripheral corneal neuropathy. Even a minimal decrease in corneal sensitivity is sufficient to cause changes in tear secretion. Keratopathy is a well described ocular complication of diabetes. Specifically, patients are at higher risk of developing several corneal complications including superficial punctate keratitis, recurrent corneal erosions, persistent epithelial defects and corneal endothelial damage. Studies by Gekka et al., and Gobbels et al., showed that corneal epithelial barrier function is weakened in diabetic patients, which

correlated with higher HbA1c levels, longer duration of disease, and the presence of diabetic retinopathy.[19][20] Presence of abnormal adhesions of the epithelium to the underlying basement membrane. Such a weakened barrier likely accounts for the fact that diabetic patients were reported to be more prone to the development of corneal infections such as fungal keratitis.[21][22][23] Diabetic corneal neuropathy is a potential visual impairment condition caused by damage to trigeminal nerve under chronic hyperglycemia, and results in reduction or loss of corneal innervation. Corneal epithelium abnormality is one of the most common and long- term complications of DM.[24] The most serious consequence of diabetes on the iris is neovascularization which Occurs in up to 7% of diabetic eyes and in up to 60% in eyes with proliferative retinopathy due to capillary dropout in the retina.[25][26][27] The diabetic iris epithelium may become depigmented and three times more likely to release pigment which gets deposited on the corneal endothelium and trabecular meshwork.[28] High blood sugar levels can cause huge damage to the pupils, this is first seen in the inability to adjust vision in darker places. The action of pupils is to constrict in places when there is light and dilate when it is dark. Due to diabetes it can no longer dilate and remains small. Hence, this causes decreased vision in the dark.[29] Hyperglycaemia is reflected in a high level of glucose in the aqueous humour, which diffuse into lens. Here glucose is metabolized into sorbitol, which accumulates within the lens resulting in secondary osmotic overhydration. In mild degree, this may affect the refractive index of the lens with consequent fluctuation of refraction in line with the plasma glucose level, hyperglycaemia resulting in myopia and viceversa. Cortical fluid vacuoles develop and later evolve into frank opacities. Classic diabetic cataract, which is actually rare, consists of snowflake cortical opacities occurring in the young diabetes, it may resolve spontaneously.[30] Patients with diabetes have higher risk of developing glaucoma than those who do not have diabetes. Patients who had been diagnosed for longer periods were at a higher risk. In diabetes individuals, IOP is found to be higher than in non diabetics and this impact is linked to rise in fasting blood glucose. Microvascular damage from diabetes impair blood flow to the anterior optic nerve, resulting in optic nerve damage. Diabetes also impairs the autoregulation of posterior ciliary circulation, which may exacerbate glaucomatous optic neuropathy. In the modern medical context, these ocular complications are managed with strict blood glucose control, laser therapies, surgical interventions, and intraocular injections. However, these treatments primarily address the symptoms rather than the underlying systemic imbalances that contribute to the disease's progression. This highlights a significant gap that Ayurveda can fill, providing a more holistic and preventive approach in managing diabetic eye diseases.

Ayurvedic Interpretation of Diabetic Ocular Manifestations

In Ayurveda, the approach to diabetic ocular manifestations is multifaceted, rooted in the understanding of systemic *dosha* imbalances and tissue depletion. The key Ayurvedic principles that govern the pathogenesis of diabetic eye diseases involve the vitiation of *Pitta* and *Vata doshas* and the depletion of *Rasa* and *Rakta dhatus*, which directly affect the nourishment and functioning of the eye. Diabetic retinopathy can be correlated with its clinical features to few Netra roga in Ayurveda, but there is a reference in Netra Prakashika written by Poojyapada Mahamuni clearly mentioned that netrarogas are caused due to Prameha upadravas. *Drishti gata roga*, as described in *Sushruta Samhita*, can be indirectly correlated with diabetic retinopathy based on its clinical features. The retinal changes observed in diabetic retinopathy, such as hemorrhages and exudates, reflect the disruption in the circulation of *Rakta dhatu*, caused by the vitiation of Pitta. Similarly, *Timira*, or the clouding of vision, is indicative of cataract formation and is understood in Ayurveda as the accumulation of *Kleda* and aggravated *Vata* leading to opacity in the lens. *Timira* is a condition where patient present with blurred vision. *Timira* is a broad term which involves various presentations of eye diseases. *Triteetapatalagatadoshas* present almost majority of features seen in diabetic retinopathy. Hence, it can be considered. *Adhimantha*, with its symptomatology of severe pain and vision loss, corresponds directly to glaucoma, where the buildup of intraocular pressure damages the optic nerve. This classical correlation reinforces the idea that diabetic eye diseases are not isolated conditions but rather manifestations of systemic imbalances that Ayurveda seeks to address holistically. The Ayurvedic approach prioritizes systemic metabolic and physiological correction alongside ocular care, which aligns with current medical understanding that integrated diabetes management is essential for preventing or delaying eye-related complications.

Ayurvedic Therapeutics: A Holistic Approach to Management

Ayurveda offers a range of therapies that are aimed at both systemic regulation and localized ocular care. The use of *Snehapana* (internal oleation) and *Virechana* (purgation) plays a crucial role in balancing the doshas and detoxifying the body, addressing the root cause of metabolic imbalance. These therapies aim to correct the underlying pathology that contribute to diabetic complications, offering a preventive approach to managing ocular diseases. The use of herbal formulations such as *Triphala*, *Guduchi*, for internal administration supports overall eye health by improving circulation, enhancing antioxidant defences, and promoting tissue regeneration. Furthermore, *Nasya Karma* (nasal therapy) is believed to act on the optic nerve and enhance sensory functions, offering a direct benefit to vision. In *sushrutha samhitha* while describing

chikitsa of *madhumeha* at last there is a description of *tuvaraka anjana* containing *tuvaraka majja*, *saindhava*, *anjana* and *tuvaraka taila*, which is said to be useful in many *netra rogas* like *timira*, *kacha*, *arma*, *naktandhya*, *neeli roga*. So it may be an indirect reference of *timira* occurring due to *madhumeha*.[31] *Yoga ratnakara* while explaining *prameha chikitsa* he have mentioned *pramehadaou drakshapaka*, in which *netra pida* will be relieved, and in *pramehadao puga paka* he have told that it is indicated in *netra roga*, by this we can understand this as the indirect reference that there will be involvement of *netra* in *prameha*.[32] These Ayurvedic interventions not only address the symptoms of diabetic eye diseases but also work towards enhancing the body's natural healing processes, thus preventing further deterioration of vision.

CONCLUSION

Diabetes Mellitus is the disease that affects almost every system in the body. It is associated with long term complications involving eyes, kidneys, nerves and blood vessels. Eyes due to their peculiar structure and metabolism are specially subjected to diabetic disturbances. Aetiopathogenesis and management of DM have very much resemblance with Ayurvedic descriptions on *Madhumeha* (a type of *Vataja Prameha*). Since this disease is concerned with urinary system with the presence of sugar content in the urine, the comparison of *Madhumeha* with Diabetes Mellitus is justifiable. *Prameha* significantly impacts *netra roga* necessitating careful monitoring and management. Diabetic retinopathy, the most common ocular manifestation, can progress from non proliferative to proliferative, potentially leading to severe vision impairment or blindness if left untreated. Other related eye conditions, such as diabetic macular edema, cataracts, glaucoma, further elevate the risk of visual dysfunction in individuals with diabetes. Early detection through regular eye examinations, alongside strict glycemic control and appropriate therapeutic interventions like *shamana aushadhis* and *shodhana* is essential in managing these metabolic changes and preserving vision in those affected by *prameha*. Ayurveda offers a profound and holistic approach in managing these conditions by addressing the underlying doshic imbalances, enhancing tissue nourishment, and promoting systemic healing. Through the integration of Ayurvedic therapies with modern medical practices, there is significant potential to improve outcomes for diabetic patients, preserving vision and enhancing overall quality of life.

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