



Review Article

INSIGHT OF AYURVEDA IN DIABETIC RETINOPATHY: A REVIEW STUDY

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ABSTRACT

Present day lifestyle i.e. change in eating habits, progressive weight gain, stress, pollution, tobacco use and a sedentary life style lead to increase in number of lifestyle disorders. One of such lifestyle related disorders is Diabetes Mellitus, which if not controlled later on leads to Neuropathy, Nephropathy, Cardiomyopathy and Retinopathy. Diabetic Retinopathy (DR) is considered as a most threatening complication of Diabetes Mellitus. Diabetics have a 20-25 times greater risk of blindness as compared to the normal population. In Ayurveda, Diabetes Mellitus can be coined with *Madhumeha*, as DR is due to its complication so it can be correlated with *Madhumeha janya netra vikaar*. Various *Kriyakalpa* procedures like *Anjana*, *Aschyotan*, *Tarpan*, *Putpaka*, other daily regimes like *Snana*, *Padabhyanga*, *Abhyanga* etc., are considered as highly effective procedures for the maintenance of eye health in DR. These measures help to modify lifestyle, promote psychosomatic health and thereby reducing psychosocial stress and help in prevention and management of a wide range of lifestyle disorders. The purpose of this presentation is to analyse Ayurveda's preventive and therapeutic measures for treating DR and to evaluate how these measures can contribute towards improving the level of health care.

KEYWORDS: Diabetes Mellitus, Diabetic Retinopathy, *Kriyakalpa*, *Madhumeha janya netra vikaar*, *Anjana*, *Aschyotan* etc.

INTRODUCTION

Diabetes is a widely prevalent disease in the current era. It is a group of disorders due to either alterations in glucose secretions or insulin absorption. Long term high blood sugar levels will have negative effects on entire body and its functions and may lead to diabetic neuropathy, diabetic nephropathy and diabetic retinopathy. India is set to emerge as the diabetic capital of the world due to its increasing prevalence rate. According to WHO, globally an estimated 422 million adults are living with Diabetes mellitus.^[1] In India, it is gaining the status of a potential epidemic with more than 62 million diabetic individuals currently diagnosed with the disease.^[2,3] The prevalence of diabetes is predicted to afflict up to 61.3 million individuals in India by 2030.^[4]

It is a heterogeneous condition with number of symptoms and complications. Out of these complications discussed above, Diabetic Retinopathy is the most difficult to manage and disabling as it affects the vision of the patient. It has caught the fancy of ophthalmologists in today's world as it alone accounts for 1/4th ophthalmology clinic visits. Diabetes causes weakening of the blood vessels in the body. The tiny, delicate retinal blood vessels,

accompanied by structural changes in the retina, are termed as Diabetic retinopathy. In Diabetic retinopathy, the retinal blood vessels may go through a series of changes such as leakage or closure.

These changes may progress from one stage to the next. In Ayurveda, diseases of polyuric nature are collectively considered under a group '*Prameha*'. This group includes an entity called *Madhumeha* which is similar to Diabetes Mellitus. As Diabetic retinopathy is a disease occur due to Diabetes Mellitus, so it can be coined as *Madhumehajanya netra roga* in Ayurveda. There is no such term mentioned in Ayurvedic Samhitas, but evidences are there which clearly indicates that *Prameha*, not only effects the metabolic system of an individual but also has an impact on eye also.

OBJECTIVES

- This review study is being conducted to establish the probable pathogenesis and management of Diabetic retinopathy with its Ayurvedic counterpart.
- To analyse Ayurveda's preventive and therapeutic measures for treating DR, and

- To evaluate how these measures can contribute towards improving the level of health care currently in India.

Incidence: Diabetic retinopathy is a microvascular complication of both type 1 and type 2 diabetes mellitus. It develops in nearly all persons with type 1 diabetes and in more than 77% of those with type 2 who survive over 20 years with the disease.^[5]

- WHO has estimated that Diabetic retinopathy is responsible for 4.8% of the 37 million cases of blindness throughout the world.^[6]
- Of persons who have insulin dependent diabetes mellitus for 20 years or more, 60% will have had proliferative retinopathy^[5], while of those who have had the condition for 30 years or more, more than 12% are blind.^[7]
- Diabetic retinopathy is also one among the target diseases in VISION 2020.^[8]

After viewing the magnitude of the problem of disease, a comprehensive and thorough analysis of all related modern and *Ayurvedic* literature was done. Tremendous advancement made in the science of ophthalmology in recent years has opened a new era in the history of medicine. Still there are numerous challenging problems, existing before modern **Vascular and haematological changes seen in diabetes mellitus**^[10]

ophthalmologists that require special attention to develop untrodden fields of medical knowledge hidden in ancient medical texts. A safe preventive medicine or treatment of Diabetic retinopathy still remains a dream and in this review study a prompt attempt has been made for the same with the treasure of Ayurveda.

Classification of Diabetic Retinopathy: Diabetic Retinopathy has been variously classified. Presently followed classification is as follows^[9]:

I. Non Proliferative Diabetic Retinopathy (NPDR)

- Mild NPDR
- Moderate NPDR
- Severe NPDR
- Very severe NPDR

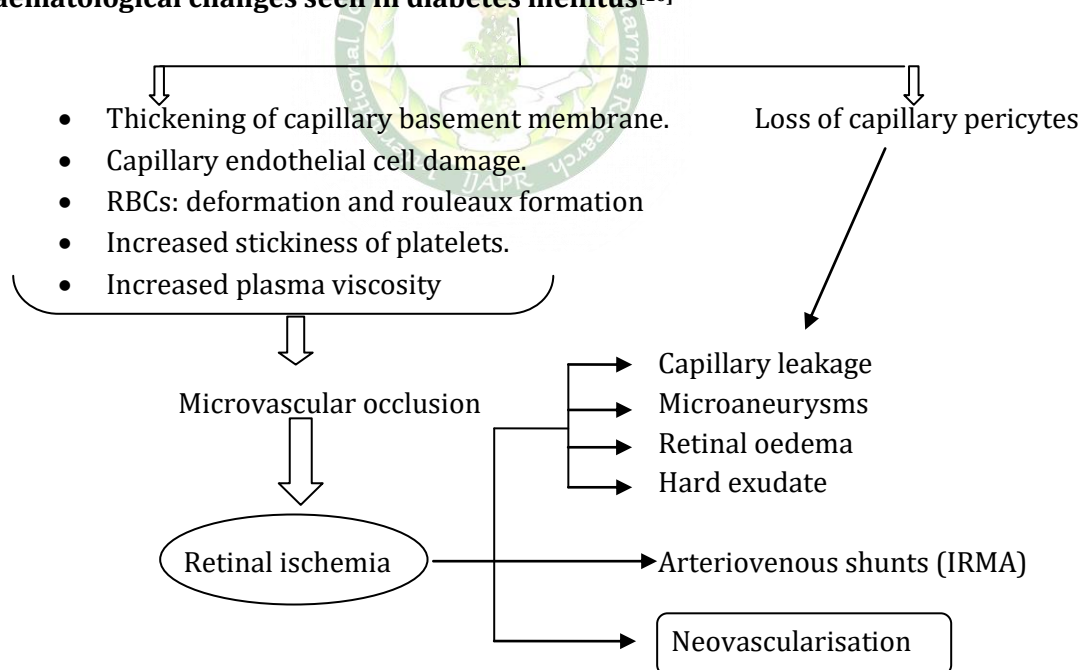
II. Proliferative Diabetic Retinopathy (PDR)

III. Diabetic Maculopathy

IV. Advanced Diabetic eye diseases

Samprapti (Pathogenesis) of Diabetic Retinopathy:

Diabetic retinopathy is micro-angiopathy affecting retinal pre capillary, arterioles, capillaries and venules. The pathogenesis of Diabetic retinopathy is given below in the flowchart diagram as:



Understanding Samprapti in the light of Ayurveda: *Netra* is *Tejo mahabhoota pradhana* i.e. *pitta* dominant in origin. According to *Acharya Charaka* and *Vagbhata*, eye has a fear from *Kapha dosha*.^[11,12] Any organ with *Pitta* origin, if get *Avrudha* by *Kapha dosha* will definitely lead to *Srotoavarodha*. We can see the involvement of all type of *Sroto dusti* i.e. *Atipravvruthi*, *Sanga*, *Siragranthi*, *Vimarga gamana* in modern pathogenesis of NPDR and PDR as:

- Any occlusion in the retinal vessels considered as *Sanga*,
- Development of micro-aneurysms can be correlated to *Siragranthi*,
- Retinal hemorrhage and Neovascularisation to *Vimarga Gamana* and
- Maculopathy and Retinal oedema to *Atipravvruthi*.

- **Thickening of capillary basement membrane:** *Kapha dosha* plays a significant role in *Madhumeha*. The *Panchbotika* composition of *Kapha* consists of *Prithvi* and *Jal* component.^[13] With the increase in *Kapha* i.e. *Prithvi* and *Jal* component there is thickening of capillary basement membrane.
- **Capillary endothelial cell damage and loss of capillary pericytes:** Diabetic Retinopathy is a microangiopathy which affects the retinal precapillary arterioles, capillaries and venules. Precapillary arterioles, capillaries and venules are the types of vessels. Vessels are made up of tissue, elastin fibres and smooth muscle cells.^[14] *Kapha dosha* has a property of *Sandhibandhan* that is why all these factors are intact with each other.^[15] The vitiation of *Kapha dosha* hampers the normal functioning of *Kapha dosha* which in turn causes *Sandhibandhan vikriti*.^[16,17] It means there will be damage to endothelial cells of retinal capillaries and loss of capillary pericytes due to vitiated *Kapha dosha*.
- **Changes in RBC and increased stickiness of platelets:** Out of ten *Dushyas* in *Prameha*^[18] - *Rasa*, *Rakta* and *Majja vikriti* are responsible for the changes in RBC and also increase stickiness of platelet and haemorrhage.

Treatment: Medical treatment of Diabetic retinopathy is aimed at prevention of retinopathy. There should be strict metabolic control of blood sugar and proper management of hypertension or other associated conditions. No treatment is mentioned in modern science for background diabetic retinopathy except for intra-vitreous steroid injection. The only ocular treatment available for macular diabetic retinopathy and proliferative diabetic retinopathy is photocoagulation. Despite the magnitude of problem no definitive cure is available in modern system of medicine and palliative measures are inadequate while Ayurveda gives an elaborated account of management of DR. In Ayurvedic *samhitas* like *Sushruta Samhita* a wide description are available pertaining to eye diseases and its management. *Acharya Sushruta* has given more importance to eye as it is evident from the fact that the *Uttaratantra* of *Sushruta Samhita* start with eye disease and out of which 19 chapters are devoted only to eye disease. The treatment modality in DR should possess properties like *Madhumehahara* properties, *Shothagna* properties, *Shonitasthapana*, *Ropana*, *Kaphanisaraka*, *Raktaprasadana*, *Srotodushtinirharana*, *Chakshushya* and *Balya* properties. So *samana netra roga prathishedha* along with *Kaya shodana* and *Shamana chikitsa* can be adopted for the management of DR.

I. **Shodhana chikitsa:** *Shodhan chikitsa* are important of all the Ayurvedic therapies. According to *Pratimargharan chikitsa sidhanta*, *Virechan* is the best way of *Kaya shodana* in case of haemorrhages from *Urdhwanga* route.^[19] It is also useful in the disorders in which *Pitta* is associated with *Vata* or *Kapha*.^[20] *Mridu sanshodhan* can be given to those who are not fit for *Virechan karma*. *Eranda tail* is the drug of choice for *Mridu virechan*, as it acts upon all the *Avarans* and works as *Sramsana*. *Shirovirechan (Nasya)* is also indicated in expelling out the morbid *Doshas* in *Urdhawjatrugat srotas*. *Nasya* with oil prepared from *Chakshushya* drugs can be administered. *Nasya* with *Durva ghrita* can also be administered as it has *Rakta-sthambak* property.

II. **Shamana chikitsa:** *Shamana chikitsa* should possess the medicines which are *Pramehahara* as well as *Chakshushya* in action. *Mahavasakadi kwath* which has a *Sthambhak* property can be given, which checks the formation of exudates. For *Ropana*, *Sthambana*, *Sheeta* drugs can be preferred. In stage of *Rakta-pitta*, *Vasa*, *Lodhra*, *Yashti*, *Manjista*, *Sariva*, *Chandana* drugs can give a better result. *Nishaamalaki* helps in checking further hemorrhage. *Shilajatu* when given internally helps in relieving the *Avarana* and clears the *Raktvaha srotas*. *Triphala* formulation is a better drug of choice in all conditions and stages of DR.

III. **Kriya kalpa and management of Diabetic retinopathy:** *Kriya Kalpa* procedures can be adopted like *Tarpana*, *Putpaka*, *Aschotana* and *Thalapothichil*.

- *Tarpan* helps in nourishment of local cells and a nerve ending thereby improves the blurred vision. Different *Ghrita* can be used according to stages of DR. To alleviate hemorrhagic signs by its *Raktipitta shamak* and *Ropan* properties, *Ghrita* like *Jivantyadi*, *Patoladi ghrita* and *Drakshadi Ghrita* can be administered in *Tarpan*.
- *Doorva ghrita Tarpan* is effective in mild to severe NPDR and even PDR stages of DR due to its *Raktstambak* property and it further checks the haemorrhage.
- *Mahatriphaladi ghrita* can be given in all stages of DR.
- Retaining of (Topical application) of plant extracts, fats, for a stipulated period is *Putpaka*. It is similar to *Tarpan* but the method of drug preparation is different. For different stages of DR, *Ropana putpaka* can be used. It can be used in *Rakta*, *Pitta*, *vrana* condition of the eye.^[21] *Putpaka* with *Tikta rasa* drugs like *Vasa* is effective in DR.

- *Seka* with drugs having *Tikta-kashaya rasa* and *Chakshushya* properties can be used which has the property of repairing the endothelial cells and healing the intra retinal blood vessels thereby preventing the loss of pericytes. Drugs like *Vasa*, *Amalaki*, *Lodhra*, *Yashti* etc can be used in *Seka*.
- Instillation of the medicated solution into the conjunctival sac when the eye is completely open and patient is in supine position is *Aschotana*. *Aschotana* with *Triphala ghrita*, *Mahatriphala gritha*, *Patoladi ghrita* and *Doorva ghrita* etc can be administered in the dose of 3-4 drops.
- *Thalam* (a form of *Keralaya panchkarma*) with *Vasa churna*, *Yashti churna*, *Amalaki churna*, *Rasna churna*, *Lodhra churna* etc (mixed with buttermilk) can also be administered according to the stage of DR.

Among all the sense organs, eyes are considered to be most important because vision is crucial for social and intellectual development of a person. For this, one has to take necessary efforts to take care of the methods for prevention of eye diseases. As we know, "Prevention is better than cure" so along with above therapeutic measures, preventive ophthalmology should be adopted in case of Diabetic retinopathy. Diabetes retinopathy is a complication of Diabetes mellitus which is a lifestyle disorder, so it can be prevented and proper vision can be restored for long time by following certain points mentioned under *Dincharya*, *Ritucharya*, *Sadvritta* and *Swasthvritta*. So the daily regimen can be summarized in a more practicable way as follows.

1. *Dincharya* and *Ritucharya*- Firstly, one should get up in "*Brahm Muhurta*" which will help in maintaining the equilibrium of the *Doshas*.^[22]
- Appropriate habit of diet, exercise in the form of yoga and meditation which helps in controlling the blood sugar level.
- Practicing *Netraprakshalana* (Eye Wash) with decoction of *Lodhra* or *Amala kwath* or with plain water helps in removing the impurities from eyes.^[23]
- *Anjana* (Collyrium) with *Souveeranjan* or *Darvi rasa kriya* can be mixed with honey can be applied in the eye for *Kapha shodhana* as eye is *Pitta* predominant in nature and has a fear from *Kapha dosha*.^[24]
- *Abhyanga* daily application of oil on head, selected and medicated according to "*Prakritti*" of person is effective in strengthening the body and act as *Drishtiprasadan*, thereby preventing eye diseases. It also nourishes all sense organs.^[25,26]
- By administration of *Pratimarsha nasya*, accumulation of vitiated *Kapha* in the *Srotas* of the

eye gets clear. Daily practice of *Nasya* prevents eye related disorders.^[27]

- Application of *Mukhalepa* is beneficial to eye by providing strength to it, as the facial artery, facial nerve and trigeminal nerve are lying along the cheek, having branches to the eye.^[28]
 - *Padabhyanga*^[29] (foot massage), *Padaprakshalana*^[30] (cleaning foot) and *Padatra dharana*^[31] (using footwear) has *Chakshushya* effect (improves vision) because the stimulation of the nerve endings of the foot reflects in the eye via sympathetic and parasympathetic supply.
 - *Chatra Dharana* (umbrella) also helps in maintaining the health of eye by protecting it from sunshine, heat, dust and smoke.^[32]
 - Adopt suitable measure according to *Ritu* and *Dosha* like avoiding day sleep except in summer season and avoidance of *Kapha* and *Meda yukt ahara-vihara*
2. *Sadvritta palana* by following the ethical regimen and eight codes of conduct provides peace of mind and balance. Though suppression of natural urges i.e., *Vegadharana* has impact on whole body but in the context of eye diseases *Acharya Charka*^[33] has mentioned *Nidra* (sleep) and *Bashpa vega* (Suppression of tear urge) which causes heaviness in eyes and various diseases of eye respectively. So it is evident that these *Vegas* should not be suppressed.
 3. In *Swasthvritta*, *yoga* and eye health yoga especially *Shat kriya's* like *Trataka* and *Neti kriya* is also helpful to improve vision and maintain the eye health.

DISCUSSION

In Ayurvedic texts, there is no direct reference or detail about the diabetic retinopathy or for *Madhumehajanya netra rogas*, though there are evidences showing affections of *Prameha* in sense organs. In *Charak Samhita*, it has been mentioned "*Hrinnetra jihwa sravanopadeha*."^[34] Which gives direct clue regarding the involvement of vital organs like eye in *Prameha*. Any change in the mechanism of *Dhatu parinamakriya* (metabolism) can lead to various pathologies. This mechanism is supplied by nutrients (*Dhatu poshak*) through *Rasa-rakta dhatu*, which travels through various *Srotas* to various organs of the body including eye also. Any alteration in the *Dhatu parinamakriya* and in the chain of *Dhatu poshak kriya* lead to homeostatic imbalance of whole metabolism mechanism, which in turn leads to *Vaigunya* of the *Rasa-rakta dhatu* and its functions. Due to *Sewan* of *Achakshushya ahaar-vihaar*, *Pitta dosha* get vitiated. Due to interconnection of *Pitta* and *rakta* as *Ashrya-ashrayee bhava*, *Rakta dosha* also get

vitiated. These vitiated *Doshas* reach the supraclavicular region through *Urdhwajatru gat srotas* and finally get confined to *Netra*. In *Prameha*, the major *Sampraptighataka* is *Kleda* which contributes much to the *Upadrava rogas*. The complications of *Prameha* are considered mainly due to the presence of *Kleda* in *Rakta* and in *Raktavaha srotas*. Due to *Sewan* of *Prameha nidaan*, *Kapha dosha* gets vitiated and *Kleda tatva* increases in the body. The combination of *Kleda* and *Kapha* in *Prameha*, through *Pratilomagati* of *Vyana vayu* and *Rasavahinis* reaches *Netra* and stimulate the process of *Srotorodha* in *Sukshma raktavahi srotases*. The vitiated *Kapha* and *Kleda along with already* vitiated *Pitta-rakta* will get *Sthana samsraya* in *Netra* and lead to various pathological processes and the pathology can be given name as *Pramehajanya netra roga* or diabetic retinopathy. This highly prevalent condition substantially affects the quality of life and is economic burden too, if left untreated it can result in visual morbidity. It is need of time to find out an Ayurvedic management which is effective to control the DR by repairing its endothelial cell, intra retinal vessels, prevents oedema and checks further hemorrhage, free from preservatives and also cost effective. The treatment modality in DR proves fruitful when preventive ophthalmology is also adopted by an individual at the same time. As it is due to lifestyle disorder, prevention of lifestyle disorders by adopting a positive life style helps in reducing the impact of ocular diseases in general population.

CONCLUSION

Ayurveda has a holistic and scientific approach in health management. It emphasizes much more on diet and regimen along with medicines. This presentation demonstrated that Ayurveda has the potential to effectively contribute towards the goal of reducing the high incidences of DR in India, as it is a cost effective, long term preventive and therapeutic safe form of medicine. It can provide comprehensive preventive care to potential DR patients and therapeutic benefits to those already afflicted with DR. With proper intervention of *Kriyakalpa*, life style modification, *Pathya-apathya* along with oral medicines at appropriate time, will definitely stop the progression of the disease and maintains the retinal function.

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