

Diabetic Retinopathy: From an Ayurvedic Standpoint

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ABSTRACT

“*Sarvendriyanam Nayanam Pradhanam*” As per our ancient literature Eye is the prime sense organ. One should always make consistent effort to protect eyesight. Diabetic retinopathy is one of the leading causes of blindness on global scale and as an important ocular micro vascular complication of Diabetes mellitus, a better treatment plan is needed as the available treatment modalities in modern system of medicine have their own limitations. Treatment modalities include intravitreal anti VEGF drugs, intravitreal steroids, laser therapy, pars plana vitrectomy etc. In Ayurveda *Prameha* is considered under eight *Mahagada*, but there is no direct indication of Ocular manifestation under it in *Brihatrayi* and *Laghutrayi*. But Acharya Charaka has mentioned “*Netramaya*” as a result of excessive intake of *Madhura* Rasa which we can correlate to the condition of chronic Hyperglycaemia and also *Timira* is considered as the *updrava* of *Madhumeha* by Pujyapad Muni in his book “*Netra Prakashika*”. According to the symptoms and complication of diabetic retinopathy it can be considered as *Prameha/Madhumeha janya netra roga*. Here an attempt is made to understand the etiopathogenesis and treatment protocol evaluation of Diabetic Retinopathy by the virtue of Ayurveda. So that an effective and consistent Ayurvedic management can be implied in treating and preventing further complication of diabetic retinopathy.

Key Words *Diabetic Retinopathy, Pramehajanya netra roga, Timira, Takradhara*

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INTRODUCTION

Diabetic retinopathy is an alarming issue causing retinal changes in patient with Diabetes mellitus. Chronic hyperglycemia has toxic effect on cells, with retinal damage being the most profound. The risk increases with the duration of Diabetes, Hypertension and poor metabolic control. Diabetic Retinopathy is microvasculopathy in which retinal cell damage occur along with loss of pericytes and thickening of basement

membrane of capillaries because of deposition of Advanced Glycation End products (AGE) due to hyperglycemia. Hematological and biochemical changes which gives way to microangiopathy includes increase in platelet adhesion, blood viscosity, RBC deformation and rouleaux formation. All these changes leads to breakdown of blood retinal barrier (causing retinal edema, hemorrhages and leakage of lipids i.e. hard exudates), weakened capillary wall (causing

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microaneurysms and haemorrhages) and microvascular occlusions (causing ischemia, cotton wool spots due to infarct of nerve fibre layer and arteriovenous shunt i.e. intra retinal microvasculature abnormalities). Neovascularization of retina occurs as the disease proceeds.

Classification of Diabetic Retinopathy:

- I. Non Proliferative Diabetic Retinopathy
- II. Proliferative Diabetic Retinopathy
- III. Diabetic Maculopathy
- IV. Advanced Diabetic Eye Disease

In modern practice management of Diabetic Retinopathy includes metabolic control of hyperglycemia, dyslipidemia, Intravitreal Anti VEGF (Vascular Endothelial Growth Factor) drugs, Intravitreal steroids, Laser therapy and surgical intervention.

Ayurvedic Review of Diabetic Retinopathy

According to its sign and symptoms we can correlate it to *Prameha janya Netra roga* but in Ayurveda there is no direct reference of *Pramehajanya Netraroga* in *Brihatrayi* and *Laghutrayi*, but *Timira* is mentioned as an *updrava* of *Madhumeha* by Pujyapada Muni in his work "*Netra Prakashika*"¹. According to Acharya Vagbhata *Madhumeha* occur due to (i) "*Dhatukshaya*" which results in aggravation of *Vata dosha* (ii) "*Avaranjanya*" in which obstruction of *Vata* pathway is done by *doshas*². Acharya Charaka has mentioned occurrence of "*Akshiamaya*" and "*dhamani roga*" due to excessive intake of *Madhura rasa*³ and in our

classics it is mentioned that *Mandagni* is the root cause of all disease.

Etiopathogenesis

As we know diabetic retinopathy is an end result of a metabolic disorder in which microangiopathy is the main feature so with this scenario in mind we can put forward the etiology from Ayurvedic view as follows:

- I. Madhura rasa Atisevana janya
- II. Dhatukshaya janya
- III. Avarana janya
- IV. Mandagni janya
- V. Raktapitta janya

1. Madhura Rasa Antisana janya

Acharya Charaka has mentioned occurrence of "*Akshiamaya*" due to excessive intake of *Madhura rasa* (sweet), we can correlate it to the microvasculopathy due to chronic hyperglycemia in diabetes. According to Acharya Charaka and Acharya Vagbhata, eye is afraid of *Kapha* and excessive intake of *Madhura rasa* leads to *Kapha dosha vridhi* which results in *srotoavarodha* in eye vasculature giving rise to retinal ischemia and ultimately to neovascularization. As we all know Diabetes is a metabolic disorder which in long run leads to retinopathy and maculopathy and according to Acharya Charaka excessive intake of *Madhura rasa* can cause "*Agnidaurbalya*" and "*Dhamani roga*"⁴ so we can correlate it accordingly to the metabolic and vasculature interference of the disease, as accumulation of sorbitol and Advanced Glycation End Products (AGE) as both are related with increased glucose level which will

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lead to retinal cell damage, endothelial cell damage, loss of pericytes and thickening of basement membrane of capillaries which will lead to abnormal microvasculature changes.

2. Dhatukshaya janya

In Madhumeha loss of *Oja dhatu* occurs which leads to loss of other *dhatu*. As told by Acharyas *Sirashaithilya*, *Dhamanishaithilya*, *Sandhishunyata* and *Timiradarshana* are the major characteristic of *Raktakshaya*, *Mansakshaya*, *medakshaya*⁵ and *majjakshaya*⁶ respectively. *Sirashaithilya* and *Dhamanishaithilya* can be correlated to the abnormal changes occurring in the microvasculature of the retina i.e. capillary leakage, micro aneurysms etc. *Sandhishaithilya* can be compared to loss of capillary pericytes which play an important role in maintaining blood retinal barrier and vessel homeostasis. *Timiradarshana* as told by Acharya Vagbhata is feature of *Majjakshaya* can be correlated with axonal degeneration of retinal nerve fiber layer.

3. Avarana janya

In context of *Vata* the concept of *Avarana* is given in our classics. Here *Raktavrita Vata* and *Pranavrita Vata* will be more relevant. In *Raktavrita Vata* obstruction of circulation occur due to stagnation of *Vata* which results in “*saraga shotha mandalani*”⁷ means reddish patches, which can be correlated with Intraretinal Microvascular Abnormalities (IRMA), splinter hemorrhages and macular edema occurring in diabetic retinopathy.

In *Pranavrita Vyana* obstruction of *Vyana vayu* is done by *Prana vayu*, which act as a controller of all other *vayu* and perception of vision is also its function. *Vyana vayu* does the “*Rasa vikshepana*” i.e. it is responsible for circulation and also for neural conduction. So when the obstruction of *Vyana vayu* occur by *Prana vayu* it will hamper the circulation and visual conduction function. This will result in “*Sarva indriya sunyata*”⁸ or loss of vision because the circulatory dysfunction will lead to microvascular changes in retina like ischemia, neovascularization, IRMA etc.

4. Mandagni janya

“*Roga sarve api mande agnau*”⁹ means *Mandagni* is the cause of manifestation of all diseases. Diabetes is a metabolic disorder and *Agni* (*Jatharagni* and *Dhatavagni*) play a very important role, as *Agnimandhya* will lead to the formation of *Ama* which will lead to *Tridosha* imbalance affecting the body at cellular level. *Ama* formation can be correlated with Reactive Oxygen Species (ROS) formation and due to this excessive oxidative stress cell death/damage will occur in retinal capillaries leading to development of microvasculopathy in retina.

5. Raktapitta janya

Bleeding disorder in which blood vitiated by pitta flows out through orifices is called *Raktapitta*. When bleeding occurs through the seven orifices present in head it comes under *Urdhwa Raktapitta*. When the vitiated *Doshas* confined to the retina it will give rise to the abnormal microvasculature changes. As it is known that

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Raktavaha srotadushti occur in Diabetic Retinopathy along with *Sira abhishyanda* i.e. changes in permeability of capillaries which will lead to characteristic ischemia, hemorrhages, cotton wool spots and neovascularization.

Ayurveda Treatment Protocol

As no direct indication of treatment of diabetic retinopathy is given in classics, treatment protocol is made on the basis of *Samprapti vighatana* or breaking of etiopathogenesis. The ultimate goal of this protocol is preventive, curative, stopping further progression of the disease and strengthening intraocular structures. Firstly it includes the removal of causative factor i.e. *Nidana parivarjana*, internal medication and procedures having properties of *Dipana*, *Pachana*, *Srotoshodhaka*, *Pramehahara*, *Raktapittahara*, *Vataraktahara*, *Medohara*, *Raktavaha srotasdustihara*, *Vatanulomana*, *Rasayana* and *Chakshushya* are used.

Nidana Parivarjana:

As told by Acharya Sushruta “*Sankshepata kriyayogo Nidana parivarjana*”¹⁰. It is first line of treatment of any eye disease. Giving medication without removal of causative factors (faulty diet and lifestyle) is like removing and filling water in a pit at the same time so to get a proper result etiological factors of diabetes should be avoided like sedentary lifestyle, taking too much sugar (*Madhura rasa*) or carbohydrate diet, *Abhishyandi* / heavy to digest food, sleeping in day time etc. Causative factors of *Netra roga* and *Raktapitta* have similarities like

Pittaprapakopakar ahara, *Virudha ahara* so it should be avoided.

Agnimandhya Chikitsa:

Agni plays an important role in metabolism in body both at digestive level (*Jatharagni*) and tissue level (*Dhatawagni*). Weak Agni will not be able to provide adequate *Rasadhatu* resulting in deterioration of further *Dhatu* giving rise to diseases. This can be corrected with *Dipana*, *Pachana* drugs like *Trikatu churna*¹¹, *Chitrakadi vati*¹² etc. Because *Dipana* drugs separate the *Dosha* from *Dhatu* and *Pachana* drugs digest the *Ama* which is essential before *Shodhana*.

Shodhana chikitsa:

To eliminate the *Ama dosha* from body *shodhana* is done, it includes both *Kayavirechana* and *Shirovirechana*. And also in *Raktapitta* “*Pratimarga haranam chikitsa*”¹³ is indicated so in this case of *Urdhwaraktapitta*, *Virechana* will give better result. For elimination of morbid *Dosha* present in *Urdhwajatrugata srotas*, *Shirovirechana* will be done. Before *Virechana*, *Snehapana* can be done with *Triphala ghrita*, *Mahatriphala ghrita* or *Jivantyadi ghrita*. For *Virechana* *eranda taila* can be used as it is a good *Srotoshodhaka* along with *Vatahara* property¹⁴ and it will act upon all *Avaranjanya roga*. *Avipattikara churna* can also be used as it is indicated in *Prameha*. For the people who are not fit for *Virechana*, *Mriduvirechan* can be given. For the purpose of *Shirovirechana* *Anutaila*, *shadbindu taila* etc. can be used.

Shamana Chikitsa:

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Drugs for *Shamana chikitsa* should include properties – *Pramehahara*, *Raktapittahara*, *Medohara*, *Shothahara*, *Srotorodhhara*, *Vatanulomana*, *Rasayana*, *Chakshushya* and should be used according stages of diabetic retinopathy. Such as *Raktastambhaka* and *Ropaka* drugs during PDR stage, *Shothahara* drugs during the stage of Macular edema. *Pramehahar*, *Rasayana* and *Chakshushya* drugs can be used in all stages of diabetic retinopathy. Drugs having anti VEGF and Antioxidant property should be used like Triphala, Guduchi satva, Haridra etc.

Therapeutic procedures:

This includes both the *Kriyakalpa* (local ocular therapeutics) as well as some of *Panchakarma* procedures. The locally administrated drug (*kriyakalpa*) has to pass through corneal barrier, blood aqueous barrier, blood retinal barrier, while *Panchakarma* procedures work on whole body and has to cross the blood retinal barrier. The procedures include *Tarpana*, *Putapaka*, *Seka*, *Aschyotana*, *Takradhara*, *Virechana*, *Nasya* and *Basti*. *Virechana* and *Shirovirechana* has been explained in *Shodhana* therapy.

Tarpana:

The drug can reach the retinal vasculature through ciliary circulation as retinal pigment epithelium is the continuation of non-pigment epithelium of ciliary body. The property of drug used depends upon the stages of diabetic retinopathy. In case of intraretinal hemorrhages drugs having *Raktapitta shamaka*, *Ropaka* and *Rasayana* properties can be used like Patolayadi

ghrita¹⁵, Drakshadi ghrita¹⁶, Jeevantyadi ghrita¹⁷ etc. In PDR stage drugs having Anti VEGF property can be used like Mahatriphala ghrita¹⁸. Doorvadi ghrita¹⁹ can also be used in PDR and NPDR stages as it has *Raktapittashamak* property.

Putapaka:

The nanoparticle and drug ionization property leads to better absorption. In *Pitta*, *Rakta* and *Vrana* condition of eye *Ropana putapaka* is indicated so it can be beneficial in different stages of Diabetic Retinopathy. *Ropana putapaka* is prepared by breast milk, flesh of wild animal or bird, honey, ghee and *Tikta* rasa drugs²⁰ like Vasa.

Seka:

In *Pittaja* and *Raktaja netra roga*, *ropana* type of *Seka* is indicated. It will also do vasodilation of superficial vessels. *Tikta* and *Kashaya* rasa drugs are used along with *Chakshushya* property drugs to combat the intraretinal hemorrhage. For breaking the *Raktapitta* pathology Vasakadi kashaya²¹, Triphaladi kashaya²², Manjishtadi kashaya²³ and Chandanadi kashaya *Pariseka* can be useful. Shabaradi yoga²⁴, Triphalalodhradi yoga²⁵ can also be used

Aschyotana:

The drug should have *Raktapitta shamaka* property, *Raktastambhaka*, *Chakshushya* property like Prapoundarikadi²⁶, Manjishtadi²⁷, Triphaladi²⁸, Doorvadi, Patoladi ghrita can be used in different stages of diabetic retinopathy.

Takradhara:

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In Sahasrayogam it is indicated in debility, strengthening of eyes and inducing sleep. Takradhara works through the pharmacological action of the drugs absorbed subcutaneously and through somato autonomic reflex by thermo sensors or pressure sensors via trigeminal nerve. The drugs used in *siddha Takra* (like Amalaki, Yashtimadhu, Daruharidra, Musta, Lodhra, Vasa, Chandana, Utpala) has property of *Raktapitta shamana* and *Chakshushya*. So it will be very useful in severe NPDR and PDR condition in checking hemorrhages and providing nourishment.

Nasya:

It does the work of *Shodhana*, *Shamana* and strengthening. For *Shodhana* purpose *Shirovirechana* will be done. For *Shamana*, strengthening and prevention of further complication *Nasya* or *Pratimarsha nasya* can be used. For this drug like Durvadi ghrita can be used because of its *Raktapitta shamaka* property and *Dhatu* nourishment.

Basti:

As told by Acharya Parashar Guda is the *Moola* (root) of the body, all *Siras* are located here. So medicine given will act on all parts of the body. *Basti* has both *Shodhana* and *Shamana* property. *Chakshushya basti*²⁹ described by Acharya Vagbhata is a type of *siddha Basti* which includes Madhutailika basti contents (Erandamoola kwatha, Madhu, Taila, Shatapushpa kalka, and Saindhava lavana) and Yashtimadhu kalka. It has property of *Raktapittahara*, *Chakshushya*, *Vatahara*, *Rasayana* and *Ropana* properties. So it

can be used in the NPDR and PDR stages. *Sthiradi niruha basti*³⁰ and *Mustadi yapana basti*³¹ are the other *Chakshushya basti* which can be used. *Mahavasadikwatha*, *Vasadikwath* can also be used.

DISCUSSION

In Diabetic retinopathy we can find all the four attribute of *Srotovaigunya* which includes *Atipravritti*, *Sanga*, *Siragranthi* and *Vimargagamana*. In diabetic retinopathy condition *Sanga* can be correlated to occlusion of retinal vessels, *Siragranthi* is the development of micro aneurysm, *Vimargagamana* can be correlated to the retinal hemorrhages and *Atipravritti* is the neovascularization. So in order to break this pathology *Srotorodhhar chikitsa* is must along with *Agnimandhya chikitsa*, *Pramehahar chikitsa*, *Avarana chikitsa* in combatting *Sanga*, while in *Siragranthi* strengthening of vascular structure is needed which can be done with the help of *Chakshushya* and *Rasayana* drugs. In *Atipravritti* and *Vimargagamana* stages *Raktapittahara chikitsa*, *Vataraktahara chikitsa* and *Ropana chikitsa* should be done. Drugs having anti VEGF, antioxidant property should be preferred. In the management of diabetic retinopathy we should not forget *Nidanaparivarjana*.

CONCLUSION

Diabetic retinopathy is the result of chronic hyperglycemia and keeping its progressive nature in mind treatment should be both curative and

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preventive. After proper analysis of intraocular signs with the help of funduscopy examination, fundus fluorescein angiography (FFA), OCT etc. Treatment should be given on the basis of *Dosha* predominance, type of *Srotodushti* and stage of the disease. Based on the above description it can be concluded that diabetes mellitus occur due to *Madhura rasa atisevana*, *Dhatukshaya*, *Agnimandhya*, *Avarana janya* and *Raktapitta janya*. Treatment should be given with keeping this in mind. Ayurveda approach in treatment of diabetes mellitus can have an upper hand if treatment is given with necessary *Kriyakalpa* and *Panchakarma* procedure along with healthy diet and lifestyle.

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