

A Review on Prevention of Diabetic Retinopathy and Ayurveda

Harshada Patwardhan*¹, Manisha Pingale², Chandana Virkar³

1. PG (scholar)
2. MS (Shalya), Guide
3. MS (Shalakyatantra), HOD

Shalaky Tantra Netra Rog Department,
Institute-College of Ayurveda and Research centre, Pune, Maharashtra, India

*Corresponding Author: harshada.patwardhan123@gmail.com; Ph.- 9405842452

ABSTRACT:

Diabetic Retinopathy (DR) is a chronic progressive, potentially sight threatening disease of retinal microvasculature associated with prolonged hyperglycemia. The risk of development of blindness in diabetics increases by 20-25times as compared to the normal population have great concerns which leads to find out preventive measures in Ayurveda.

Currently available conventional options for diabetic retinopathy have certain limitations. Ayurveda, the traditional system of Indian subcontinent hold huge number of remedies that can be useful in the treatment of diabetes and preventing associated complications like diabetic retinopathy. Prevention is all about correcting and preventing the etiopathological mechanism (Samprapti vighatana). So as per etiopathological mechanisms described, the first and foremost care should be given to prevent madhumeha. The prevention of diabetic retinopathy revolves around treating the causes of madhumeha, management of *Urdwaga Raktapitta*, prevention of dhatu kshaya including oja kshaya and

prevention of *Agnimandya* in general. Ayurvedic therapies like *Pancha Karma* (purification/cleansing procedures), *Shamana* (pacifying medicinal treatment) and *Netra Kriya Kalpa, Rasayana* in DR were found to be significantly effective.

Keywords: Diabetic retinopathy, Ayurveda, *Urdwaga Raktapitta*, *Agnimandya*

INTRODUCTION:

Diabetes mellitus has in recent times, gained importance as one of the most common, non communicable disease, which contributes to death and disability worldwide. Diabetes affects almost all aspects of intermediary metabolism and is also associated with accelerated aging of the cardiovascular system. Hence diabetes is best defined as a metabolic cum vascular syndrome of multiple etiologies characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both, leading to changes in both small blood vessels (microangiopathy) and large blood

vessels (macroangiopathy) and which is often associated with long term damage, leading to malfunction and failure of various organs like eyes, kidneys, heart, nerves and blood vessels.

Diabetic Retinopathy is one of the major complications of diabetes mellitus. It is a leading cause of blindness in developed as well as developing countries. According to VISION 2020 (Working together to eliminate avoidable blindness) up to 80% of the world's blindness is avoidable. Avoidable blindness is defined as blindness which can be either treated or prevented by known, cost-effective means. Although there are many other causes of vision impairment, VISION 2020 seeks to address the main causes of avoidable blindness, in order to have the greatest possible impact on vision loss worldwide. Diabetic retinopathy is one among the target diseases for VISION 2020. The prevalence of DR, proliferative diabetic retinopathy (PDR), diabetic macular edema (DME), and VTDR (Vision threatening Diabetic retinopathy) among individuals with diabetes is 34.6%, 7.0%, 6.8%, and 10.2%, respectively. Estimate shows that the number of people with DR will grow from 126.6 million in 2011 to 191.0 million by 2030, and the number of people with VTDR will increase from 37.3 million to 56.3 million, if no urgent action is taken. Though there are no direct references are available regarding Madhumeha/Prameha janya Timir, enough evidences are available in all leading treaties of Ayurveda, which substantiate that Timir can be a complication of Madhumeha. In this review study many aspects of basic concepts of Ayurveda were analyzed to

find out the probable etiology and pathogenesis of Diabetic retinopathy with probable correlation of different stages of the disease with different types of Timir described in Ayurvedic literature. The risk of development of blindness in diabetics increases by 20-25 times as compared to the normal population have great concerns which leads to find out preventive measures in Ayurveda.

2. Etiopathogenesis of Diabetic Retinopathy according to ayurvedic literature.

2.1 Agnimandhya:

Agnimandya at the gastric level (*Jatharagni*) and at the tissue level

(*Dhatwagnimandya*) is well established in Prameha and Madhumeha in Ayurveda.

Dhatwagnimandya leads to accumulation of Ama at the tissue level. This can be correlated

with generation of reactive oxygen species (ROS), activation of polyol pathway and

accumulation of Advanced Glycation End products (AGEs), which are the main pathways of

development of retinopathy in diabetics.

2.2 Urdhavag Raktapitta :

Diabetic retinopathy basically a *Dristipatalagata roga* is mainly

attributed to *Sira srotasabhisyandam* and *raktavaha sroto dusti* due to a variety of *Achakshyushya ahara* and *vihara karanas* especially in Prameha patients. Nidana of endogenic eye diseases are mainly *Achakshyushya* factors which vitiates Pitta. The vitiated Pitta in turn

vitiates the *Pitta vaha srothas*. Due to interconnection of *Pitta* and *Rakta*, which shares *Ashrya Ashrayee bhava*, the *raktavaha srotas* is also gets vitiated due to *Pitta* vitiation. As the nidana factors are *Achakshyushya*, the vitiated *pitta* and *rakta* have an affinity towards penetrating the eyes. Hence the vitiated dosha move towards the eyes through *Jatroordhwa srotas* and finally gets confined to the eyes, there is a stage when the *Sirasrothas* are deeply involved which is known as *Sira abhisyanda*. The whole pathology of diabetic retinopathy which starts with *sroto dusti* of *Raktavaha srotas* manifested as microangiopathy in the form of *Attipravriti*, *Sanga* and *Granthi* as haemorrhages, exudates and venous beading in diabetic retinopathy respectively. All these factors altogether promote prominent changes in the vessels of *Dristipatalm*. The texture of the vessels is damaged and hence the permeability increases. This results in leakage and hemorrhages from the blood vessels. The blood oozes out like sweat. This again correlates with pathogenesis of *Raktapitta*, specially quoted by Charaka. Due to lack of circulation there is localized hypoxia which results in development of new vessels. As these vessels are fragile they bleed easily. Exudates formation, neovascularization and proliferation of the tissues which leads to degenerative changes in the retina. In this context *Urdhwaga Raktapitta* can be correlated with Diabetic Retinopathy, as the seat of *Urdhwag Raktapitta* are all the seven natural opening of the head.

2.3 Dhatu kshaya : *Sirasaithilya* is one of the major signs of *raktakshayaas* per Sushruta. Loss of pericytes and formation of microaneurysms are earliest

signs of Diabetic Retinopathy. First *Patala* consists of *rasa* and *rakta dhatu*, so manifestation of the disease is in the form of microaneurysms and less severe in nature, which are very similar to background Diabetic retinopathy or mild NPDR and symptoms of 1st *Patalagata Timir* appears in this stage.

Dhamanisaithilya is one of the features of *mamsakshaya*. This can be correlated with endothelial cell loss due to improper apoptosis and loss of capillaries, leads to early break down of blood retinal barriers and signs like dot/blot or flame shape hemorrhages appear in this stage. As 2nd *patala* consists of *sookshma rupi mamsa dhatu*, symptoms of 2nd *patalagata timir* seen in this stage.

Sandhishunyata is another feature of *medakshaya*, which may be correlated with junctional cell protein loss or cell adhesion defects and break down of BRB. Appearances of macular edema and exudates formation are prominent signs in this stage. 3rd *patala* consists of *Meda dhatu* and when *dhatu kshaya* reaches the 3rd *patala* symptoms of 3rd *patalagata timir* appears.

Timiradarshana is one of the symptoms of *majjakshaya* and thus leads to *Vata kshaya*. Depletion of marrow tissue leads to decrease in blood cells formation and results in hypoxic condition of retinal neurons. Axonal degeneration of retinal nerve fibers occur due to *Vata kshaya* which may be correlated with hypoxia and this hypoxic axonal degeneration leads to formation of cotton wool spots or soft exudates in severe NPDR stages of Diabetic retina.

2.4 Ojakshyaya : Madhumeha is also known as *Ojameha*. The vitiated dosha obstructed the path of *vata* and *vata*

carried the *Ojas* to the *basti* and causes *madhumeha*. According to *Chakrapani* *apara Oja kshaya* occurs in *madhumeha* and the seat of *Apara Oja* are ten *Mahamula dhamanis*. Loss of *Oja* leads to loss of *dhamanis* as per *ashrayaashrayeesambandha*. This can be correlated with loss of capillaries and thus due to *Ojakshyaya* abnormal apoptosis can enhance, leads to loss of capillaries and basement membrane thickening.

3. Preventive measures according Samprapti (Etiopathogenesis)

(Samprapti vighatana). So as per etiopathological mechanisms described, the first and foremost care should be given to prevent *madhumeha*. The prevention of diabetic retinopathy revolves around treating the causes of *madhumeha*, management of *Urdwaga Raktapitta*, prevention of *dhatu kshaya* including *oja kshaya* and prevention of *Agnimandya* in general.

3.1 Agnimandya Prevention : Agnimandya at tissue level is called *Dhatwagnimandya*. With proper *dipana -pachana* drugs, like *Trikatu churna* *Jatharagni* as well as *Dhatwagni* can be corrected as per individual requirement.

Sodhan chikitsa : Initially, detoxification of the body is important part of all the Ayurvedic therapies. so as to clear the channels and stop the perfusion. Along with this step diabetes should be in control. Due to *dhatwagnimandya*, accumulation of impurities occurs at the *srotas/capillary* level. For this *Virechan* can be advocated. *Nasya* with oil prepared from *chakshyusya* drugs should be done for *urdhwajatrugata. srotas sodhan*.

Urdwa jatrugata: Vata anad pitta shaman -Nasya, Shirodhara, Shirolepa and Shiropichu treatments. (Vata shaman treatment for head and body, and pitta Shaman treatment for eyes).

3.2 Dhatu kshaya prevention:

Vata (vascular changes)-
Paritarapan (nourishing therapy)
Santarpan chikitsa.

Virechan and *Basti* with *chakshyushya* drugs. *Shothahar* treatment + *Basti* treatment

(to prevent retinal/macular edema).
Madutailika Chakshyusya Basti (beneficial in *Rakapitta* as well as *chakshyusya* in nature).

3.3 Raktapitta preventives:

Raktapittahari kriya aahar, virechan, Upavasa (fasting) all the procedures should be advised in case of different stages of *Madhumehajanya timir*.

3.4 Kriyakalpa:

1.TARPAN: Patoladi ghrita, Jivantyadi ghrita Drakshyadi ghrita, Doorvadya ghrita. Mahatriphala Ghrita. In Dhatukshyajanya pathology Jivantyadi Grita Tarpana is useful. Raktavritta Vata janya cases Patoladi ghrita Tarpana is useful.

2.PUTAPAKA : Ropana type of putapaka is indicated in Pitta, Rakta, Vrana conditions of eye. Breast milk, meat of animals of *Jangala* origin, honey, ghee and Tikta rasa herbal drugs are used for Ropana Putapaka.

3. ASCHYOTANA : Triphaladi ghrita, Doorvadi ghrita and Patoladi ghrita can be used in the dose of 3-4 drop. Triphaladi, Prapoundarikadi and

Manjisthadi Aschyotana can be used in initial stages of NPDR cases.

4. PARISEKA : Pariseka with drugs having Tikta Kashaya Rasa and Chakshyusya properties helps in healing intra retinal blood vessels.

5.ANJANA : Ropana and Dristiprasadana type of Anjanas might be helpful in treating and preventing DR pathogenesis in pakwavastha like Sarivadyanjana andrakshyadi varti anjana.

3.5 Rasayan: All the palliative and preventive Rasayan drugs are useful for the prevention. Especially Shilajatu Guggulu, Chyavanprash and Brahma rasayan are mostly helpful. These Rasayan drugs are also useful in diabetic retinopathy cases, as oxidative stress theory is well established in pathology of Diabetic Retinopathy and *Ama* theory in madhumeha too has role in development of Diabetic Retinopathy.

3.6 Systemic drugs for preventon: Depending on the strength of the patient and stages of disease Triphaladi churna, Triphaladi kwatha, Chandraprabhavati, Mahavasadi kwatha, Vasakadi kwatha can be advised.

4. DISCUSSION AND CONCLUSION:

Diabetic retinopathy is a disease of *Dristipatala* (retina) and complication of long standing uncontrolled diabetes due to defective metabolism and endocrine dysfunction. All the three *doshas* are affected with *rakta* (as both *dosha* and *dushya*), mainly *vata*, *pitta*, *rakta* and *kapha anubandha*. All the dhatus are affected with *rakta*, *meda* and *mamsa* predominant, *sira srotas* of *raktavaha srotas* and *Ojavaha dhamani* gets affected in successive

stages. Agnimandya and *Ama* formation, *raktapitta* and *dhatu kshaya* are few aspectsof pathogenesis . Breaking the link of pathogenesis along with the rasayan ,chakshushya dravya *santarpana* can prevent the development of Diabetic retinopathy.

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