

## AYURVEDIC ADAPTATION TO DIABETIC RETINOPATHY

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## ABSTRACT

Eye is unique structure of the body and its anatomical and physiological frame work is said to be unique. Every organism has adaptation capacity to lead life on earth. Due to modern life style, number of diseases increasing day by day. Diabetic Retinopathy is an ocular manifestation of the systemic disease and sight-threatening disease. The treatment of modern system of medicine, focal laser therapy, anti-vascular growth factor drugs. These treatment modalities have side effects. The aim of this conceptual study to manage the diabetic retinopathy or *Prameha janya Netra Rogas* by means of Ayurvedic adaptation like *Shodhana*, *Shamana* and *Sthanika Netra Chikitsa* and to reduce the further complications of diabetic retinopathy.

**KEYWORDS:** Diabetes retinopathy, *Prameha janya Netra Rogas*, Ayurvedic adaptation, *Sthanika Netra Chikitsa*.

## INTRODUCTION

Every living organism has unique features in its anatomical and physiological framework so that it can sustain to a large extent from the challenges of external hazards. Being the most developed link in the revolutionary chain human have best possible defense mechanism and adaptation power against many number of external challenges. The body tissues and muscles are developed in such a way that it can resist to a wide range of physical and mental conflicts. But the modern era, its development, new life style all made a drastic change in the normal well-being of human life and he is becoming more prone to the external hazards day by day. This in turn led to a tranquil life style with less usage of naturally available sources and activities. The sedentary life style and activities with stress and strain made the human prone to many life style disorders including diabetic mellitus.

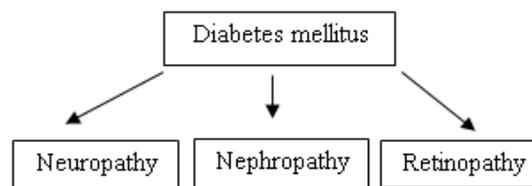
## Aims and Objectives

Aim of the present study is to undertake a conceptual study on the managing aspects of *Prameha janya Netra Rogas* or diabetic retinopathy. Objective is to treat by *Shodhana*, *Shamana* and *Sthanika Netra Chikitsa* and to reduce the further complications of diabetic retinopathy.

## Diabetes mellitus

Diabetes is a widely prevalent disease in the current era. It is a heterogeneous condition with number of

symptoms and complications. It can be defined as a metabolic disorder caused due to the combination of environmental or hereditary factors resulting in abnormally high blood sugar level. Diabetes mellitus 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. Many complications can occur if it is not treated or controlled accordingly, (hypoglycemia, ketoacidosis etc.) long term complications include chronic renal failure, cardiovascular damages, nerve damages, micro vascular damages which may also cause poor wound healing. Poor healing of wound particularly of the lower extremities can lead to gangrene and possibly to amputation. Out of these complications above discussed, Diabetic retinopathy is most difficult to manage and disabling as it affects the vision of the patient.



Ayurvedic descriptions about *Prameha* shows very much resemblance with that of diabetic mellitus both in aetiopathogenesis and management aspects. Ayurvedic science has grouped *Prameha* under *mahagadas* as it is

clearly told that *Krichasadhya* or *Yapya*. The basic causative factor for *Prameha* includes both *Beejadusti*<sup>[1]</sup> and *Mithya Ahara-Vihara*. For diabetic mellitus, the terminology *Madhumeha* is more suitable. *Madhumeha* has got two different types of pathogenesis; the concept of *Avarana* and *Dhatu kshaya* can be adopted. *Prameha* usually predominant with *Kapha Dosha*, by the passage of time other *Doshas* will also get predominant. Moreover a good number of *Dushyas*<sup>[2]</sup> also involving in the *Samprapti* of *Prameha*, making it as *Krichrasadhya*. The complications of *Prameha* is considered mainly due to the presence of *Kleda* in *Rakta* and in *Raktavaha Srothas*. The *Kleda* when combines with all the *Tridoshas* will initiate different *Vikritis* in all the *Trimarmas*, namely *Shiras-Nabhi-Vasti* which may be seriously affected if the condition of *Prameha* is not properly treated in time. Increased risk of ocularmicrovasculopathy, coronary artery disease and diabetic nephropathy supports that view.

In *Shiras*, it usually affects *Netra Indriya* leading to wide range of complications that even leads to blindness. Some of the major ocular complication of diabetic mellitus includes diabetic retinopathy, cataract, diabetic maculopathy, diabetic papillopathy and various type of refractive errors. This paper is highlighting on the Ayurvedic approach of diabetic retinopathy.

### Incidence

Diabetic retinopathy (DR) is predominantly a microangiopathy in which small blood vessels are particularly vulnerable to damage from hyperglycemia. DR is an ocular manifestation of the systemic disease which affects more than 70% of the patients having DR for 10 years or more. It is more common in type 1 diabetes than in type 2 and sight-threatening disease is present in up to 10%. Proliferative diabetic retinopathy (PDR) affects 5–10% of the diabetic population; type 1 diabetics are at particular risk with an incidence of about 60% after 30 years.

### Diabetic Retinopathy

Diabetic Retinopathy has been variously classified. Presently followed classification is as follows<sup>[3]</sup>:

#### 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

Diabetic Retinopathy is a microangiopathy which affects the retinal precapillary arterioles, capillaries and venules. This microangiopathy causes:

- (1) Microvascular leakage
- (2) Microvascular occlusion.

### 1. Microvascular leakage

Normally capillaries are lined by single layer of endothelial cells and basement membrane. But in retinal capillaries, they are also lined by Pericytes. These pericytes are responsible for structural integrity of vessel wall. These pericytes are specifically lost early in diabetic retinopathy. 4, 5 Physical weakening of capillary walls due to loss of pericyte result in localized saccular outpouching of vessel wall, termed microaneurysm. It appear as a small red spot. Some of the thin walled microaneurysms and fragile retinal capillaries may rupture and cause retinal haemorrhages, results in deep haemorrhages (dot and blot haemorrhages) and superficial haemorrhages (flame shaped). In addition there is breakdown of blood retinal barrier due to many factors, especially as a result of opening of tight junction between adjacent microvascular endothelial cell processes. Breakdown of blood retinal barrier causes leakage of plasma constituents in the retina and form hard exudates and retinal oedema. Hard exudates are deposits of plasma proteins and lipids. All the lesions often occur more near macula and optic disc.<sup>[4]</sup>

### 2. Microvascular occlusion

Due to prolonged diabetes mellitus there occurs thickening of capillary basement membrane, capillary endothelial cell damage and proliferation, changes in R.B.C's (i.e elasticity of R.B.C reduced) and increased stickiness and aggregation of platelets. All together leads to microvascular occlusion which in turn lead to retinal hypoxia, results in retinal ischaemia, which initially develops in the mid retinal periphery. Appearance of ischaemic areas due to occlusion of capillaries may manifest as "cotton wool spots" or soft exudates. These are microinfarct of nerve fibre layer of retina. Venous dilation, beading and looping of the veins occurs secondary to Ischaemia.<sup>[5]</sup>

The two main effects of retinal hypoxia are 1) Arteriovenous shunts 2) Neovascularisation. All these occur in an attempt to revascularise the hypoxic areas of retina. Formation of arteriovenous shunts from arterioles to venules associated with significant capillary occlusion are referred as intraretinal microvascular abnormalities (IRMA). Retinal hypoxia leads to release of vasoproliferative substance such as vascular endothelial growth factor (VEGF). It results in development of neovascularisation i.e. proliferation of new vessels from the capillaries in the form of neovascularisation at the optic disc (NVD) or elsewhere (NVE)<sup>[6]</sup> in the fundus along the course of major temporal retinal vessel and occasionally on the iris (rubeosis iridis) and angle of anterior chamber (neovascular glaucoma). This neovascular tissue is more fragile, bleed easily and incites a fibroblastic response. These new vessels may proliferate in the plane of retina or spread into the vitreous as vascular fronds. Later on condensation of connective tissue around the new vessels results in formation of fibrovascular epiretinal membrane. Vitreous detachment and vitreous haemorrhage may

occur in this stage. Later fibrovascular and gliotic tissue contracts to cause retinal detachment and blindness.

### Treatment

Medical treatment of diabetic retinopathy is aimed at prevention of retinopathy. Tight glycaemic control is associated with reduction in the development of retinopathy. Good metabolic control and proper management of hypertension or other associated conditions prevent the progression of diabetic retinopathy. No treatment is required for background diabetic retinopathy with normal visual acuity except periodic annual examination. The only ocular treatment available for macular diabetic retinopathy and proliferative diabetic retinopathy is photocoagulation. Satisfactory treatment is yet not available.

### Prameha janya netra roga

In the context of *Shalakya Tantra* there is no direct reference is told by detailing about the diabetic retinopathy or for *Pramehaja Netra Rogas*, though there are credible references about affections of *Pramehain* sense organs. It is also told clearly that those *Indreeya Dourbalyatha* will occur by the progress of disease. In *Prameha* the major *Sampraptighataka* is *Kleda* which contributes much to the *Upadrava Rogas*. It has been mentioned in classics “*Hrinnetra jihwa sravanopadeha*<sup>[7]</sup>” which gives direct clue regarding the involvement of vital organs like eye in *Prameha Samprapti*. It can be understood that any alterations in the mechanism of *Dhatu Parinamakriya* (metabolism) can lead to combinations of various symptoms. The *Poshaka Dhatus* (nutrients) for *Dhatuparinama Kriya* is supplied by *Rasa-Rakta Dhatus* through various *Srotas* to various organs of the body. The *Dhatus* undergo *Upapachaya Pravarthanas* through *Brahmana-Langhana Kriyas*. Any disruptions in any of the mentioned steps will alter the homeostatic balance of the whole *Parinama Kriya*. It finally leads to *Vaigunya* of the *Rasa-Rakta Dhatus* and its functions. The vitiated *Doshas* will get *Sthana Samsraya* in *Netra* and will lead to various pathological processes and the pathology can be given name as *Pramehajanya Netra Vyadhi* or diabetic retinopathy.

*Netra* is *Tejo Mahabhoota Pradhana* with definitely *Pitta Pradhana*. Any organ with *Pitta* origin if it is get *Avrutha* by *Kapha Dosh* will lead to *Srotoavarodha*. If we deeply analyse the pathogenesis of NPDR and PDR we can clearly see the involvement of all type of *Sroto Dusti* i.e., *Atipravrutthi*, *Sanga*, *Siragranthi*, *Vimarga Gamanam*. Retinal vessel occlusion to *Sanga*, development of aneurysms can be correlated to *Siragranthi*, retinal hemorrhage to *Vimarga Gama* and neo vascularization to *Ati Pravrutthi*. Each of these *Srothodustis* are present in various stages of retinopathy. *Sopha Samprapti* can also give special attention over here.

### Classification

#### On the basis of involved Doshas

*Kapha-pitta Pradhana*

*Vata-pitta Pradhana*

#### On the basis of samprapti<sup>[8]</sup>

*Kapha-Avaranavasta* - Simple background retinopathy

*Raktapitta Prakopavasta* - Diabetic maculopathy

*Urdwaga Raktapittavasta* - Pre-proliferative Diabetic retinopathy

*Vataja Linganasham* - Proliferative Diabetic retinopathy

*Kapha-Avaranavasta -Kapha Dosh* in *Dravavasta* produces *Srothodusti* in the eye and leads to *Dhatwagni Vaigunya*. The *Raktadhatwagni Vaigunya* leads to *Rakta Srothovaha Vaigunya* and cause deposition of *Samakapha* in the minute channels. The result is *Khavaigunya* of the *Srothas*.

*Rakta-pitta Prakopavasta- Pitta* and *Rakta* are *Ashrayashrayibhavas*. The already existing *Rakta Dusti* in the eye causes *Pitta Prakopa*. Mild presence of *Pittakopa*, *Rakta Prakopa* and *Srothorodha* in the *Raktavaha Srothas* and malfunctioning of *Vyana* and *Prana Vayu* lead to the destruction of the micro vessels (*Lomika*) and consequent dilation.

*Urdwaga Raktapittavasta* - It is a state of hemorrhage formation. Here *Rakta* and *Pitta* which are already in a vitiated form, the sites where the vessels are already dilated, due to *Atipravrutthi* of *Doshas*, *Rakta Srava* (hemorrhage) from some points of dilation.

*Vataja Linganasham* -In this stage there will be a marked occlusion in the end arteries of the retina. It is due to *Avarodha* of the *Pranavayu*. This leads to hypoxia of the 4<sup>th</sup> *Patala* (retina) which is made up of *Nadis*. The result is the infarction in the retinal layer. This leads to various structural transformation in the retina leading to the formation of *Vijatheeya Lomikas* (neo vascularization). These *Vijatheeya Lomikas* structurally and functionally abnormal and undergo easily rupture leading to *Rakta Srava* (hemorrhage). Due to chronicity *Srava* may be extended to 3<sup>rd</sup> *Patala Pradesha*; vitreous and thus formed vitreous hemorrhage.

### Treatment

The treatment mentioned in *Prameha*, *Raktapitta*, *Kaphaja Timira*, *Abhishyanda* can be ayurvedic adaptation as the treatment modality for the different condition of DR. *Samanya Netra Roga Prathishedha* along with *Kaya Shodana* and *Shamana Chikitsa* can be adopted for the management of DR.

### Shodhana therapy

*Kaya Shodana* should be done for eliminating the *Amadosha* from the *Shareera*. *Snehapana* with *Triphala Gritha*, *Maha Triphala Gritha* followed by *Virechana* (depending upon *Doshavastha*).

**Shamana therapy**

Shamana can be given for those who are not fit for undergoing Shodana therapy. Shamana Oushadi should be Pramehahara as well as Chakshushya in action. Ropana, Sthambana, Sheeta drugs can be preferred. Triphala formulation is a better drug of choice in all conditions and stages of DR. In Kapha-Avarana Avastha drugs like Lajjalu, Khadira, Bilwa, Haridra, Ashwagandha give a better result. In stage of Rakta-Pitta, Vasa, Lodhra, Musali, Yashti, Manjista, Sariva, Chandana drugs can give a better result. Pratimarsha Nasya can be with Anu Taila and Shadbindu Taila. Saptamritha Loha, Asanadi Gana Kashaya, Sameera Panchaka Kashaya, Guduchyadi Kashaya.

**Stahnika netra chikitsa**

In Sthanika Chikitsa, Kriya Kalpa procedures can be adopted like Seka, Ascotana, Tarpana and Shirotalam. Seka can be given with Vasa, Amalaki, Lodhra, Yashti Kashayas etc drugs. Aschotana with Triphala Ghrita, Maha Triphala Gritha etc. Tarpana with Triphala Ghrita, Maha Triphala Ghrita, Jeevanthyadi Gritham etc. Shirotalam with Vasa Churna, Yashti Churna, Amalaki Churna, Lodhra Churna etc can be adopted according to the stage of Vyadhi.

**Ayurvedic adaptation for Life style**

Along with these treatment, if person follows:

**1 Dinacharya<sup>[9]</sup> and Ritucharya-** getting up in “Brahmi Muhurta” sets the biological clock properly and this is the equilibrium of the *Doshas* to work in the right way.

- Appropriate habit of diet ,exercise, meditation and life style which helps to maintain control the blood sugar level
- Practicing *Sirobhyanga* (head massage), *Anjana*, *Padabhyanga*( foot massage), *Pratimarsha Nasya* , *Pada Trana Dharana* (footwear) and *Chatra Dharana* (umbrella) will help in maintaining the health of eye.
- Adopt suitable measure according to *Ritu* and *Dosha* like avoiding day sleep except in summer season.

**2 Achara Rasayana Sevana**

- Following the ethical regimen and eight codes of conduct provides peace of mind and balance.

**CONCLUSION**

*Prameha janya Netra Roga* or diabetic retinopathy can be controlled or aggravated according to one's life style and control over blood sugar levels. It is the leading cause of blindness in elderly subjects. As no satisfactory treatment is available for diabetic retinopathy, new approaches are needed to slow the progression and limit the damage caused by this disease. Ayurveda provides a better management for diabetic retinopathy compared to modern medicine. Ayurvedic treatment helps to manage blood sugar levels and the same time *Chakshushya* in

nature helps to maintain the vision which deteriorates according to the stages of diabetic retinopathy. Changes in life style, diet habit, exercise, meditation and following daily regimen and ethical regimen plays important role.

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