

CONCEPTUAL ANALYSIS OF DIABETIC RETINOPATHY IN AYURVEDA AND ITS MANAGEMENT

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ABSTRACT

Inclusion of *Prameha* among the eight major disorders in *Charaka Samhita* shows the importance of the disease given by ancient seers. The present study endeavors to discuss the similarities and differences among the various components of *Madhumehajanya Timir* with Diabetic retinopathy and its stages. All the three *doshas* along with *Raktadosha* and *Saptadhatu* with four internal *Dristipatals* of eye are affected in *Madhumehajanya timir* in different stages of the disease. *Avarana* and *Dhatukshaya* too have important role in development of diabetic retinopathy due to prolonged and uncontrolled hyperglycemia. *Agnimandya* related *Ama* formation has a role in pathology of diabetic retinopathy which is quite similar to oxidative theory of diabetic

retinopathy explained in modern pathology. *Urdhwaga raktapitta*, *Ojas kshaya*, *Raktavritta vata* and *Pranavritta vyana* are other causes in development of diabetic retinopathy. Diabetic retinopathy is most common and serious complication of Diabetes and changes in the retina are observed by 10 years of Diabetes history or even earlier due to modified lifestyle in present era. This disease results in generalized macro and micro vascular complications linked to glycemic control and affect these resulting in poor vision or even blindness.

KEYWORDS: Diabetic retinopathy, *Timir*, *Avarana*, *Amadosha*, *Raktapitta*.

INTRODUCTION

Though, the direct references of Diabetic retinopathy are not available in the classical texts, *Acharya Sushrut* has mentioned *Timir Vyadhi* in *Madhumeha Chikitsa Adhyay*. From this

reference, it is clear that *Ayurvedic* intellects were very well aware of the ophthalmic complications of *Prameha* at 3000 years ago also. *Timir Rog* which is described as the complication of *Madhumeha* has been described by *Acharya Sushrut*. Vitiating of *Tritiya (Medashrit) Patal* and *Chaturtha Patal (Asthyashrit)* plays a centralized role in the pathogenesis of the disease. *Drishtimandya* (impairment of vision), *Timirdarshan* (darkness before eyes) and *Netrasrav* (discharge from eyes) are the characteristic features. *Meda Dhatu* plays a vital role in the constitution of *Tritiya* and *Chaturtha Patal*. The relation of *Meda Dhatu* with *Prameha* is also well explained by *Ayurvedic* scholars by using the terms *Dravatwa* and *Abaddhatwa* to show gross vitiation of *Meda Dhatu* in *Prameha*. Diabetes is a group of metabolic diseases. In recent time, this is a major health problem. Diabetic retinopathy also known as diabetic eye disease is a medical condition in which damage occurs to the retina due to diabetes mellitus and is a leading cause of blindness.^[1] In diabetic retinopathy the blood vessels of retina and vitreous become weak and fragile resulting in leakage inside retina and vitreous. It is divided in three clinical stages.

1. Background diabetic retinopathy
2. Non proliferative diabetic retinopathy
3. Proliferative diabetic retinopathy.

Causes

Diabetic retinopathy is seen in almost every patient of uncontrolled blood sugar levels for a longer duration. The changes in the blood vessels are sometimes also seen in those with good control of blood sugar levels.

Symptoms

- Seeing floaters and black spots
- Progressive loss of vision
- Photophobia
- Pain in eyes
- Watering and dryness of eyes
- Sharp loss of vision can also occur in acute stages
- Difficulty in color recognition.

Diabetic nephropathy, the impact of diabetes on the kidneys, can lead to harmful changes in the kidney tissue and eventually chronic kidney disease requiring dialysis. Diabetic

neuropathy is the impact of diabetes on the nervous system, most commonly causing numbness, tingling and pain in the feet and also increasing the risk of skin damage due to altered sensation. Together with vascular disease in the legs, neuropathy contributes to the risk of diabetes related foot problems that can be difficult to treat and occasionally require amputation. Concept of Diabetic Retinopathy is highlighted in this research article.

Prevalence rate

The risk of development of blindness in diabetics increases by 20-25 times as compared to the normal population. High prevalence rate of Diabetic retinopathy (34.6%), proliferative diabetic retinopathy (7%), diabetic macular edema (6.8%), and vision threatening diabetic retinopathy (10.2%) in diabetics was great concerns which led to search and analyze the disease process on the basis of modern pathogenesis and different *Timirvyadhi* mentioned in *ayurvedic* authoritative texts.^[2] According to WHO, 31.7 million people were affected by diabetes mellitus in India in the year 2000. This figure is estimated to rise to 79.4 million by 2030, the largest number in any nation in the world. Almost two-third of all Type 2 and almost all Type 1 diabetics are expected to develop diabetic retinopathy over a period of time.^[3]

AIMS AND OBJECTIVES

1. To understand the similarities and differences among the various components of *Madhumehajanya Timir* with Diabetic retinopathy.
2. To understand the role of *Ayurveda* in management of diabetic retinopathy.

Constituents of Netra

According to *Ashtang Samgraha*, the constituents of *Netra* are *Kapha*, *Raktavaha srotas* and *Pancha Mahabhuta*.^[4]

Pancha Mahabhuta constituents of *Netra* as per *Sushruta*.^[5]

Predominance of *TejaMahabhuta*

- *Mamsa* - *Pruthvi*(muscles of the eye ball)
- *Rakta* - *Agni*(blood in the vessels)
- *Krushna part* - *Vayu*
- *Shweta part* - *Aapa*
- *Ashrumarga* - *Aakasha*(lacrimal duct, cavity in capillary)

Acharya Vagbhata described the constituents of *Netra*^[6] as follows

- *Suklamandal* (white portion) –*Shlesma* (paternal in origin)
- *Krushnamandal* (black portion)- *Rakta* (maternal in origin)
- *Drushtimandal* (middle portion) –both paternal and maternal in origin

Anatomy of the eye in *Ayurveda*

- *Peshi*^[7] -2
- *Sira*^[8]- *Vatavaha*, *Raktavaha*, *Kaphavaha*(8 each), *Pittavaha*(10 each)
- *Dhamani*^[9] - 2 (*Roopgrahana*)
- *Srotasa*^[10] - 2 (*BahyaSrotas*)

Description of *Prameha*

According to available literature of *Prameha*, it can be correlated with Diabetes mellitus. *Dosh- Dushya* combination in *Vyadhi samprapti*(patho-physiology) of *Prameha*^[11], is as follows-

- *Dosha* - *Kapha* (predominance), *Vata+Pitta+Kapha*.
- *Dushya-Meda*(predominance),
Meda+Rakta+Shukra+Jala+Vasa+Lasika+Majja+Rasa+Oja+Mamsa.

According to *Acharya Charaka* and *Vagbhata*, eye is afraid of *Kapha dosha*.^[12]

Vascular and Hematological Changes seen in Diabetes mellitus

Diabetic Retinopathy is micro angiopathy affecting retinal pre capillary, arterioles, capillaries and venules.

- Thickening of capillary basement membrane
- Capillary endothelial cell damage
- Changes in RBC
- Increased stickiness of platelets
- Loss of capillary pericytes (capillary leakage)^[13]

Then microvascular occlusion leads to retinal ischemia;

- Capillary leakage
- Micro aneurysms
- Hemorrhage

- Retinal edema
- Hard exudates
- Arterio-venous shunts
- Neovascularization

Thickening of capillary basement membrane

Predominance of *Mahabhuta* in *Kaphadosha* is *Pruthvi* and *Jala*.^[14] *Kapha dosha* play significant role in diabetes. In thickening of capillary basement membrane, *Prithvi* and *Jala Mahabhuta* increases. To understand this concept let us take an example of drowning in which the dead body is fully swell because of the tendency of body tissues to absorb fluids, so it increases in the size.

Capillary endothelial cell damage and loss of capillary pericytes

Pre capillary, arterioles, capillaries, venules are the types of vessels. Vessel is made up of tissue, elastic fibers and smooth muscle cells. These all factors are intact together because of *Kaphadosha* i.e. *sandhibandhan*, which is a normal function of *Kapha dosha*.^[15]

Vitiation of *Kapha dosha* leads to impede normal functioning of *Kapha dosha* that causes *sandhibandhan vikruti*,^{[16],[17]} means capillary endothelial cell damage and loss of capillary pericytes. *Kapha* played essential role in the *sandhibandhana* of *Sharir*. In the *Dushya samgraha* of *Prameha*, *Meda* is a foremost factor. Normal function of *Meda* is *snehan*. *Meda* is made up of *Saptadhatu sara*, *Teja*, *Jala* and it is one of the main site of *Kapha dosha* in the body. Elasticity, flexibility of vessels depends on said factors. If there is *Meda vikruti* takes place which tends to reduce elasticity of blood vessels and that acquired rigidity may hamper contraction and dilatation functioning of vessels. Hence some extent blood vessels cannot dilate and get ruptured. Likewise *Meda*, *Mamsa* is also included in *Dushya samgraha* of *Prameha*. Sign of *Vridhdha Meda* produces all the premonitory symptoms of *Prameha*, obesity and its complications, symptoms of increase of *Kapha*, *Rakta* and *Mamsa*. In *Netra Sharira*, the functioning of *Netra* depends upon *vataavaha*, *raktavaha*, *kaphavaha* and *pittavaha sira*. Vitiating *dosha* circulated in upward direction through *sira* and produces various diseases of eye. *Acharya Sushruta* also explained “*SiraSarvavahatva*” that means one *sira* conducts all types of *dosha*.^[18] *Sira* are affected because of *Meda vikruti* as *sira* are the *mridu paka* of *Meda*. Normal function of *sira* is *Sandhibandhana*. On the other hand, *sira* is a

synonym of *Srotasa*, *Netra* one of the *bahya srotas* which will be affected due to vitiated *sira*.

Changes in RBC and increased stickiness of Platelets

Remaining factors in *dushya samgraha* are *Rasa*, *Rakta*, *Majja vikruti* which are responsible for the changes in RBC, increased stickiness of platelet and hemorrhage. But the effect of all factors will be seen stepwise simultaneously as per *prakruti*, lifestyle, and immunity of the patient.

Risk factor

Duration

50% patients = Diabetic retinopathy after 10 years

70% patients = Diabetic retinopathy after 20 years

90% patients = Diabetic retinopathy after 30 years

Netra is a maternal organ.^[19] So we can say that in the diabetic retinopathy females are more affected than males^[20] (F:M = 4:3).

Treatment

The *Ayurvedic* procedures like *Thakradhara*, *Netradhara*, *Tharpanam* and many others which are potent enough to provide strength in blood vessels of retina so that there will not be any further haemorrhage. Any leakage from the blood vessels also get reabsorbed. The nourishing ayurvedic medicines provide strength to retina and optic nerves thus clearing the vision.^[21] Also *Panchkarma Ayurvedic* therapies play a vital role in the treatment of Diabetic retinopathy. The main aim of the treatment is to clear the passage of blood vessels in the most macro levels and improve the blood circulation on the retina. According to *Ayurveda*, channeling the treatments in a systematic way can control diabetic retinopathy to a great extent and can lead to incredible improvement in the vision.^[22]

DISCUSSION

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 *dhatu*s are affected with *rakta*, *meda* and *mamsa* predominant, *sira srotas* of *raktavaha srotas* and *Ojovaha dhamani* gets affected in successive stages. If the diabetic retinopathy pathology is analyzed properly, it possesses all the four features of

srotovaigunya i.e. *Atipravritti*, *Sanga*, *Siragranthi* and *Vimarga gamana*. *Sanga* is manifested by the retinal vessels occlusion leading to hypoxic related ischemia. *Siragranthi* is nothing other than development of microaneurysms, *Vimarga gamana* is the retinal haemorrhages and *Atipravritti* can be correlated to the neovascularization where new vessels are formed. *Agnimandya* and *Ama* formation, *raktapitta*, *avarana* and *dhatu kshaya* are few aspects of pathogenesis and development of Diabetic retinopathy and this may provide inputs for development of treatment protocol for the disease in *Ayurveda* in future.

CONCLUSION

On the analysis of the whole scattered description related to *Netra* and *Prameha*; it shows that diabetic retinopathy is well described by *Ayurveda* scholars. Because of unfavorable changes in life style and environment, the existing diseases in *samhita* need to be modified which could be understood in view of modern science, it will be helpful in understanding the patho-physiology of diseases in today's era like diabetes retinopathy. It is very useful in the management of diabetes mellitus and its complications. There is still further scope of study for effectiveness and advancement of *Ayurveda* in field of diabetes mellitus.

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