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ANALYTICAL STUDY OF PRAMEHA AND IT'S COMPLICATION PRAMEHJANYA TIMIR (DIABETIC RETINOPATHY)

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ABSTRACT

Prameha Vyadhi is considered one of the eight major disorders in *Charaka Samhita*. It can be correlated with modern disease Diabetic Mellitus as sign and symptoms were similar. India leads the world with maximum number of diabetic patients being termed as the diabetic capital in the world. Diabetic retinopathy is one of the major complications of Diabetes Mellitus. In Diabetic Retinopathy the retinal changes seen like capillary leakage, microaneurysms, haemorrhages, retinal oedema, hard exudates and neovascularisation. After 10 years of Diabetes Mellitus leads to Diabetic retinopathy can lead to irreversible blindness. Its prevalence rate is 34 %. In Ayurveda, *Pramehjanya Timir* can be correlated with Diabetic retinopathy. **Aims & Objective:** To analysis the similarities in pathogenesis of *Prameha* and *Pramehjanya Timir* (diabetic retinopathy). **Material & Methods**: Now a day's people's lifestyle and food habits getting changed which leads to *Prameha* with *Raktadosha* and *Saptadhatu* with four internal *Patala* of eye are affected which leads to diabetic retinopathy. *Agnimandya* related *Aama* 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. **Result & Conclusion**: As mentioned in above aim and ob-

jectives, clinical features and pathogenesis of *Pramehjanya Timir* can be correlated with the diabetic retinopathy which is the complication of Diabetes Mellitus.

Keywords: *Prameha, Madhumeha*, Diabetic retinopathy.

INTRODUCTION

India is the diabetes capital with 69.1 million people with DM. Diabetes Mellitus has now assumed epidemic proportions in many countries of the world. With the present population of 19.4 million diabetics and approximately 60 million by the year 2025, India would rank first in its share of the global burden of Diabetes [(1)] . Diabetes Mellitus is characterized by derangement in carbohydrate, protein and fat metabolism caused by complete or relative insufficiency of insulin secretion and/or insulin action 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 [(2).] Prolonged hyperglycemia causes thickening of capillary basement membrane, capillary endothelial cell damage, RBCs deformation and roueaux, increased platelets stickiness, increased plasma viscosity and loss of pericytes.[(3)]

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.

It is a chronic progressive, potentially sight threatening disease of the retinal microvasculature associated with prolonged hyperglycemia and other conditions linked to diabetes mellitus such as hypertension, hyperlipidemia and proteinuria (4).

Almost all patients with Type 1 Diabetes develop a retinopathy in about 15 years. Proliferative diabetic retinopathy (PDR) affects 5–10% of the diabetic population; type 1 diabetics are at particular risk, with an incidence of up to 90% after 30 years[(5)] . In those with Type 2 diabetes, the risk of diabetic retinopathy increases with the duration of diabetes, accompanying hypertension and smoking. Diabetics have a 20–25 times greater risk of blindness as compared to the normal population [(6)] .As far as the working class or industrial areas are concerned Diabetic Retinopathy is 2nd leading cause of blindness in this group.

In Ayurveda *Timir* can be a complication of *Madhumeha*. Signs and symptoms of Diabetic retinopathy can be correlated with *Pramehajanya Timir*. Probable aetiology and pathogenesis of Diabetic retinopathy with probable correlation of different stages of the disease with different types of *Timir* is described in Ayurvedic literature [(7)].

Aims and Objective: To analysis the similarities in pathogenesis of *Prameha* and *Pramehjanya Timir* (Diabetic Retinopathy).

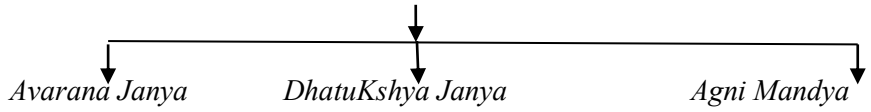
Samprapti of Pramehjanya Timir [(8)]:

It is a *Dristipatalagata roga*. Aacharya Vaghbhata described *Madhumeha* is one of the type of Vataja *Prameha* and it has two types *Samprapti* (9).

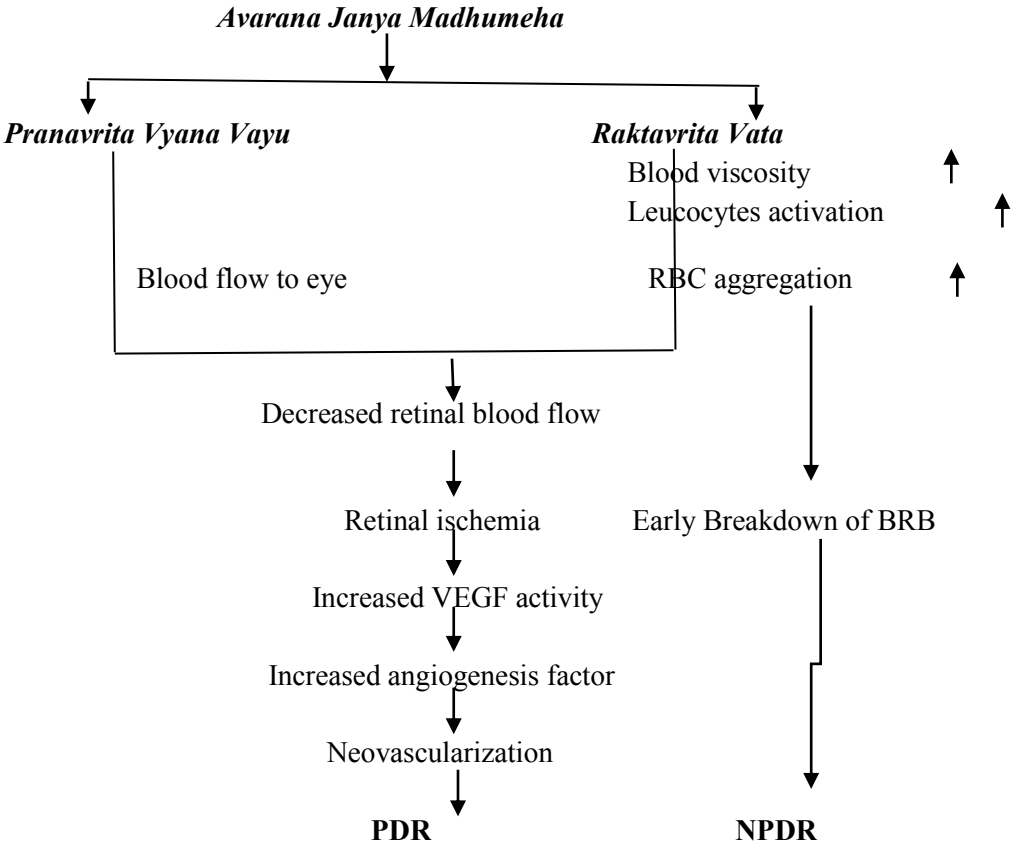
A. *Avaranjanita Vataprokopa Nimittaja Madhumeha* (*Avaranjanya Madhumeha*)

B. *Dhatukshyajanita Vataprakopa Nimittaja Madhumeha (Dhatukshayja Madhumeha)*

Madhumeha: Vata* predominant *Pitta* and *Kapha Anubandha



***Avaranajanya Madhumeha Samprapti* and pathogenesis of diabetic retinopathy**.



A. *Avaranjanya*

Due to excess intake of heavy (*Guru*), salty (*Lavan*) and sour (*Amla*) diet, avoidance of worry, exercise and *Samshodhana Kapha* and *Pitta* get provoked and Vitiate *Meda* and *Mamsa*; which are present in excess quantity. They cause obstruction to normal pathway of *Vata*. These *Vata* get aggravated and drowse Out *Oja* from all parts of body and carries it towards Basti resulting in *Madhumeha. Avritta Vatajanya Madhumeha* is *Krichhrasadhya*. As per Aacharya Charak "*Prameho Anusanginam*" means Diabetes is concomitant in nature [10]. Thus diabetes remains always present with its many complications. Due to both *Dhatukshya* and *Avarana* all the ten *Dushyas* goes into state of depletion and produce symptoms according to the seat of that particular *Dhatu*. In the case of Diabetic retinopathy main affected *Dhatu* is *Rakta Dhatu*, though all the Dhatus gets affected and *Srotas* affected are *Raktvaha, Mamsavaha* and *Medovahasrotas* mostly [11].

B. *Dhatukshaya Janya*: It also takes place by two ways.

i) *Madhumeha* due to *Dhatukshaya*: Aacharya Charaka has explained in *Nidana Sthana* that *Vata prakopak hetu sevan* causes *Vata prakopa* in person who is suffered from *Prameha*. This *Vata* turns the vital *Dhatus* towards Basti. *Vata Dosha* is *Ruksha* and converts *Madhura Rasa* of oja into *Kashaya Rasa*. This *Kashaya rasatmaka Oja* excreted from *Mutravaha*

Strotas. It is called *Madhumeha*. Here aggravation of *Vata* is due to its *Nidana Sevana*. Which causes diminution of Dhatus. So, it is called *Samprapti Vishishta Anilatmaka Madhumeha. Dhatukshyajanya Madhumeha* is *Asadhya.*

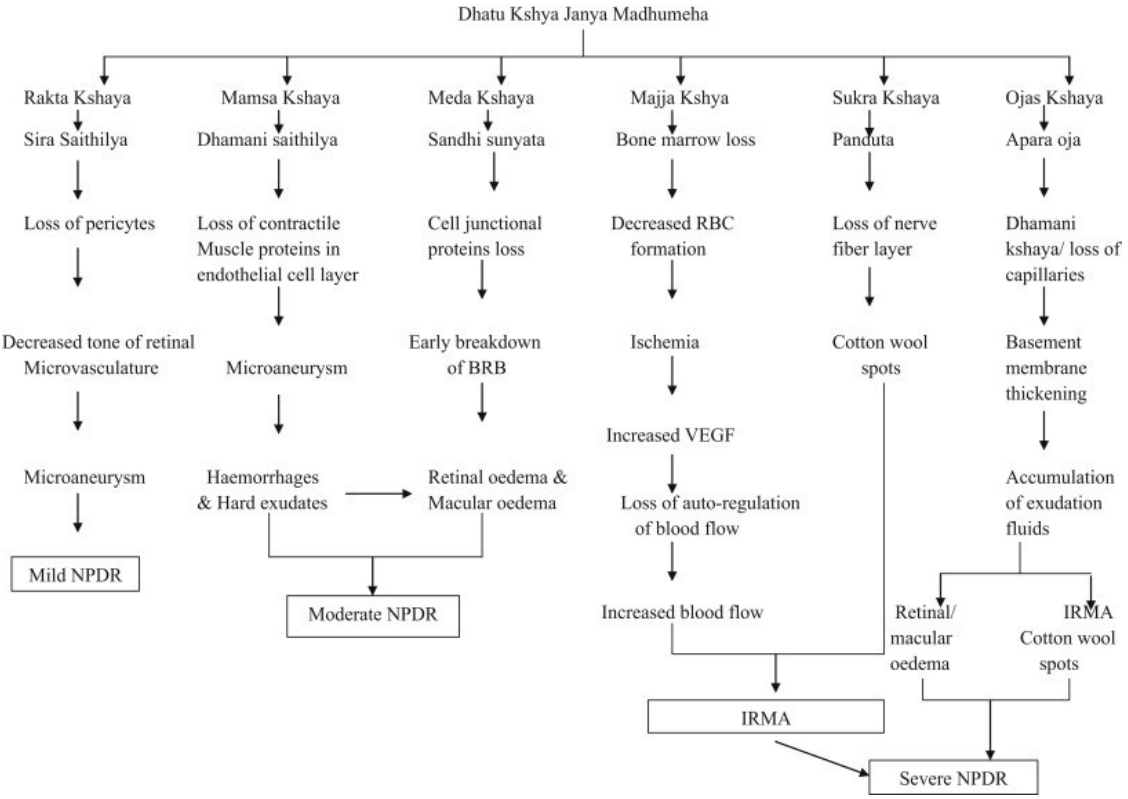
ii) *Madhumeha* due to *Shuddha Vata*: Aacharya Charaka explained that due to depletion of *Kapha* and *Pitta* aggravation of *Vata* occurs which then causes to occur *Madhumeha*.

Lakshanas of *Dhatukshaya Janya Samprapti*:

1. *Sirasaithilya*[11] According to Aacharya Shushruta *Sirasaithilya* is a major sign of *Raktakshayaas*. It can be correlated with loss of pericytes and formation of microaneurysms which are earliest signs of Diabetic Retinopathy. *Pratham 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.
2. Dhamanisaithilya[11] : It is major sign of *Mansakshayaa*. As 2nd *Patala* consists of *Mamsa Dhatu*, symptoms of 2nd *Patalagata Timir* seen in this stage. It 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 haemorrhages. This stage may be correlated with mild NPDR or moderate NPDR.
3. *Sandhishunyata*[11]: It is a major sign of *Medakshaya*. 3rd *Patala* consists of *Meda Dhatu* and when *Dhatu kshaya* reaches the 3rd *Patala* symptoms of 3rd *patalagata Timir* occur. 4th *patala* of *dristipatal* is *Asthyasrita* in nature and loss of *Asthi and Majja Dhatu* leads to symptoms of 4th *Patalagata Timir*. It can be correlated with junctional cell protein loss or cell adhesion defects and break down of BRB. Appearances of macular oedema and exudates formation are prominent signs in this stage. This stage may be correlated with Moderate NPDR based on the extent of *Dhatu* affected.
4. *Timiradarshana* [11] : It is one of the symptoms of *Majjakshaya* and leads to *Vata kshaya*. It can be correlated with depletion of marrow tissue leads to decrease in blood cells formation and results in hypoxic condition of retinal neurons. Axonal degeneration of retinal nerve fibres 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. In latent stages when *Sukradhatu* gets affected signs of paleness of retina and optic atrophy appears as *Panduta* is one of the features of *Sukrakshaya*. In this stage the disease becomes incurable and this proves the hereditary and genetic predisposition nature of diabetic retinopathy.
5. *Madhumeha* is also known as *Ojameha*[12]. 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. Among the functions of *Oja* are *bahya* and *avyantara karana (indriya*) karma, means motor and sensory functions. Loss or diminution of sensory functions including visual loss which are prominent features *Oja Kshaya*.

C. *Kalaprabhavaja*

This type of *Madhumeha* is narrated by Aacharya *Sushruta* [13]. He said that if all types of *Prameha* are ignored or ill treated they ultimately convert into *Madhumeha*. And then they become incurable due to complications. It probably occurs due to increased involvement of *Vata* and increased complexity of *Dosha-dushya Sammurcchana* and it leads to *Dhatukshaya*.



D. *Agnimandya*

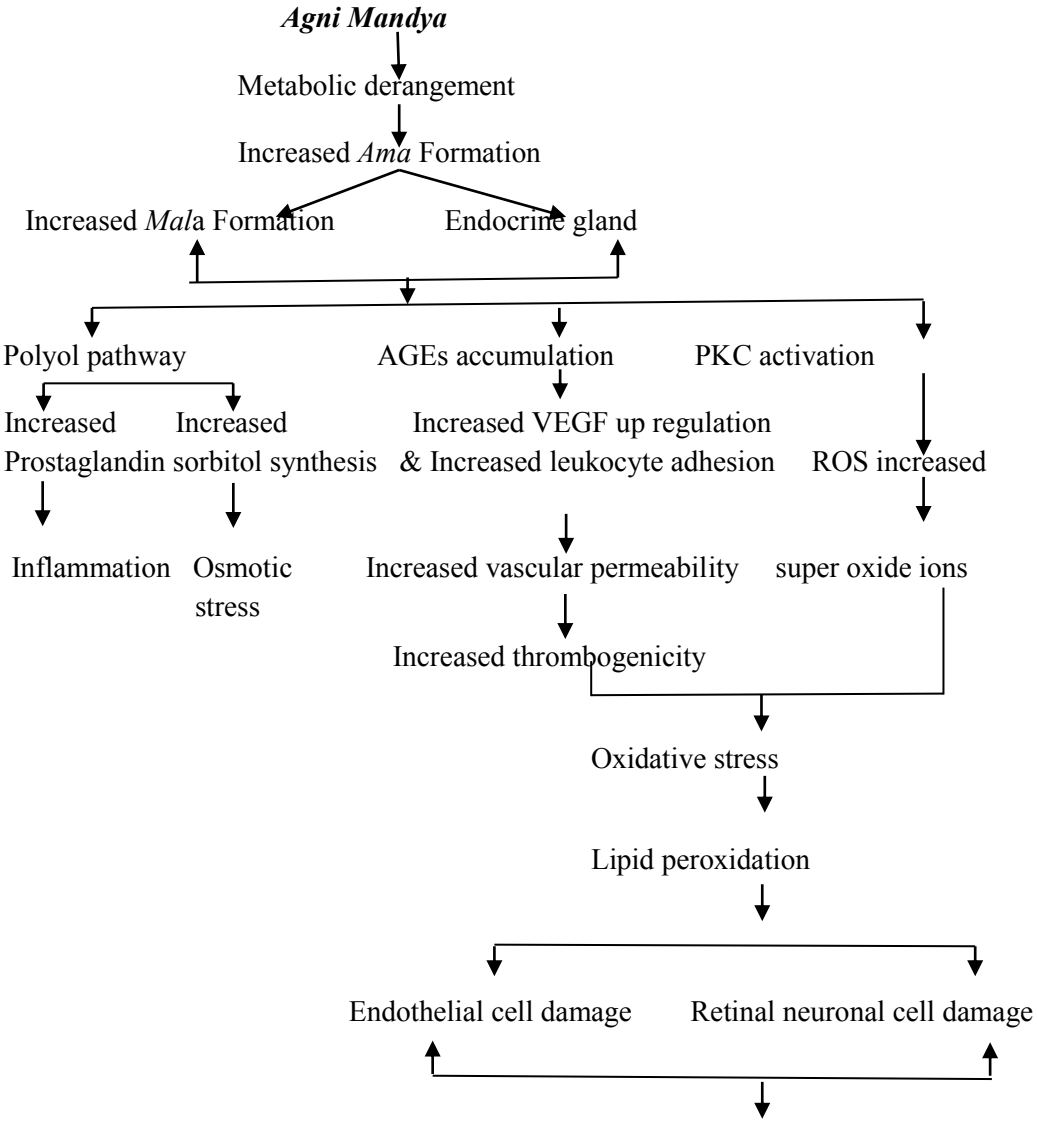
As *Prameha* is disease related to metabolism it suggests that there is defect in the Agni i. e. *Agnimandya*. There are 3 types of Agni stated in Ayurveda – *Jataragni, Bhutagni and Dhatvagni.*

a) *Jatharagni* – It is the main among all Agni, as all of them are dependent on *Jataragni*. The chemical factors which transform exogenous substances into endogenous substances in the body may be stated as Agni. Thus the ptylin enzyme, HCL, pepsin, renin, dextrin, gastric secretions, lipase, bile, trypsin, chemotrypsin, amylase, duodenal secretions, and intestinal secretions may be said to a part of *Jatharagni*. Agnimandya at the gastric level (*Jatharagni*) and at the tissue level is well established in *Prameha* and *Madhumeha* in Ayurveda. As *Nidana* of *Prameha* are having *Pruthvi* and *Jala Mahabhtadhikya, Pruthvyagni* and *Jalagni* are hampered in the disease. Again *Kapha* is composed of *Pruthvi* and *Jalamahabuta*. Therefore, defective functioning of *Bhutagni* leads to production of *Vikruta Kapha* in excess and thereby increases *Madhura Rasa* in the body.

b) *Dhatvagni* – This is the main level of disturbance in *Prameha*. Dhatu are main building components of the body (*Dehadharaka*). The *Dhatvagni* of respective *Dhatu* in its natural state is essential for its *Paka*, *Brumhana* and *Tarpana* and their *Kshaya* is seen due to increased *Dhatvagni*. In *Prameha* either qualitative or quantitative in *Dhatvagni* take place particularly *Rasa, Rakta, Mamsa, Meda, Majja* and *Shukra Dhatvagni.* In case of *Aavaranjanya Madhumeha* excessive fat deposition on the body indicated *Medo dhatvagnimandya*. The same thing is applicable to another *Dushya* also. Therefore, Agni plays an important role in *Prameha*.

In *Dhatwagimandya* state, the quantities of *Malarupi Dosha* are increased and create the pathological features inside the body. *Mala* of *Rasa Dhatu* and *Rakta dhatu* are *Kapha* and *Pitta* respectively. This *Malarupi* Pitta can create Diabetic Retinopathy pathology in the presence of pitta predisposing factors in retina. *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

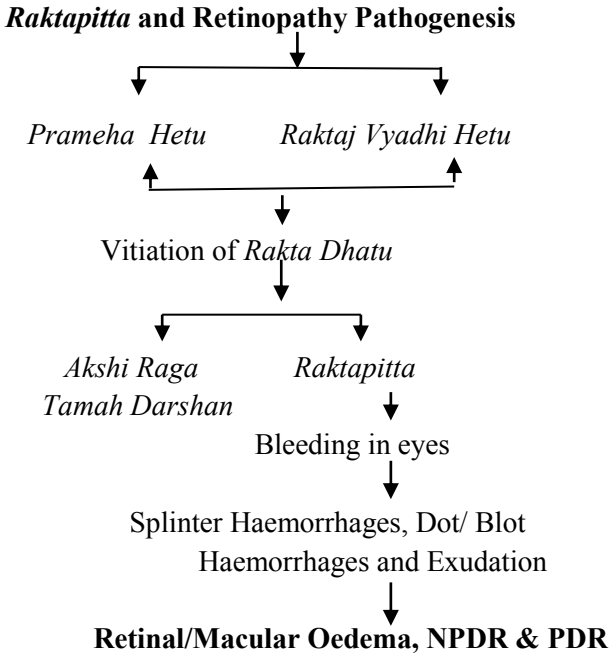
Glycation End products (AGEs), which are the main pathways of development of retinopathy in diabetics.



Microangiopathy in Diabetic Retinopathy in all the stages of NPDR & PDR.

E. *Urdhavag Raktapitta* [14] : *Pramehajanya Timir* (Diabetic retinopathy) basically a *Dristipatalagata* roga is mainly attributed to *Sira srotasabhisyandam* and *raktavaha sroto dushti* due to a variety of *Achakshyushya Ahara* and *Vihara hetusevan* especially in *Prameha* patients which vitiates *Pitta*. The vitiated Pitta in turn vitiates the *Pitta vaha srothas*. Due to interconnection of *Pitta and Rakta*, which shares *Aashrya Aashrayee 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 Strotas* and finally gets confined to the eyes, there is a stage when the *Sirastrotas* are deeply involved which is known as *Sira Abhisyanda*. The whole pathology of diabetic retinopathy which starts with *Stroto dusti* of *Raktavaha strotas* manifest-

ed 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 *Dristipatala*. The texture of the vessels is damaged and hence the permeability increases. This results in leakage and haemorrhages from the blood vessels. The blood oozes out like sweat. This again correlates with pathogenesis of *Rakttapitta*, 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. Thus *Urdhwaga Raktapitta* can be correlated with haemorrhage in Diabetic Retinopathy, as the seat of *Urdhwag Raktapitta* are all the seven natural opening of the head.



DISCUSSION

Diabetic retinopathy is a complication of long-standing uncontrolled diabetes due to defective metabolism and endocrine dysfunction. It is correlated with *Pramehajanya Timir*. It involves all three *Doshas, Raktadosha*, *Saptadhatu* with four internal Dristipatals of eye at different stages. All the dhatus are affected with *Rakta, Meda* and *Mamsa* predominant, *Sira Strotas* of *Raktavaha Strotas* and *Ojavaha Dhamani* gets affected in successive stages. If the DR pathology is analyzed properly, it possesses all the four features of *Srotovaigunya* i.e. *Atipravritti*, *Sanga*, *Siragranthi* and *Vimargagamana* are manifested by the retinal vessels occlusion leading to hypoxic related ischemia. *Siragranthi* is nothing other than development of microaneurysms, *Vimargagamana* is the retinal haemorrhages and *Atipravritti* can be correlated to the neovascularization where new vessels are formed. *Agnimandya* and *Aama* formation, *Raktapitta, Avarana and Dhatu Kshaya* are few aspects of pathogenesis and development of *Pramehajanya Timir* and this may provide inputs for development of treatment protocol for the disease in Ayurveda in future.

CONCLUSION

The probable aetiology and pathogenesis of Diabetic retinopathy with probable correlation of different stages of the disease with different types of *Timir* is described in Ayurvedic literature since very long time ago. The clinical features of *Pramehjanya Timir* and pathogenesis of *Pramehjanya Timir* can be correlated

with the Diabetic Retinopathy which is the complication of Diabetes Mellitus.

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