



## Review Article

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## CRITICAL STUDY OF DIABETIC RETINOPATHY WITH REFERENCE TO SHARIRA

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**ABSTRACT**

Diabetes mellitus is a metabolic diseases in which there is high blood sugar level over a prolonged period. This high blood sugar produces the symptoms of frequent urination, increased thirst and increased hunger. Untreated diabetes can cause many complications. Acute complications include diabetic ketoacidosis and nonketotic hyperosmolar coma. Serious long-term complications include heart disease, stroke, kidney failure, foot ulcers and damage to the eyes. Research scholars are doing enormous research to find out the solution on diabetic retinopathy despite that patients are suffering from it. In Ayurveda compendia, the constituents of various organs are given, Netra (eye) is the one of them and description of Prameha is well explained. By studying constituents of Netra and the disease, Prameha and its applicability, in further research work, one can find out not complete but better solution on progression of diabetic retinopathy. So this study on diabetic retinopathy with reference to Sharira was preferred.

**Keywords:** Diabetes mellitus, diabetic retinopathy, constituents of Netra, Prameha**INTRODUCTION**

Diabetes is a group of metabolic diseases. In recent time, this is a major health problem. Diabetes causes "micro vascular" complications, damage to the small blood vessels. Diabetic retinopathy, which affects blood vessel formation in the retina of the eye, can lead to visual symptoms, reduced vision, and potentially blindness. Diabetic nephropathy, the impact of diabetes on the kidneys, can lead to harmful changes in the kidney tissue, loss of small or progressively larger amounts of protein in the urine, 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 (such as diabetic foot ulcers) that can be difficult to treat and occasionally require amputation. Among these complications, Concept of Diabetic Retinopathy with reference to Sharira is highlighted in this research article.

**Constituents of Netra**

According to Ashtang Samgraha, the constituents of Netra are Kapha, Raktavaha srotas and Pancha Mahabhuta<sup>1</sup>. Pancha Mahabhuta constituents of Netra as per Sushruta<sup>2</sup>-Predominance of Teja Mahabhuta

- 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/ vessels)

**Acharya Vagbhata described the constituents of Netra<sup>3</sup> as follows**

- Sukla mandal (white portion) – Shlesma (paternal in origin)
- Krushna mandal (Black portion) – Rakta (maternal in origin)
- Drushti mandal (Middle portion) – Both paternal and maternal in origin

**Anatomy of eye in Ayurveda**

- Peshi<sup>4</sup> – 2
- Sira<sup>5</sup> – Vataava, Raktavaha, Kaphavaha (8 each), Pittavaha (10 each)
- Dhamani<sup>6</sup> – 2 (Rooptagrahana)
- Srotasa<sup>7</sup> – 2 (Bahya Srotasa)

**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<sup>8</sup>, 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<sup>9</sup>.

**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)<sup>10</sup>

Then, Microvascular occlusion leads to retinal ischemia;

- Capillary leakage
- Micro aneurysms
- Hemorrhage
- Retinal edema
- Hard exudates
- Arterio-venous shunts (intra retinal micro vascular abnormalities and IRMA)
- Neovascularization

#### Thickening of capillary basement membrane

Predominance of Mahabhuta in Kapha dosha is Pruthvi and Jala<sup>11</sup>. Kapha dosha play significant role in diabetes. In thickening of capillary basement membrane, Prithvi and Jala Mahabhuta are 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 muscles cells<sup>12</sup>. These all factors are intact together because of Kapha dosha i.e. sandhibandhana, which is a normal function of Kapha dosha<sup>13</sup>.

Vitiation of Kapha dosha leads to impede normal functioning of Kapha dosha that causes sandhibandhan vikruti<sup>14,15</sup>, means capillary endothelial cell damage and loss of capillary pericytes (Capillary leakage). Kapha played essential role in the sandhibandhana of Sharir<sup>16</sup>. In the Dushya samgraha of Prameha, Meda is a foremost factor. Normal function of Meda is snehan<sup>17</sup>. Meda is made up of Saptadhatu sara, Teja, Jala and it is one of the main site of Kapha dosha in the body<sup>18</sup>. Elasticity, flexibility of vessels depends on said factors. If there is a 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 after some extent blood vessels cannot dilate and get ruptured. Likewise Meda, Mamsa is also included in Dushya samgraha of Prameha. Sign of Vriddha Meda produces all the premonitory symptoms of Prameha, obesity and its complications, symptoms of increase of Kapha, Rakta and Mamsa<sup>19</sup>. In Netra Sharira, the functioning of Netra depends upon vatavaha, raktavaha, kaphavaha and pittavaha sira. Vitiating dosha circulated in upward direction through sira and produces various diseases of eye<sup>20</sup>. Acharya Sushruta also explained "Sira Sarvavahatva" that means one sira conducts all types of dosha<sup>21</sup>. Sira are affected because of Meda vikruti as sira are the mridu paka of Meda<sup>22</sup> (made up of Meda dhatu). Normal function of sira is Sandhibandhana<sup>23</sup>. So, Medo vikruti be likely to affect sandhibandhan function of sira. On the other hand, sira is a synonym of Srotasa<sup>24</sup>, Netra

one of the bahya srotas<sup>25</sup> which will be affected due to vitiating sira.

#### Changes in RBC and increased stickiness of platelets

Remaining factors in dushya samgraha are Rasa, Rakta, Majja vikruti<sup>26</sup> 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<sup>27</sup>

Netra is a maternal organ<sup>28</sup>. So, we can say that in the diabetic retinopathy females are more affected than males<sup>29</sup>. (F : M = 4 : 3). Other risk factors also vitiate to Dosh-Dushya samgraha, which are smoking, obesity and hyperlipidemia. In purvaroop of Prameha, Acharya Sushruta explained that muddy vision, hemorrhage and after some span total loss of vision may take place<sup>30</sup>.

#### CONCLUSION

On 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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