

# An Ayurvedic Protocol to Manage Proliferative Diabetic Retinopathy with Tractional Retinal Detachment

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## ABSTRACT

Proliferative Diabetic Retinopathy (PDR) occurs in 50% of cases of diabetic retinopathy after 25 years of onset of diabetes. Neovascularization associated with diabetic retinopathy stimulates scar formation, which leads to retinal detachment, the separation of the neuro-sensory retina proper from the retinal pigment epithelium. Management options, which include pars plana vitrectomy, anti-Vascular Endothelial Growth Factor (anti-VEGF) injections, and pan-retinal LASER photocoagulation, are not always effective. Here, the present authors report a case of 41-year-old male who presented with foreign-body sensation for 1 year, photophobia for 8 months, and distorted image perception for 6 months. The patient was diagnosed as having *Kacha* (diminished vision) according to *Ayurveda*. He was managed using oral medications, viz., *Samirapancakam Kashaya*, *Cirivilvadi Kashaya*, and *Laksha Jala*, and external therapy, which comprised of local therapies for both the eyes and head. Assessment at discharge by fundus photography demonstrated reduction in retinal haemorrhages, and optical coherence tomography showed reduction in macular oedema and vitreo-macular traction.

**Keywords:** Alternative medicines, Kacha, Kriyakalpa

## CASE REPORT

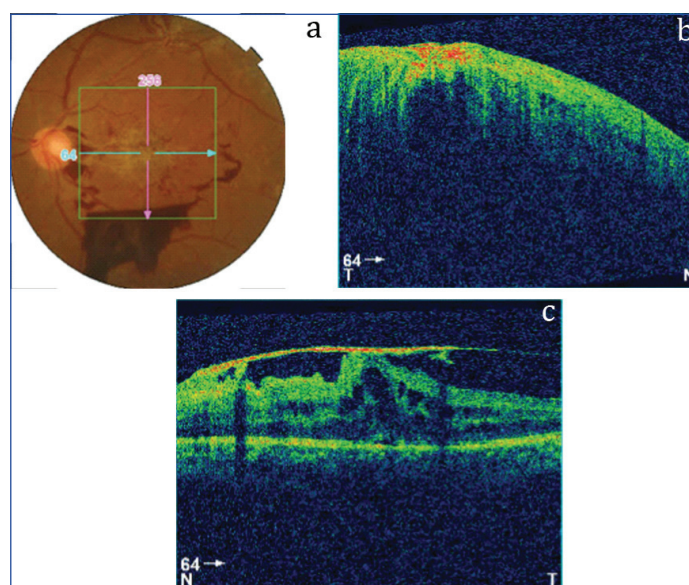
A 41-year-old male presented to the OPD with a complaint of foreign body sensation in both eyes (OU) since one year associated with photophobia OU since 8 months and distorted image perception OU for 6 months.

The patient was apparently healthy before one year, after which he started gradually experiencing foreign body sensation, which he neglected. Photophobia developed 8 months ago. The patient consulted an ophthalmologist, who diagnosed him with Proliferative Diabetic Retinopathy (PDR) and retinal detachment. He underwent pars plana vitrectomy and silicone oil removal in his right eye but got no relief. Gradually, his left eye also became affected. He was diagnosed with PDR in his left eye and underwent two courses of Laser therapy. He has advised surgery in his left eye also, but he refused. He came to Hospital to seek alternative options.

The patient is a known diabetic for 8 years and has been under medication for 6 months. His father was a known case of diabetes. His treatment history is remarkable for pars plana vitrectomy in his right eye in November 2018, silicone oil removal in his right eye in February 2019, and two rounds of Laser therapy in his left eye in January 2019. His personal history is unremarkable and he does not have any addictions or habits.

Distant Visual Acuity (DVA) at admission was hand movements (HM+ve) in his right eye (OD) and 6/36 Snellen (LogMAR 0.77) in his left eye (OS); anterior segment examination OU was normal; and pupillary reactions OU were within normal levels.

Fundus examination OS showed a macular scar and presence of haemorrhages near the optic disc and in the inferior quadrant [Table/Fig-1a]. Optical Coherence Tomography (OCT) scanning OD showed elevation of the retina due to vitreous accumulation under the structure [Table/Fig-1b]. OCT scanning OS showed vitreo-macular traction and cyst-like lesions at the macula, suggestive of cystoid macular oedema and tractional retinal detachment [Table/Fig-1c].



**[Table/Fig-1]:** a) Fundus photograph OS at admission; b) OCT scan OD at admission; c) OCT scan OS at admission.

A provisional diagnosis of proliferative diabetic retinopathy with tractional retinal detachment was made based on the examination and investigations. *Raktaja Kacha* (diminished vision due to blood), a *Drishtigata Roga* (disease of vision) according to *Ayurveda*, was explored for this patient based on the symptom of blurring of vision and vascular abnormalities and haemorrhages seen in the fundus. *Parimlayi*, a type of *Kacha* according to *Susruta*, and involvement of *Rakta Dhatu* (haemoglobin fraction of blood) was explored based on the changes in the retinal vasculature seen in proliferative diabetic retinopathy. Tractional retinal detachment was explored along the lines of increased *Kapha Dosha* and *Rakta*.

He was prescribed *Samirapancakam Kashaya* (60 mL at 6 am and 6 pm)\*, *Cirivilvadi Kashaya* (60 mL at 10 am and 4 pm), and *Laksha Jala* (500 mL at 10 am) orally [Table/Fig-2]. External therapies

included *Siroveshtana* (application of paste on a Cora cloth over the head), *Anjana* (collyrium), *Ascyotana* (eye drops), *Purampada* (application of paste over the eyelid), *Sirolepa* (application of paste over the head), and *Talapoticchil* (application of paste in a plantain leaf over the head) [Table/Fig-3].

Medicine	Preparation	Dosage	Time	Duration
<i>Samirapancakam Kashaya</i> (decoction of <i>Cyperus rotundus</i> Linn., etc.)*	1 part of the ingredients are boiled in 4 parts of water and reduced to 1/4.	60 mL	6 am and 6 pm	07/05/2019-22/05/2019
<i>Cirivilvadi Kashaya</i> (decoction of <i>Holoptelea integrifolia</i> Planch., etc.)	1 part of the ingredients are boiled in 4 parts of water and reduced to 1/4.	60 mL	10 am and 4 pm	10/05/2019-14/05/2019
			10 am	15/05/2019-23/05/2019
<i>Laksha Jala</i> (water processed with <i>Laccifer lacca</i> Kerr.)	1 part of the powder is taken and mixed with 500 mL of water	500 mL	10 am	10/05/2019-23/05/2019

[Table/Fig-2]: Oral medicines.

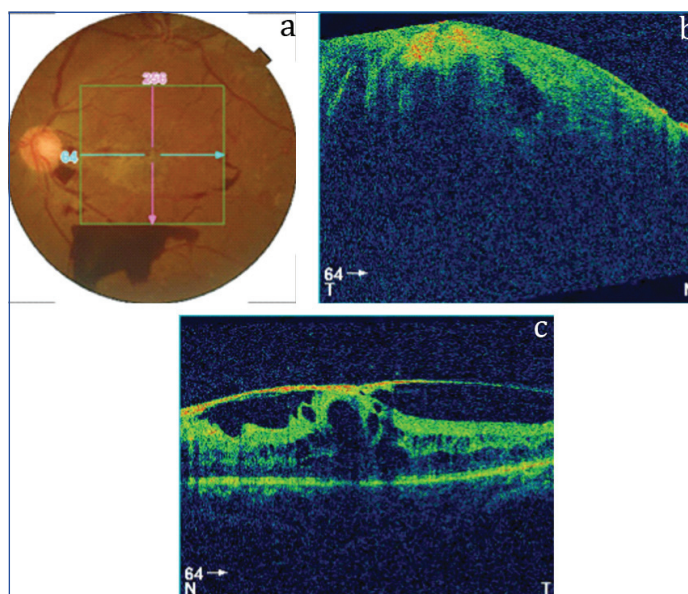
Treatment	Medicine	Method of administration	Duration
<i>Siroveshtana</i>	<i>Vasa Lakshadi Churna</i> (powder prepared from <i>Adathoda vasica</i> Nees., etc.)	45g of powder was made into a paste by mixing with water. The decoction was added to one <i>Gutika</i> (tablet). A Cora cloth was immersed in 350 mL of the decoction and the paste is smeared over the cloth. The cloth was applied over the forehead from one ear to the other and tied over the head.	07/05/2019-12/05/2019
	<i>Vasa Triphala Kvatha</i> (decoction of <i>Terminalia chebula</i> Retz., etc.)		
	<i>Karutta Gutika</i> (tablet prepared from <i>Boswellia serrata</i> Planch., etc.)		
<i>Anjana</i>	<i>Netramrtam</i> (sterile drops prepared from NaCl, etc.)*	1 drop of the medicine was instilled from a height of 2 <i>Angula</i> (2 fingers) in both eyes. The patient was asked to gently rotate the eyes while keeping them closed.	07/05/2019
<i>Ascyotana</i>	Drops prepared from <i>Veronia cinerea</i> Less.		07/05/2019-19/05/2019
<i>Purampada</i>	<i>Desmodium triflorum</i> Linn. and <i>Cynodon dactylon</i> C. Fisher	A paste prepared from the medicine was applied over the eyelid, obviating the lashes.	16/05/2019-24/05/2019
<i>Sirolepa</i>	<i>Desmodium triflorum</i> Linn. and semisolid constituency of <i>Adathoda vasica</i> Nees.	60g of the powdered ingredients and semisolid were made into a paste and applied to the forehead.	16/05/2019-24/05/2019
<i>Talapoticchil</i>	<i>Vasa Lakshadi Churna</i> (powder prepared from <i>Adathoda vasica</i> Nees., etc.)	A paste prepared by mixing 60g of the powder and 300 mL of the decoction mixed with the tablet was applied on a plantain leaf, which was kept face down over the head, obviating a small circular hole in the centre.	16/05/2019-24/05/2019
	<i>Vasa Triphala Kvatha</i> (decoction of <i>Terminalia chebula</i> Retz., etc.)		
	<i>Karutta Gutika</i> (tablet prepared from <i>Boswellia serrata</i> Planch.)		

[Table/Fig-3]: External Therapies.

Ingredients for the medicines were procured at Sreedhareeyam's own herbal gardens and the medicines were manufactured by Sreedhareeyam Ayurvedic Medicines Pvt. Ltd., the hospital's GMP-certified manufacturing unit.

Assessment was done by DVA, fundus examination, and OCT. DVA was maintained at discharge. Fundus examination OS showed reduction in haemorrhages [Table/Fig-4a]. OCT scanning OD showed absorption of vitreous humour from the retina [Table/Fig-4b].

OCT scanning OS showed reduction in vitreo-macular traction and absorption of macular oedema [Table/Fig-4c].



[Table/Fig-4]: a) Fundus photograph OS at discharge; b) OCT scan OD at discharge; c) OCT scan OS at discharge.

The patient was prescribed medicines at discharge [Table/Fig-5] and advised regular follow-ups. One of the medicines, Chimum-Co, was manufactured by J&J Dechane Laboratories Pvt. Ltd.; the others were manufactured by Sreedhareeyam Ayurvedic Medicines, Pvt. Ltd. A timeline of events is also given [Table/Fig-6].

Medicine	Dosage	Time
<i>Samirapancakam Kashaya</i> (decoction of <i>Cyperus rotundus</i> Linn., etc.)*	15 mL with 45 mL boiled and cooled water	Twice a day before food
<i>Amalaki Churna</i> (powder of <i>Emblica officinalis</i> Gaertn.)	5 gm	Make into a paste by mixing with decoction and apply over the forehead for one hour
<i>Laksha Churna</i> (powder of <i>Laccifer lacca</i> Kerr.)	5 gm	
Chinium-Co (capsule prepared from <i>Rheum emodi</i> Wall.)^	1 capsule	Twice a day after food
<i>Vasa Sree</i> (tablet prepared from <i>Adathoda vasica</i> Nees., etc.)*	1 tablet	Twice a day after food
<i>Vara Curna</i> (powder prepared from <i>Terminalia chebula</i> Retz., etc.)	3 gm	1/2 hour after food at night
Cardocure (tablet prepared from <i>Rauwolfia serpentina</i> Royle ex. Benth., etc.)*	1 tablet	Twice a day after food

[Table/Fig-5]: Discharge Medicines.

## DISCUSSION

Diabetic retinopathy (DR) is a micro-angiopathy that primarily affects pre-capillary arterioles, capillaries, and post-capillary venules of the retina [1]. The Early Treatment Diabetic Retinopathy Study (ETDRS) classifies DR into background or Non-Proliferative DR (NPDR), diabetic maculopathy, pre-proliferative DR, proliferative DR (PDR), and advanced diabetic eye disease. PDR affects 5-10% of the diabetic population, especially Type 1 diabetic, with an incidence of 60% after 30 years [2]. In general, the pathogenesis of DR involves cellular damage.

Neovascularization, the hallmark finding of PDR, can be either at the optic disc (neovascularization disc or NVD) or elsewhere (neovascularization elsewhere or NVE). It is caused by capillary non-perfusion, which leads to retinal hypoxia. New vessel growth is thought to be caused by an imbalance between angiogenic and anti-angiogenic factors, in an attempt to re-vascularize the already hypoxic retinal tissue. Neovascularization may encourage scarring at the macula, which results in retinal detachment.

Time	Event
05/2018	<ul style="list-style-type: none"> <li>Experiences foreign body sensation OU, which he neglects</li> </ul>
09/2018	<ul style="list-style-type: none"> <li>Experiences photophobia OU</li> </ul>
11/2018	<ul style="list-style-type: none"> <li>Experiences distorted vision OD</li> <li>Diagnosed with proliferative diabetic retinopathy and retinal detachment</li> <li>Pars plana vitrectomy OD and injection of silicone oil</li> </ul>
01/2019	<ul style="list-style-type: none"> <li>Experiences distorted vision OS</li> <li>2 rounds of LASER therapy OS</li> <li>Advised surgery, which he declines</li> </ul>
02/2019	<ul style="list-style-type: none"> <li>Silicone oil removal OD</li> </ul>
06/05/2019	<ul style="list-style-type: none"> <li>Consultation at Sreedhareeyam and admission for inpatient management</li> <li>DVA: HM +ve OD and 6/36 OS</li> <li>Fundus exam OS: macular scar and haemorrhages near the optic disc and in the inferior quadrant</li> <li>OCT scanning OD: elevation of the retinal layers due to vitreous accumulation</li> <li>OCT scanning OS: vitreo-macular traction and cyst-like lesions at the macula</li> </ul>
07/05/2019	<ul style="list-style-type: none"> <li><i>Samirapancakam Kashaya</i>* is started</li> <li><i>Siroveshtana</i> with <i>Vasa Lakshadi Churna</i>, <i>Vasa Triphaladi Kashaya</i>, and <i>Karutta Gutika</i> is started</li> <li><i>Anjana</i> with <i>Netramrtam</i>* is done</li> <li><i>Ascyotana</i> with drops prepared from <i>Veronia cinerea</i> Less. is started</li> </ul>
10/05/2019	<ul style="list-style-type: none"> <li><i>Cirivilvadi Kashaya</i> is started (at 10 am and 4 pm)</li> <li><i>Laksha Jala</i> is started</li> </ul>
12/05/2019	<ul style="list-style-type: none"> <li><i>Siroveshtana</i> is stopped</li> </ul>
15/05/2019	<ul style="list-style-type: none"> <li><i>Cirivilvadi Kashaya</i> is continued by giving only at 10 am</li> </ul>
16/05/2019	<ul style="list-style-type: none"> <li><i>Purampada</i> with paste prepared from <i>Desmodium triflorum</i> Linn. and <i>Cynodon dactylon</i> C. Fisher. is started</li> <li><i>Sirolepa</i> prepared from <i>Desmodium triflorum</i> Linn. and semisolid constituency of <i>Adathoda vasica</i> Nees. is started</li> <li><i>Talapoticchil</i> with <i>Vasa Lakshadi Churna</i>, <i>Vasa Triphaladi Kashaya</i>, and <i>Karutta Gutika</i> is started</li> </ul>
19/05/2019	<ul style="list-style-type: none"> <li><i>Ascyotana</i> is stopped</li> </ul>
22/05/2019	<ul style="list-style-type: none"> <li><i>Samirapancakam Kashaya</i> is stopped</li> </ul>
23/05/2019	<ul style="list-style-type: none"> <li><i>Laksha Jala</i> is stopped</li> </ul>
24/05/2019	<ul style="list-style-type: none"> <li><i>Purampada</i>, <i>Sirolepa</i>, and <i>Talapoticchil</i> are stopped</li> <li>Fundus exam OS: Reduction in haemorrhages</li> <li>OCT scan OS: Reduction in vitreo-macular traction and absorption of macular oedema</li> <li>OCT scan OD: Absorption of vitreous</li> </ul>

[Table/Fig-6]: Timeline.

\*Patented medicines of Sreedhareeyam Ayurvedic Eye Hospital and Research Centre

^Patented medicine of J & J Dechane Laboratories

*Kacha* is a *Drishtigata Roga* (disease of vision) described by *Acharya Vagbhata* in the *Ashtanga Hridaya Uttara Sthana*. When the pathological *Doshas* (humours) invade the 3<sup>rd</sup> *Patala* (layer) of the eye, objects are perceived above but not below, objects are covered by a thin cloth, vision gradually reduces, and the area of vision (*Drshiti*) gets colorized based on the *Dosha* [3]. *Raktaja Kacha* is characterised by redness of the organ of vision and seeing of objects as either red or black [4].

The concept of *Meha* (metabolic disorders including diabetes) as a cause for *Netraroga* was mentioned by *Netra Prakashika*, an ancient text dealing with eye care [5]. The *Samprapti* (pathogenesis) of diabetic retinopathy according to *Ayurveda* revolves around *Srotobhishyanda* (pathological oozing of fluid from *Srotas* or channels) and *Raktavaha Sroto Dushti* (pathological activity of the channels carrying blood) [6]. *Acakshushya Ahara* and *Vihara* (diet and lifestyle choices detrimental to eye health) aggravate *Pitta Dosha*. *Pitta* in turn aggravates *Rakta* as the two share *Asraya Asrayi Bhava* (homologous connection) with each other. These two traverse the *Urdhvavaha Sira* (vessels of the upper extremity) and lodge in *Netra*. The pathogenic factors of DR are due to the *Kleda* (moisture) and *Kapha* in *Prameha*, causing *Srotorodha* (obstruction of the channels) in the retinal vasculature. This *Srotorodha* results in *Atipravrtti* (increased flow) of already-increased *Doshas*, which may be compared to neovascularization [7].

In this patient, the neovascularization caused a macular scar, which in turn led to a tractional retinal detachment. The *Atipravrtti* of *Doshas* ended up at the macula and the already-increased *Kapha* solidified *Rakta* into a scar. The *Gurutva* (heaviness) and *Mahatva* (prominence) of *Kapha* caused the macula to undergo tractional movement and thus detach the retina from its normal place.

Based on the above descriptions, a treatment protocol according to *Ayurvedic* principles may be explored. Two case studies of diabetic retinopathy managed with *Ayurvedic* treatments such as *Panchakarma* (detoxification) and *Kriyakalpa* (local ocular therapeutics) showed improvement in maintenance of serum glucose, identification of primary colours, and clarity of vision both at discharge and at follow-ups [8].

*Cirivilvadi Kashaya* acts as a digestive agent and helps move adherent *Doshas* including *Vata* downwards. *Laksha* (*Laccifer lacca* Kerr.), by its properties of *Pitta-Kapha Nasaka* (diminishing *Pitta* and *Kapha*), *Sandhaniya* (binding), *Balya* (strengthening), and *Ropana* (healing), helps the retina restore itself to the rest of the eye, and at the same time, treats *Rakta* by acting on *Pitta* and *Kapha*. Mixing *Laksha* with water helps to flush out the impurities caused by aggravated *Pitta* and *Kapha*.

*Siroveshtanam*, *Sirolepa*, and *Talapoticchil* reach the target tissue by absorption through the skin and hair follicles. This allows them to bypass the blood-brain barrier and the blood-ocular barriers.

The ingredients used for *Siroveshtana*, *Sirolepa*, and *Talapoticchil* all act on *Rakta Dhatu*, *Netra* (eye), and help to rejoin the retina to the rest of the eye. *Vasa* (*Adathoda vasica* Nees.) is known to treat *Raktapitta* (bleeding disorders) by its wound-healing properties. *Vasa* improved breaking strength, absorption, and extensibility in wound tissue, and hence has been proven to be an excellent wound healing drug [9]. *Triphala* (*Terminalia chebula* Retz., *Terminalia bellerica* Linn., and *Embilica officinalis* Gaertn.) are indicated in both *Prameha* (diabetes) and *Netra Roga* (ophthalmic diseases). *Terminalia chebula* Retz. and *Terminalia bellerica* Linn. have antioxidant properties, which eliminate free radicals in the retinal tissue. The ingredients of *Karutta Gutika* possess binding and healing properties, and thus enable the retina to firmly adhere to the rest of the eye.

*Purampada* (application of paste over the closed eyelids) reduces pressure by applying counterpressure from the lids. It allows for faster mobilisation of toxins, stimulation of peripheral nerves, and reducing subretinal fluid in the eye. *Ascyotana* (eye drops) and *Anjana* (collyrium) allows deeper penetration by factors such as height and temperature of the medicine.

*Samirapancakam Kashaya*, prepared from *Cyperus rotundus* Linn., *Hordeum vulgare* Linn., *Picorrhiza kurroa* Royle. ex. Benth., *Santalum album* Linn., and *Tinospora cordifolia* Miers., is indicated in *Pramehajanya Netraroga* (DR) and *Raktapitta* (bleeding disorders). *Netramrtam* is prepared from NaCl, KAl(SO<sub>4</sub>)<sub>2</sub>, and distilled water, and is a promoter of vision. *Vasa Sree* is prepared from *Adathoda vasica* Nees., *Mesua ferrea* Linn., *Embilica officinalis* Gaertn., and *Hemidesmus indicus* Linn., and is indicated in *Raktaja Netra Rogas* (ophthalmic diseases caused by blood) and diabetic retinopathy. *Cardocure* is prepared from *Rauwolfia serpentina* Royle ex. Benth., *Terminalia chebula* Retz., *Terminalia bellerica* Linn., *Embilica officinalis* Gaertn., and *Clitoria ternatea* Linn., and is indicated in hypertensive conditions.

Challenges in managing of DR include vigorous maintenance of serum glucose and preservation of existing vision. Promising effects of the *Ayurvedic* intervention were noted in the fundus examination and OCT scanning. Vision was maintained throughout, with no further deterioration. Hence, this modality may be explored.

## CONCLUSION

This *Ayurvedic* protocol for managing Proliferative Diabetic Retinopathy (PDR) and TRD not only targeted the ocular conditions, but enabled normal physiology to be adequately restored in terms of

digestion and metabolism. Hence, the protocol may be considered as a treatment option. The case may be used as a stepping stone for further management and the results obtained may be verified using large-scale sample trials.

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