



Review Article

RETINITIS PIGMENTOSA AND ITS AYURVEDIC MANAGEMENT

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ABSTRACT

Retinitis pigmentosa (RP) is a group of diseases involving progressive degeneration of photoreceptor cells of retina. Usually, it starts in mid periphery and advancing towards the macula and fovea centralis. Visual symptoms are nyctalopia (night blindness), tubular vision and reduced visual field. The symptoms of RP mostly starts on early teen age and severe visual loss occurs at ages of 40 to 50 years. RP has worldwide prevalence of 1:3000 to 1:7000 people. Males are more affected than female in ratio of 3:2. *Nakulandhya* and *Shleshmavidagdha Drishti* explained under *Drishtigata Roga* in Ayurvedic literature. These two are described as *Sannipataja Vyadhi* and *Kaphaj Vyadhi* respectively. They have close resemblance with retinitis pigmentosa in their symptomatology. In current era treatment for RP includes Gene therapy, retinal implants, Neurotrophic factor, stem cells, retinal transplants. But these treatment options are not specific and satisfactory and expensive. All these treatments are still in their early stages of research and development. *Ayurvedic Panchakarma* therapies and *Kriyakalpa* therapies can help to regulate vitiated *Doshas* and provide nourishment and strength to ocular tissue. These therapies can help to maintain the existing vision of patient and reduce progression of RP.

KEYWORDS: Retinitis pigmentosa (RP), *Drishtigata Roga*, *Kriyakalpa*, *Panchakarma*, *Shodhana*, *Shaman Chikitsa*.

INTRODUCTION

Human eyeball has 3 main coats and the innermost coat is called as the retina which is formed by the neural tissue. The retina has rods and cones and it is light sensitive part of eyeball. Retinitis pigmentosa is a group of diseases involving progressive degeneration of photoreceptor cells of retina. Usually, it starts in mid periphery and advancing towards the macula and fovea centralis. Visual symptoms are nyctalopia (night blindness), tubular vision and reduced visual field. RP is almost bilateral and both eyes are equally affected. Usually, RP is limited to the eyes but may occur as a part of syndromes like Usher syndrome and Laurence-Moon-Biedl syndrome. The symptoms of RP mostly starts on early teen age and severe visual loss occurs at ages of 40 to 50 years. The chief clinical features of RP are^[1]

- 1) Abnormal fundus with bony spicule deposits
- 2) Attenuated retinal arterioles.
- 3) Waxy pallor appearance of optic disc.

RP has worldwide prevalence of 1:3000 to 1:7000 people. Males are more affected than female in ratio of 3:2.^[2]

Shalakyatantra is a branch of *Ayurveda* deals with the study of eyes and provides information about ocular diseases and their management. All ocular diseases are distinguished between 4 types depending upon vitiated *Doshas* namely *Vataja*, *Pittaja*, *Kaphaja* and *Sannipataja Vyadhi*. *Nakulandhya* and *Shleshmavidagdha Drishti* explained under *Drishtigata Roga* in Ayurvedic literature. These two are described as *Sannipataja Vyadhi* and *Kaphaj Vyadhi* respectively. They have close resemblance with retinitis pigmentosa in their symptomatology. According to Ayurvedic texts *Shleshmavidagdha Drishti* is *Sadhya Vyadhi* (curable) and *Nakulandhya* is *Asadhya Vyadhi* (non-curable). In *Ashtanga Hridayam Samhita Acharya Vagbhata* explained that, In practice many times we are unable to name the disease but we should treat the disease on the basis of type *Doshdushti* i.e., vitiated *Doshas* causing the disease.^[4] In *Sushruta Samhita Acharya Sushruta* explained the same, each disease is caused by vitiated *Doshas* therefore one can treat the disease according to *Doshdushti Lakshanas* (signs and symptoms).^[5]

RP is a degenerative condition and degeneration process cannot be caused by single vitiated *Doshas*. There must be vitiation of *Tridosha*. Ayurvedic literature gives an opportunity to physicians to deal with management of such degenerative diseases based on *Nidana* and *Doshadushti Lakshanas*. In Ayurveda, *Shodhana Chikitsa* and *Shaman Chikitsa* are two main treatments used for balancing the vitiated *Doshas*. Among these, *Shodhana Chikitsa* includes *Vaman*, *Virechana*, *Basti*, *Nasya* and *Raktamokshana Chikitsa* and helps to eliminate the causing factors of vitiation of *Doshas*. *Basti Karma*, *Virechana Karma* and *Nasya Karma* can be used in such degenerative diseases. *Kriyalkpas* like *Tarpana* and *Anjana* can be used as local therapeutics.

In current era treatment for RP includes Gene therapy, retinal implants, neurotrophic factor, stem cells, retinal transplants.^[6] But these treatment options are not specific and satisfactory and expensive. All these treatments are still in their early stages of research and development. By using Ayurvedic medicinal therapies Physicians can try to reduce the progression of vision loss in retinitis pigmentosa with minimal side effects.

AIMS

- To study pathophysiology of retinitis pigmentosa.
- To compile various suitable medicinal therapies and therapeutic procedures available in Ayurveda for management of retinitis pigmentosa.

MATERIALS AND METHODS

- The published literature about retinitis pigmentosa.
- *Ayurvedic Brihatrayi* and *Laghutrayi Samhita* and their commentaries.
- *Panchakarma* and associated therapeutic procedures mentioned by different Ayurvedic texts are collected and reviewed.
- Scholarly articles written and published on various internet platforms related to retinitis pigmentosa, *Netraroga* and *Panchakarma* were reviewed.

DISCUSSION

What is Retinitis pigmentosa?^[1,7]

It is also called as pigmentary retinal dystrophy. This is slow growing and degenerative disease of retina. Always occurs in both eyes. It begins in childhood and it results blindness in middle or advanced age. Retinal degeneration affects mainly the rods and cones particularly the former and commences in a zone near the equator of eye actually spreading both anteriorly and posteriorly. Macula is not affected until late stage.

Characteristics

- Defective vision at night (night blindness). This symptom may present many years before actual pigment is visible on retina.
- Visual field shows concentric contraction, marked Illumination is reduced.
- In early stage, partial or complete annular or ring scotoma is found corresponding to degenerated zone of retina.
- Tubular vision.
- Loss of central vision does not usually occur until 50 to 60 Years of age. But cataractous changes cause early unilateral or bilateral deterioration.

Associated Ocular Anomalies

Higher incidence of primary open angle glaucoma, rarely keratoconus, microphthalmos, posterior subcapsular cataract. Retinitis pigmentosa describes a heterogeneous group of inherited retinal dystrophies characterized by progressive photoreceptor cell degeneration that affects approximately 1 in 4000 to 1 in 7000 in general population.^[2]

Genetics of retinitis pigmentosa varied, Non-syndromic cases maybe inherited as an autosomal dominant (least common) 30%, autosomal recessive (most common) 15%, Sporadic 30%. 5% maybe early onset and grouped as part of Leber's congenital amaurosis. Rare forms are X linked dominant (most sever), mitochondrial and digenic. Males are more commonly affected than females in a ratio of 3:2.^[6]

RP disease usually limited to the eyes limited to the eyes, it may occur as part of syndrome like, Usher syndrome, Laurence-Moon-Biedl syndrome, Abetalipoproteinemia syndrome etc. Approximately 20 to 30% off patients with RP how an associated non ocular disease and would be classified as having syndromic RP.^[1,7]

Ophthalmic Examination Shows^[1,7]

- Fundus- Initially the equatorial region is affected. Posterior pole and the periphery are normal. appears tessellated.
- Bony spicules- In the affected zone retina is studded with small jet-black spots resembling bone corpuscles. Initially found in equatorial region and later progress towards anteriorly and posteriorly. These pigments dispersed in perivascular pattern.
- Retinal blood arterioles- Extremely attenuated and thread like.
- Optic disc- pale wax like yellowish appearance, consecutive optic atrophy.
- Posterior subcapsular cataract formed in late stages.

- Annular or ring-shaped scotoma related to degenerated equatorial retina.
- Electrophysiological changes- Electro-retinogram (ERG) is initially subnormal. Electro-oculogram (EOG) is subnormal with an absence of light peak.

Atypical forms of retinitis pigmentosa [1,7]

- 1) **Retinitis pigmentosa sine pigmentosa:** It has same symptoms of RP but no visible pigmentation on retina.
- 2) **Retinitis punctata albescens:** This is same condition with same history and symptoms. Retina shows hundreds of small white dots distributed uniformly over whole fundus.

Treatment^[6]

- 1) **Gene therapy:** To date, Ocular Gene Therapy has been tried with success mice, dogs, now in some humans.
- 2) **Retinal implants:** Patients with severe visual loss using either epiretinal or subretinal implants was reviewed recently by Margalit et Al. Humayun et al reported direct retinal stimulation using epiretinal implants in RP. Long term effects of implants have not been assessed.
- 3) **Neurotropic factors-** Several neurotropic factors have been shown to protect photoreceptors from degeneration in animal models.
- 4) **Retinal transplantation:** Places sheet of developing retinas and retinal pigment epithelial cells into the subretinal spaces. Adult transplants have been performed on humans with RP and ARMD. Transplants have not caused harm but there is no evidence of effective development of synaptic connections.
- 5) **Stem cells:** Animal study with stem cell transplant reported that, improvement in vision of treated rats was 100% over untreated controls.
- 6) **Vitamin therapy:** Vitamin A may protect the photoreceptors by trophic and antioxidant effects. Long term (5 to 15 years) vitamin A supplementation in dose of 15,000IU per day slow down the loss of ERG amplitude. There is no consensus about utility of Vitamin A treatment.

All these treatments are still in their early stages of research and development. These treatments are costly and not easily available.

Review of Ayurvedic Management

A) *Shodhan Chikitsa*

1) *Virechana Karma*

It is one of the *Panchakarma* procedure advised in treatment of *Netraroga*.^[8-10] *Netra* is a site of *Alochaka Pitta* and *Tarpak Kapha*.^[11] Most of *Netrarogas* are formed due to vitiation of *Pitta* and *Kapha Doshas*.^[12] So that *Virechana* procedure is

considered as best therapy for *Pitta Dosh* and also useful in *Pitta- Kaphaj Vyadhi*.^[13,14] It is also indicated for vitiation of *Vata Dosh* by giving *Mridu Virechana*.^[15] Thus *Virechana Karma* can help to regulate functions of all 3 vitiated *Doshas*. *Virechana* is induced purgation with medication. These medications have predominance of *Jala* and *Prithvi Mahabhuta* which causes extraction of vitiated *Doshas* in the form of loose motions. According to *Acharya Charaka*, the *Virechana* drugs first get digested in *Amashaya* and then reaches *Hridayam*, *Dhamani* and *Strotasa* (macro and micro channels) and expel the vitiated *Pitta* and *Kapha* from the body in form of purgation.^[16] *Virechana* increases strength of all *Indriyas* and it helps to delay aging process.^[17] In retinitis pigmentosa there is vitiation of all these *Tridosha* present. Thus, here *Virechana Karma* can be advisable to regulate the proper function of *Tridosha* and stabilize the degeneration of retina and to maintain the vision of patient.

2) *Basti Karma*

It is an important therapy used mainly for *Vata Dosh Chikitsa* although it is best therapy for all three vitiated *Doshas*.^[18,19] It is a procedure in which the drugs prepared according to classical references is administered per rectum which reaches upto *Nabhi*, *Kati*, *Parshwa*, *Kukshi Pradesha* and then it gathers vitiated *Doshas* from all macro and micro channels of the body and excrete them per anal. *Basti* cures the diseases of all channels of body like *Shakha*, *Koshtha*, *Marma* and *Urdhwajatrugata Vyadhis*.^[20] According to *Acharya Sushruta* the root cause of disease formation is a vitiation of *Doshas*.^[5] *Basti Chikitsa* helps to regulate vitiated *Tridosha* and it is very helpful to maintain eye health^[21]. It is indicated in *Doshprakopa Avastha* and *Sannipata (Tridosh Dushti)*.^[19] There are two main types of *Basti Chikitsa* namely *Niruha* and *Anuvasana Basti*. *Niruha Basti* mainly contains *Kwatha* (decoctions) and *Anuvasana* contains medicated oils and ghee used as main drug.^[22] These drugs readily get absorbed by mucous layer of rectum and accumulate all vitiated *Doshas* and excrete them from body per anal. In *Sushruta Samhit Jivantyadi Anuvasana* helps to cure *Urdhwajatrugata Rogas*.^[23] *Guduchyadi Asthapana* helps in delay the ageing and degeneration process of body.^[24] *Charaka Samhita* stated *Sthiradi Niruha* gives strength to eyes and helps to maintain vision.^[25] Another type of *Basti* explained in *Brihatrayi* i.e., *Yapana Basti* helps to reduce degenerative changes in body also beneficial to eye sight. *Mustadi Yapana* explained by *Charakacharya* which gives benefits to reduce degenerative condition in eyes and all body.^[26] Retinitis pigmentosa is a degenerative condition here *Basti Chikitsa* can be advised to delay

degeneration of retina and maintain the vision of patient.

3) *Nasya*

In Ayurvedic *Samhita Acharya Charaka, Sushruta* and *Vagbhata* stated that nose is a gateway of the head (brain).^[27] *Nasya* is a one of the *Panchakarma* therapy in which drug is administered through nose.^[28] *Nasya* is beneficial for diseases of nose, ear, eyes, head, oral cavity. It provides nourishment to facial, vocal organs and increase sensory perception. It helps to prevent infections and early ageing of organs above clavicle.^[27] *Nasya Karma* is divided in various types according to properties and quantity of drug used. Mainly *Rechana, Brihana* and *Shaman* are the basic types. *Rechana Nasya* helps to extract vitiated *Doshas* from head, *Brihana Nasya* helps to provide energy and strength to organs above clavicle bone. *Shaman Nasya* helps to regulate *Tridosha*. Drugs used for *Nasya Karma* is in the form of oil, ghee, paste-extract, dry fine powder and medicated smoke.^[29] Nasal route is easily accessible, convenient and reliable with porous endothelial membrane and highly vascularized epithelium which provides rapid absorption of drug into systemic circulation avoiding hepatic first pass elimination.^[30]

1) Vascular pathway: Transportation is possible through the pooling of nasal venous blood into facial vein which occurs naturally. Facial vein has no valves. it communicates freely with intracranial circulation.

2) Neurological pathway: Olfactory nerve pathway is connected with limbic system and hypothalamus which have control of endocrine secretions. Thus, administration of drug through nasal route stimulates higher centers in brain which shows action of regulation of endocrine and nervous system.^[31] Considering all points that are mentioned above *Nasya* therapy can be advised in retinitis pigmentosa to strengthen the retinal epithelium and maintain the existing vision.

4) *Tarpana*

Tarpana is one of the described in Ayurvedic literature for treatment of ocular diseases.^[32] *Acharya Vagbhata* stated that *Tarpana Chikitsa* is helpful in management of *Vata-Pittaj Netrarogas* as well as *Ratrandhya* i.e., night blindness.^[33] *Ghrita Kalpa* is primarily used for *Tarpana* but *Acharya Vagbhata* indicated *Vasa* (animal fat) in night blindness. *Tarpana* can also be considered as route of ocular drug delivery through topical administration. Corneal epithelium is lipoidal in nature which helps to absorb lipid containing drugs. Most of *Tarpana Dravyas* are medicated ghee and *Vasa* thus it can be well absorbed through lipoidal membrane. Conjunctival, sclera and ciliary vasculature also helps in drug absorption.

Tarpana gives nourishment to ocular structures. It gives strength to eye.

5) *Anjana Chikitsa*

Anjana Kriya is one of the *Kriyakalpa* procedure used in ocular disorders. According to its form *Anjana* is of 3 types namely *Gutika* (pills), *Rasakriya* (semisolid), and *Churna* (powder). They are used for sever, moderate and mild disorders respectively. As per action 3 types *Lekhana* (scraping action), *Ropana* (healing) and *Prasadana* (purifying) indicated in ocular diseases of all *Doshas*.^[34] *Anjana* is the type of topical drug administration. Topical route is most favored route especially for anterior segment and ocular surface disorders of eye. *Anjana* therapy is highly effective in anterior segment of because of the presence of several anatomical and physiological ocular barriers. But in Ayurvedic science pharmacological action of drug may explained according to its *Rasa, Guna, Virya, Vipaka, and Prabhava*.^[35] These qualitative quantities are still not explained and interpreted in accordance of modern science. Hence as per Ayurveda these qualitative measures also act on posterior segment of eye. *Acharya Sushruta* and *Vagbhata* explained many *Anjana Kalpas* in *Ratrandhya* (night blindness) and *Drishtigata Rogas*. *Kubjakadyanjan, Ratrandhyaharanjan, Ajomedanjan* are some of these.^[36] *Yogartanakar Samhita* and *Sharandhar Samhita* and *Bhaishajya Ratnavali* also give many formulations of *Anjana Kalpa* like *Chandrodaya Varti, Chandraprabha Varti* for *Drishtigata Roga*.^[37,38]

B) *Shaman Chikitsa*

Various oral drug formation can be prepared from *Vayasthapak Dravyas* like *Amlaki, Haritaki, Amruta, Rasna, Shweta, Jivanti, Punarnava, Shatavari, Mandukparni, Sthira* and *Jivaniya Dravyas*^[39] and *Chakshushya Dravyas* like *Chitrak, Pippali, Amlaki, Haritaki*.^[40] Various medicated ghee like *Triphala Ghrita, Mahatriphala Ghrita*, can be used intra oral to delay the retinal degeneration.^[37] *Saptamrita loha, Netrashaniras, Dadhimarich Yog, Vachadi Kwatha, Mahish Pliha* and *Yakruta Sevan, Aja Yakruta with Pippali Churna* like various oral drug formulations are advised by various *Acharyas* in *Drishtigata Rogas* and *Ratrandhyata* (night blindness).^[38]

Previous evidence-based case studies results

Some previous case studies conducted on RP and its management through Ayurveda adopted *Shodhan* and *Shaman chikitsa* and they had significant results to maintain vision of RP patients.

1. A clinical case study on RP adopted treatment protocol including *Seka* with *Triphala* and *Yashti Kashaya, Aschyotana* and *Tarpana* with *Jivantyadi Ghrita*, oral medication like *Saptamrutaloha* and

- Triphala Ghrita* reported that visual acuity of patient was stabilized by this management.^[41]
2. Another case study on RP conducted with protocol including *Snehapana* with *Jivantyadi Ghrita*, *Virechana Chikitsa* and *Marsha Nasya* with *Anutaila*, *Shirodhara* with *Kshirbala Tialam*, *Anjana* with *Kanasindhava*, *Tarpana* and *Putpaka* with *Jivantyadi Ghrita* reported significant visual improvement.^[42]
 3. A clinical case study on RP the intervened by *Snehanapana* with *Vainateya Ghrita*, *Virechana* with *Trivrita Leha* and *Triphala kwatha*, *Marsha Nasya* with *Jivantyadi Taila*, *Netradhara* with *Kashyap Kashayam*, *Anjana* with *Timiranjana*, *Tarpana* with *Anatha Ghrita*, *Aschyotana*, *Shiro-Veshtana* and *Mukh Dhanya Pinda Sweda*, *Shirodhara* with *Kshirbala Taila* and *Shaman chikitsa* etc reported that the same visual acuity was maintained and no further progression of attenuated blood vessels.^[43]
 4. A case study conducted on RP and its Ayurvedic management adopted *Snehana* with *Mahatrpahala Ghrita*, *Virechana* with *Avipattikar churna* and *Basti* with *Chakshushya Kashaya*, *Kanadi Anjana*, *Putpaka* with *Kanadi Yoga*, *Tarpana* with *Mahatriphaladi* and *Jivantyadi Ghrita*, *Shirodhara* with *Kshirbala Taila* and *Shaman chikitsa* concluded that Ayurvedic treatment was safe and effective to minimize subjective symptoms of RP and improve eye structurally and functionally as a whole.^[44]
 5. A clinical case study conducted on RP with Ayurvedic management protocol such as *Deepanapachana*, *Snehana* with *Mahatriphala Ghrita*, *Swedana*, *Virechana* with *Trivritta leha*, *Kanadi Anjana*, *Kanadi Putpaka*, *Nasya* with *Bhringaraja taila*, *Tarpana* with *Mahatriphaladi Ghrita* concluded that the chemical constituents and other phytonutrients of the drugs used in this case had the ability to cross the ocular barriers and gives good results in treating this patient thereby improving the quality of life of the patient.^[45]
 6. A case report on Ayurvedic management of RP adopted *Vinayaka Anjana*, *Snehana Putpaka*, *Tarpana* with *Triphala Ghrita*, *Seka* with *Triphala kwatha*, *Bidalaka*, *Nasya* with *Kshirbalataila*, concluded that that case study helped in contributing the available treatments of Ayurveda which needs to be still established scientifically and further researches to be done and encouraged keeping in view the benefits of the society.^[46]
 7. A case study conducted on RP and its management intervened by *Snehana* with *Triphala Ghrita Mridu* *Virechana* with *Triphala churna* and *Shaman Chikitsa* and they concluded that an attempt was

made such that there was an improvement in the living condition of the patient, since the pathogenesis and some symptoms of Retinitis Pigmentosa are similar to that of *Kaphaja Timira* and it was showed that the visual acuity is stabilized by Ayurvedic management.^[47]

8. A clinical case study conducted on Ayurvedic management of retinitis pigmentosa adopted a protocol included *Rasnachurna Shiro Udwartana*, *Anu Taila Nasya*, *Virechana*, *Tailadhara* with *Kshirbala Taila*, *Tarpana* with *Patoladi Ghrita*, *Putpaka* and *Shaman Chikitsa* concluded that this treatment was effective to minimize subjective symptoms of RP.^[48]

CONCLUSION

The main challenge in management of retinitis pigmentosa is to maintain the vision of patient as well as to delay the degeneration of retina. In allopathy science, therapies or treatments available for RP are gene therapy, retinal transplants, stem cell therapy and vitamin therapy etc. these treatments are not satisfactory and much expensive for common people. In Ayurveda *Nakulandhya*, *Kaphavidagdha Drishti* and *Doshandh* have resemblance with RP in symptomatology. Ayurvedic *Panchakarma* therapies and *Kriyakalpa* therapies can help to regulate vitiated *Doshas* and provide nourishment and strength to ocular tissue. These therapies can help to maintain the vision of patient and reduce progression of RP. Ayurvedic therapies are cost effective and have minimal side effects. So that *Virechana*, *Basti*, *Tarpana*, *Nasya* and *Anjana* procedures can be advised in management of RP to maintain the vision and prolong the degeneration of retina. These Ayurvedic therapies are cost effective and easily available. Acharya *Vagbhata* said we should take efforts to protect eyes throughout the life because night and days are same for blind person and money and world is useless without the vision.^[49] So that we have to take efforts to maintain the vision of RP patient with the help of different scientific therapies in Ayurveda.

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