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A CLINICAL REVIEW OF PANCHAKARMA THERAPIES IN THE MANAGEMENT OF RETINITIS PIGMENTOSA: AN INTEGRATIVE APPROACH

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ABSTRACT

Retinal Dystrophy can present symptoms at any age, from infancy to adulthood, making the timing of diagnosis highly variable. As a hereditary condition, RP mainly affects the rods more severely than the cones. The classic clinical triad includes narrowing of retinal arterioles, bone spicule-like pigmentation in the retina, and a waxy pallor of the optic disc.

From an Ayurvedic perspective, the symptoms of RP closely resemble those of Doshandha, one of the Dristigata Rogas (eye diseases). This condition is described as a state where vision becomes obscured during sunset, leading to night blindness, while vision tends to improve during the day as sunlight disperses the accumulated doshas in the eye. The disease aligns with Kaphaja Timira in terms of its underlying pathology, with night blindness being a key distinguishing feature. Since RP is considered to have a predominantly Kapha origin, the treatment approach is based on Kaphahara (Kapha-reducing) and Brimhana (nourishing) therapies.

Currently, there is no definitive cure for RP. Management primarily focuses on the use of low vision aids (LVA) and genetic counseling to support affected individuals. Treatment is aimed at symptomatic relief rather than disease reversal.

INTRODUCTION

Diffuse progressive failure of primarily rod photoreceptors, followed by degeneration of cone photoreceptors and the retinal pigment epithelium (RPE), is the hallmark of retinal pigmentosa (RP), a clinically and genetically diverse group of inherited retinal illnesses. Night blindness and increasing visual field loss are the most common symptoms of visual impairment. Between 1:3000 and 1:5000 is its predominance. RP can occur alone (normal RP) or in conjunction with a systemic illness. Rare but treatable forms of RP are briefly discussed in this article, which concentrates on common RP.

ETIOLOGY

The term retinitis pigmentosa is misleading semantically as it suggests inflammation (indicated by the suffix -itis) is a significant aspect of the condition's pathophysiology, which it is not. Instead, the disorder is classified as a dystrophy or a genetically determined degeneration rather than an inflammatory condition. Given that RP encompasses a variety of genetic disorders, its causes are quite diverse. Nonetheless, the end result tends to be the death of photoreceptor cells through apoptosis, starting with rods and subsequently affecting cones.

RISK FACTORS

Currently, there are no identified risk factors for retinitis pigmentosa (RP) aside from genetic factors. RP can manifest as a sporadic condition or be passed down through autosomal dominant, autosomal recessive, or X-linked inheritance patterns. A significant number of cases result from a mutation in the rhodopsin gene. Additionally, RP may be linked to certain systemic disorders, which are typically inherited in an autosomal recessive manner. There are numerous genes connected to RP for which patients can pursue genetic testing. The connection with the RPE65 gene is particularly significant since effective gene therapy is now available for individuals with this mutation.

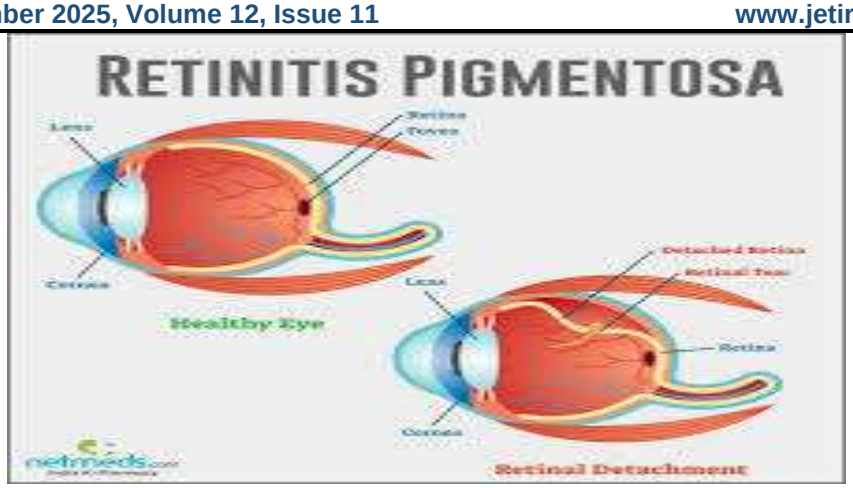
PATHOPHYSIOLOGY

Research on the pathophysiology of retinitis pigmentosa (RP) has been conducted using various animal models. In rats, retinal degeneration occurs due to the inability of the retinal pigment epithelium (RPE) to engulf the discarded discs of rod outer segments, leading to the buildup of debris from these segments. In mice with a homozygous recessive mutation related to retinal degeneration, the development of rod photoreceptors is halted, resulting in degeneration before the cells fully mature. Additionally, a defect in cGMP-phosphodiesterase has been observed, causing elevated levels of cyclic guanosine monophosphate, which is also seen in certain autosomal recessive dog models. It remains unclear if the defects observed in these animal models of retinal degeneration represent the underlying pathophysiological mechanisms of human retinitis pigmentosa.

ETIOPATHOLOGY

Histopathological research indicates that retinitis pigmentosa (RP) arises from a primary issue in the rod and cone photoreceptors. Pathological observations of an enucleated eye from a patient with autosomal recessive RP revealed that the outer segments of rods and cones were shortened and disordered in the patient's optimal visual area, while in the region of visual impairment, there was a complete absence of outer segments and a reduction in the number of photoreceptors. Two distinct types of pigmented cells were observed infiltrating the retina: typical retinal pigment epithelium (RPE) cells migrating away from the RPE layer and macrophage-like cells containing melanin.

These alterations were believed to be a response to photoreceptor injury, as the retinal pigment epithelium (RPE) appeared to be relatively normal in structure in regions where photoreceptors were initially affected. Another review provided histopathological observations from 10 patients diagnosed with autosomal dominant retinitis pigmentosa (RP), noting disorganized, shortened, or absent outer segments alongside shortened inner segments. In three instances, inclusion bodies and/or perinuclear cytoplasmic membranous swirls were observed.



CLINICAL FEATURES

1. VISUAL CHANGES: Night blindness is a hallmark symptom and often appears well before any visible retinal changes. It occurs due to the deterioration of rod cells.Dark adaptation: The light sensitivity of the peripheral retina is reduced, resulting in a higher light threshold. In the later stages of the disease, patients may develop tunnel vision (also known as tubular vision).

2. FUNDUS CHAGES: Pigmentary changes in the retina usually appear around the blood vessels and have a shape similar to bone corpuscles. Initially, these changes are observed in the equatorial region of the retina but gradually extend both toward the front (anteriorly) and back (posteriorly). As the condition progresses, the retinal arterioles become increasingly narrow and may appear thread-like in advanced stages. In later stages, the optic disc takes on a waxy, pale appearance, eventually leading to optic atrophy. Other associated retinal findings may include colloid bodies, cystoid macular edema, choroidal sclerosis, and atrophic changes in the macula.

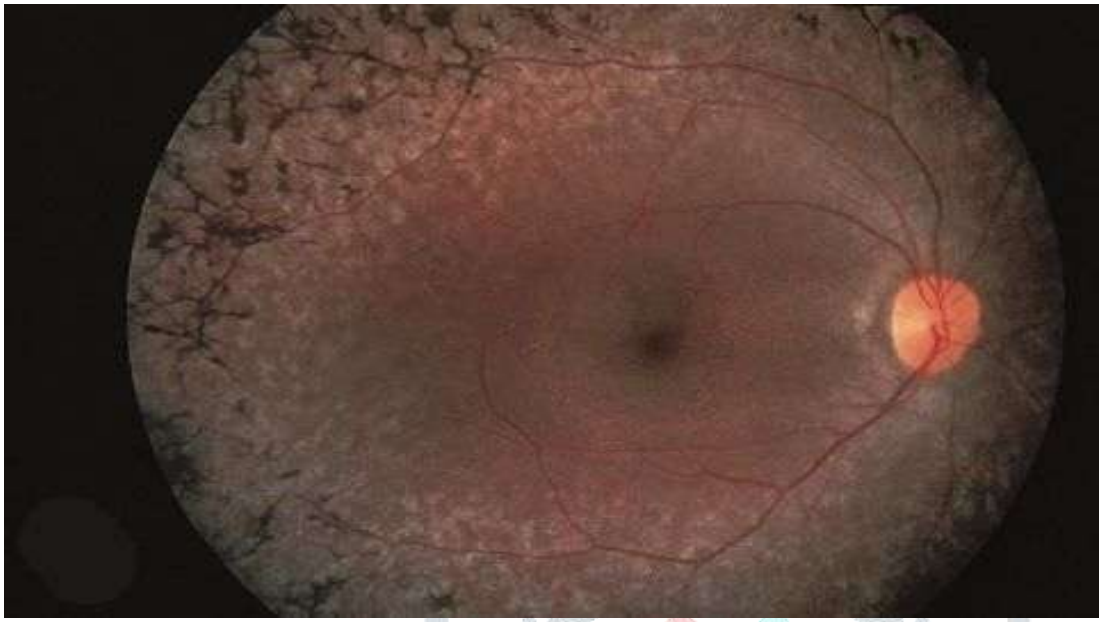
3. The electro-oculogram (EOG) reveals a missing light peak response, while the electroretinogram (ERG) shows either significantly reduced or completely absent electrical activity.

MOLECULAR GENETICS WHICH WERE KNOWN

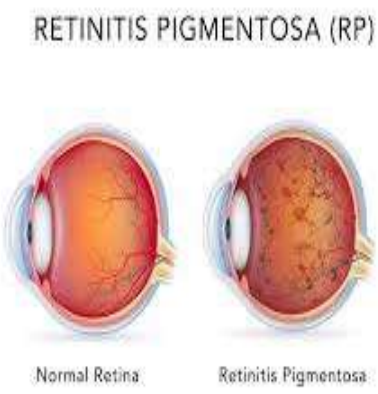
Over 100 gene loci linked to retinitis pigmentosa (RP) have been identified. These genes are typically involved in processes such as the phototransduction cascade, the retinoid cycle, the structural integrity of photoreceptors, or various other functions of photoreceptors and the retinal pigment epithelium. The most common mutations occur in the rhodopsin gene (related to phototransduction), USH2A (involved in photoreceptor structure), and RPGR (associated with cilia function and intracellular transport). Interestingly, individuals with the same genetic

mutation can exhibit differing disease severity at the same age. Despite progress in genetic research, the underlying genetic cause remains unknown in around 50% of RP cases. A gene therapy is currently available for mutations in the RPE65 gene.

PHYSICAL EXAMINATION AND THE SIGNS INVOLVED



Bone spicule like retinal pigmentary changes seen in the above image



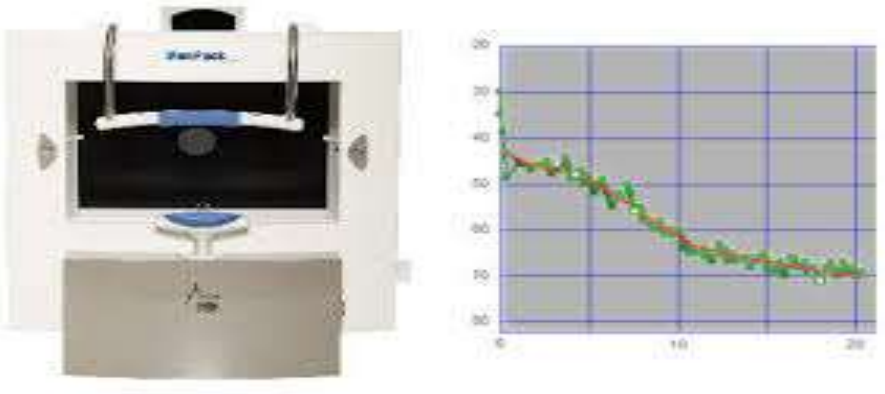
SYMPTOMS

- Patients with retinitis pigmentosa (RP) commonly experience difficulty seeing at night or have a delayed ability to adapt to darkness. As the condition progresses, they often develop a gradual loss of peripheral vision, which can eventually lead to tunnel vision.
- However, complete vision loss in both eyes is uncommon. In a large study involving nearly 1,000 individuals aged 45 and older with RP or Usher syndrome, approximately 25% had a visual acuity of 20/200 or worse in both eyes, while over 50% retained a visual acuity of 20/40 or better in at least one eye. Only 0.5% of participants were found to be totally blind in both eyes.

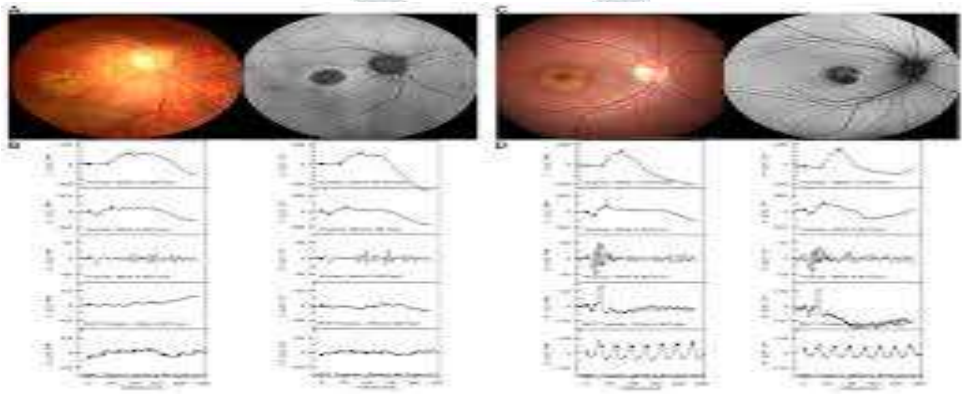
- Additionally, another study reported that about half of RP patients experienced headaches, and 35% noticed light flashes.

DIAGNOSTIC PROCEDURE

1. Dark adaptometry (DA) evaluates the lowest light intensity that can trigger a visual response from rods or cones, known as the visual threshold. It specifically measures how rod sensitivity changes over time as the eye adjusts to darkness. In individuals with retinitis pigmentosa (RP), this test typically reveals a higher absolute rod threshold and delayed dark adaptation. As a result, dark adaptometry can be valuable in identifying early stages of the



2. **Full-field electroretinogram (ERG)** is a key diagnostic tool for retinitis pigmentosa (RP), as it records the electrical responses of rods and cones following light stimulation. The main aspects evaluated are the amplitudes of the a- and b-waves, along with their implicit times. In the early phases of RP, the a- and b-wave amplitudes are typically reduced, while the implicit times may be either normal or slightly delayed. In advanced cases, ERG responses often become undetectable.



3. Visual field testing using kinetic perimetry with a Goldmann perimeter typically reveals a ring-shaped scotoma in the midperipheral visual field in retinitis pigmentosa (RP). This begins as scattered blind spots around 20 degrees from the central point of focus, which gradually merge to form an incomplete and eventually complete ring. The outer boundary of this ring

tends to spread quickly toward the peripheral field, while the inner edge moves inward more slowly, approaching central vision. Many patients retain a small area of central vision, known as "tunnel vision," well into their 50s or 60s. Visual field assessment is important for tracking disease progression and determining if a patient meets the criteria for legal blindness.

Category	Details
Purpose of Genetic Testing	Helps confirm the diagnosis of RP
Nonprofit Testing	Carver Nonprofit Genetic Testing Lab (University of Iowa) offers affordable RP testing
Commercial Testing	Available across the U.S. for RP and other hereditary retinal disorders
Additional Lab Tests	Used to rule out other conditions that mimic RP
Serologic Testing	For **syphilis**
Ornithine-related Testing	- **Serum ornithine level** - **Ornithine-lysine ratio** (for gyrate atrophy)
Phytanic Acid Testing	- **Serum phytanic acid level** (for diagnosing Refsum disease)

AYURVEDIC POINT OF VIEW ON RP

In Ayurveda, eye disorders are classified under Shalakya Tantra. Various factors can contribute to impaired eye function. Retinitis Pigmentosa, being a genetic disorder, is linked in Ayurveda to Beej Dushti or Beej Bhaga Dushti. When the reproductive element (Beej Bhaga) is affected by imbalanced doshas, it can lead to conditions like blindness, physical deformities, and other congenital issues. Beej Bhaga is considered analogous to chromosomes, and any disruption here may result in hereditary diseases. Retinitis Pigmentosa, with its genetic basis, presents symptoms similar to certain forms of Timira such as Nakulandhya and Doshanda, which involve night blindness. The condition involves vitiation of all three doshas (Tridosha), and though it is a chronic disease, Ayurveda offers effective management through the use of specific medicinal herbs.

MANAGEMENT IN AYURVEDA

The management of Retinitis Pigmentosa in Ayurveda includes Virechana Karma (purgation therapy), especially since Pitta and Kapha doshas are typically more involved in eye disorders. Virechana is beneficial in such cases as it helps eliminate aggravated doshas and also enhances the functioning of all sensory organs, including the eyes.

Nasya Karma (nasal administration of medicines) is also effective in this condition. It supports retinal health by strengthening the retinal epithelium and helps preserve existing vision. This is due to the olfactory nerve's connection with the hypothalamus and limbic system, allowing Nasya to stimulate higher brain centers.

Tarpana—a local ocular therapy involving the retention of medicated ghee or oil over the eyes—is used particularly in Vata-Pitta eye disorders. It nourishes and revitalizes the eye tissues, thereby improving ocular strength and function.

Medicinal herbs beneficial in Retinitis Pigmentosa include Rasayana (rejuvenative) and Chakshushya (vision-enhancing) drugs such as Amalaki (Emblica officinalis), Haritaki, Rasna, Punarnava, Shatavari, Jivanti, and vision-supportive herbs like Pippali, Chitrak, and Amalaki.

1. Purva Karma (Preparatory Phase)

a) Snehana (Oleation Therapy)

Internal Oleation: Intake of medicated ghee such as Triphala Ghrita or Mahatriphala Ghrita is given to promote internal lubrication and facilitate the loosening of accumulated doshas.

External Oleation: Therapeutic oil massage (Abhyanga) is performed using herbal oils like Chandanadi Taila, Bala Taila, or Shatavari Taila, focusing on the head, neck, and face to soothe the doshas and prepare the body for further cleansing.

b) Swedana (Fomentation Therapy)

Nadi Sweda involves applying herbal steam to the face and neck region, aiding in the liquefaction and movement of vitiated doshas towards the digestive tract for elimination.

2. Pradhana Karma (Primary Panchakarma Procedures)

a) Virechana (Purgation Therapy)

Indications: Most effective when Pitta and Kapha doshas are predominant in the pathology.

Objective: Aims to cleanse the liver and eliminate toxins from the body that may affect visual functions.

Medications Used: Commonly used formulations include Trivrit Leha, Avipattikar Churna, and Aragvadhadi Kashaya.

b) Nasya Karma (Nasal Drug Administration)

Objective: Helps enhance and support the optic nerve and retinal functions by activating higher centers in the brain through the olfactory route.

Recommended Timing: Ideally performed in the morning on an empty stomach.

Medications Used: Oils such as Shigru Taila, Anu Taila, and Ksheerabala Taila are commonly used.

Types of Nasya:

Pratimarsha Nasya: Gentle, daily application in small doses.

Marsha Nasya: Administered in larger doses under supervision for deeper therapeutic effect.

c) Netra Tarpana (Ocular Rejuvenation Therapy)

Indication: Particularly effective in eye disorders caused by Vata and Pitta imbalance.

Procedure: Involves holding medicated ghee such as Mahatriphala Ghrita over the eyes within a boundary made of dough.

Duration: Typically lasts between 15 to 30 minutes, depending on patient tolerance.

Therapeutic Benefits: Deeply nourishes ocular tissues, strengthens eye muscles and the retina, and helps slow down degenerative changes.

3. Paschat Karma (Post-Panchakarma Care)

Dietary Guidelines: Begin with light and easily digestible foods such as Manda (rice water) and Yavagu (thin gruel), then gradually transition to a normal diet.

Lifestyle Recommendations:

Minimize exposure to strong sunlight, limit screen time, and manage stress levels.

Adhere to Dinacharya (a balanced daily routine) and Ritucharya (seasonal regimen) to help maintain doshic equilibrium and prevent recurrence.

4. Supportive Rasayana Therapy and Herbal Medicines

a) Chakshushya Dravyas (Herbs Beneficial for Vision):

Include herbs like Amalaki, Pippali, Punarnava, Jivanti, Chitraka, and Shatavari known for enhancing ocular health.

b) Rasayana (Rejuvenating Formulations):

Triphala Rasayana, Chyawanprash, Ashwagandha, and Guduchi are recommended to nourish body tissues and support overall vitality.

c) Medicated Ghee Preparations:

Preparations such as Mahatriphala Ghrita, Saptamrita Lauha, and Kalyanaka Ghrita are used to strengthen vision and promote retinal health.

Panchakarma	**Purpose**	**Main Drugs/Techniques Used**
Snehana	To dislodge accumulated doshas	Triphala Ghrita, Bala Taila
Swedana	To liquefy and loosen doshas	Nadi Swedana (medicated steam therapy)
Virechana	To eliminate Pitta and Kapha doshas	Trivrit Leha, Avipattikar Churna
Nasya	To activate brain functions	Anu Taila, Shigru Taila
Netra Tarpana	To nourish and rejuvenate the eyes	Mahatriphala Ghrita
Rasayana Therapy	To revitalize and strengthen body tissues	Amalaki, Shatavari, Triphala

DISCUSSION

Retinitis Pigmentosa (RP) is a group of progressive, inherited retinal disorders that primarily affect the photoreceptor cells—rods and cones—leading to gradual vision loss. Clinically, RP manifests with early symptoms like night blindness (nyctalopia), followed by progressive tunnel vision and eventual loss of central vision in advanced stages. Fundoscopic findings typically show bone-spicule pigmentation around retinal vessels, narrowed retinal arterioles, and a pale, waxy optic disc. Electroretinogram (ERG) findings are subnormal or extinguished, reflecting photoreceptor dysfunction. Modern medicine currently offers no definitive cure, though low vision aids and genetic counseling can provide some support. From an Ayurvedic perspective, RP is not described as a distinct disease but can be correlated with conditions like Timira (early visual impairment), Kṛṣṇārdra Drishti, or even Linganāsha (complete vision loss) depending on the stage of progression. The pathology is primarily attributed to Vata-Pitta vitiation affecting Alochaka Pitta and Majja Dhatu, leading to deterioration of visual function.

Management in Ayurveda is holistic, aiming not only to slow degeneration but also to nourish and strengthen ocular tissues. Panchakarma therapies such as Snehana (oleation), Swedana (sudation), Virechana (purgation), Nasya (nasal therapy), and Netra Tarpana (ocular rejuvenation) are employed to remove doshic imbalance and rejuvenate eye structures. Medicated ghee preparations like Triphala Ghrita and Mahatriphala Ghrita are used for internal and external nourishment. Rasayana therapies including Saptamrita Lauha, Amalaki Rasayana, and herbs like Ashwagandha, Brahmi, and Shatavari help in neuroprotection and slowing degeneration. Supportive lifestyle measures such as a sattvic diet, protection from bright light, and reduced screen time are also emphasized.

Although complete reversal of RP may not be feasible, Ayurvedic management offers promising supportive care. By improving retinal nutrition, slowing disease progression, and enhancing quality of life, Ayurveda can play a complementary role in the integrative management of RP when initiated in the early or mid-stages.

CONCLUSION

Retinitis Pigmentosa (RP) is a progressive and genetically driven retinal disorder that currently lacks a curative treatment in modern medicine. However, Ayurveda offers a comprehensive and holistic approach aimed at slowing disease progression, preserving remaining vision, and improving overall ocular health. Through a combination of Panchakarma therapies, Rasayana (rejuvenative) formulations, and Chakshushya (eye-strengthening) herbs, Ayurveda focuses on balancing the doshas, nourishing the deeper tissues such as Majja Dhatu (nervous tissue), and revitalizing Alochaka Pitta (visual perception energy). Early intervention, individualized treatment, and adherence to supportive lifestyle practices are key to achieving the best outcomes. While Ayurvedic management may not reverse RP, it holds significant potential in enhancing quality of life, retarding degeneration, and offering hope in a condition with limited modern options. An integrative approach that combines Ayurvedic care with modern diagnostic tools may provide the most comprehensive support for patients with RP.