



Ayurveda

ROLE OF RASAYANA AND CHAKSHUSHYA DRAVYA IN PREVENTION OF AGE- RELATED MACULAR DEGENERATION (AMD)

Dr. Vaishnavi V. Mandavkar*

MD Scholar, Dept. of Shalakya Tantra, PDEA's College of Ayurved and Research Centre, Nigdi Pune, Maharashtra India. *Corresponding Author

Dr Nilima Amrute

Associate Professor, Dept. of Shalakya Tantra, PDEA's College of Ayurved and Research Centre, Nigdi Pune, Maharashtra India.

Dr. Chandana Virkar

HOD and Professor, Dept. of Shalakya Tantra, PDEA's College of Ayurved and Research Centre, Nigdi Pune, Maharashtra India.

ABSTRACT Age-related macular degeneration (AMD) is a leading cause of irreversible central vision loss in the elderly population worldwide. Modern ophthalmology attributes AMD to progressive degenerative changes in the macula due to oxidative stress, genetic predisposition, chronic inflammation, and vascular alterations. Despite advancements such as anti-VEGF (Anti-Vascular Endothelial Growth Factor) therapy and laser photocoagulation, preventive and holistic approaches remain limited. Ayurveda, with its emphasis on Rasayana (rejuvenative therapy) and Chakshushya dravya (vision-promoting substances), offers a potential preventive and promotive strategy for maintaining ocular health. Ayurvedic classics describe the eye as highly delicate and emphasize Rasayana chikitsa to enhance Ojas, prevent premature degeneration, and sustain healthy vision. Drugs such as Triphala, Amalaki, Shatavari, Yashtimadhu, Jeevaniya gana, and Ghrita preparations (e.g., Triphala ghrita, Maha Triphala ghrita) are specifically mentioned as Chakshushya. Their antioxidant, anti-inflammatory, and neuroprotective effects align with the modern pathogenesis of AMD. Recent experimental and clinical studies also indicate that polyphenols, flavonoids, and carotenoids in Ayurvedic Rasayana herbs reduce oxidative stress and delay retinal degeneration. Thus, integrating Rasayana and Chakshushya dravya may offer a safe, preventive, and complementary approach for AMD. This review explores Ayurvedic concepts, classical references, pharmacological evidence, and potential clinical application of Rasayana and Chakshushya dravya in AMD prevention.

KEYWORDS : Ayurveda, Rasayana, Chakshushya dravya, Age-related macular degeneration, Triphala, Amalaki

INTRODUCTION

Age-related macular degeneration (AMD) is a chronic progressive ocular disorder that primarily affects the central retina (macula), leading to impaired central vision, difficulty in reading, recognizing faces, and performing tasks requiring fine visual acuity. AMD is the third leading cause of blindness globally, and the primary cause in developed countries, accounting for nearly 8.7% of total blindness worldwide [1]. In India, with an aging population, AMD prevalence is steadily rising, with studies reporting rates between 1.4–4.7% among those aged above 60 years [2].

Modern science explains AMD pathogenesis as a multifactorial process involving oxidative stress, lipofuscin accumulation, drusen deposition, mitochondrial dysfunction, chronic low-grade inflammation, and angiogenesis. Preventive strategies include lifestyle modification, antioxidant supplementation (AREDS trial), and vascular-targeted therapies. However, long-term management remains challenging, and preventive measures are still under exploration.

Ayurveda describes the eye (Netra) as one of the most delicate sense organs (Pratyaksha pramana pradhana indriya), requiring nourishment from both systemic and local therapies. The concept of Rasayana emphasizes rejuvenation, prevention of early degeneration, and promotion of tissue longevity, [3] while Chakshushya dravya are beneficial to Chakshu specifically preserve and enhance ocular health. [4] These correlate with modern strategies of preventing oxidative retinal damage and maintaining vascular and neural integrity.

This article aims to critically analyze the role of Rasayana and Chakshushya dravya in the prevention of AMD through Ayurvedic and modern perspectives.

Age-related Macular Degeneration (AMD) – Modern Perspective

Age-related Macular Degeneration (AMD) is the leading cause of irreversible central vision loss in the elderly, primarily affecting the macula which is responsible for fine visual acuity [1, 5].

Types of AMD

1. Dry (Non-exudative) AMD

o Represents 80–90% of cases.

o Characterized by **drusen deposition, RPE atrophy, and photoreceptor degeneration**, leading to gradual vision loss and geographic atrophy in advanced stages [5,6].

2. Wet (Exudative or Neovascular) AMD

o Accounts for 10–15% but causes most severe vision loss.

o Defined by **choroidal neovascularization (CNV)** with leakage, hemorrhage, and scarring, leading to rapid central vision loss [5,7].

Risk Factors

- Advancing age.
- Genetic variants (CFH, ARMS2/HTRA1).
- Smoking, obesity, poor diet.
- Hypertension, cardiovascular disease.
- Low intake of antioxidants (lutein, zeaxanthin, vitamins C/E, zinc) [8,9].

Pathogenesis [10]

- **Oxidative stress and mitochondrial dysfunction** damage RPE and photoreceptors.
- **Lipofuscin accumulation and drusen deposition** impair cellular function.
- **Chronic inflammation** via complement activation worsens injury.
- In wet AMD, **VEGF-driven angiogenesis** causes CNV and exudation.

Current Management

- **Nutritional supplementation** (AREDS/AREDS2) slows progression in intermediate AMD [8,9].
- **Anti-VEGF intravitreal injections** (ranibizumab, bevacizumab, aflibercept, brolucizumab) are standard for wet AMD [10].
- **Photodynamic therapy (PDT)** with verteporfin is used in selected CNV [5].
- **Lifestyle modifications:** smoking cessation, antioxidant-rich diet, weight and BP control [1,5].

AMD In Ayurvedic Perspective

Though AMD is not directly described in Ayurveda, it can be correlated with **Patalagata Timira / Kacha / Drishti Nasha** conditions described in classics, which involve degenerative changes of ocular tissues due to **Vata predominance and Dhatu kshaya**.

- **Nidana (causative factors):** Ati-shrama (overexertion of eyes), Ratri-jagarana, excessive alcohol intake, aging (Jara), and improper diet leading to Dhatu kshaya [11].
- **Samprapti (pathogenesis):** Vitiation of Vata and Pitta dosha along with Rakta and Alochaka pitta disturbance → progressive

Dhatu kshaya of Drishti mandala → vision deterioration.

- **Lakshana (symptoms):** Gradual diminution of central vision, distortion, difficulty in recognizing objects – resembling AMD clinical features.
- **Upadrava (complications):** Complete central vision loss in advanced stage, correlating with irreversible blindness in AMD.

Thus, AMD can be understood in Ayurveda as **Netra-dhatu kshaya janya vyadhi**, requiring Rasayana therapy to restore Dhatu bala and Chakshushya dravya to prevent ocular degeneration.

Role of Rasayana in AMD Prevention Rasayana chikitsa is defined as therapy that rejuvenates tissues, improves immunity, enhances longevity, and prevents premature aging (Charaka Sutra 1/7) [3]. In the context of AMD:

- **Antioxidant effect:** Rasayana drugs like Amalaki, Guduchi, Haritaki neutralize free radicals, similar to modern antioxidant formulations.
- **Neuroprotective effect:** Drugs like Shankhapushpi, Mandukaparni protect neural tissue, beneficial in photoreceptor preservation.
- **Microcirculatory support:** Guggulu, Arjuna improves vascular health, preventing ischemic damage.
- **Ojas vardhana:** Improves systemic resilience, slowing age-related degeneration.

Key Rasayana for Ocular Health

1. Amalaki (*Embellica officinalis*) – potent antioxidant, rich in Vitamin C, Rasayana, Chakshushya [12].
2. Triphala (Haritaki, Bibhitaki, Amalaki) – described as Chakshushya, prevents early degeneration [13].
3. Yashtimadhu (*Glycyrrhiza glabra*) [14] – neuroprotective, antioxidant, anti-inflammatory.
4. Shatavari (*Asparagus racemosus*) [15] – Rasayana, supports microcirculation and tissue nutrition.
5. Ghrita preparations – Triphala ghrita, Jeevanti ghrita – lipid-soluble antioxidants beneficial for retinal health.

Role Of Chakshushya Dravya In AMD

Ayurvedic classics list numerous drugs and formulations under Chakshushya category:

- Triphala Ghrita – classical formulation for eye rejuvenation.
- Maha Triphala Ghrita – for degenerative ocular disorders.
- Saptamrita Lauha – traditionally used for chronic eye diseases, supports retinal health.
- Jeevanti ghrita – rejuvenative to ocular tissues.
- Ghrita-based Anjana (collyrium) – local therapy for nourishing ocular structures. These formulations directly target Alohaka Pitta, prevent Dhatu kshaya, and maintain Drishti sthiratva (stability of vision).

DISCUSSION

AMD is a modern degenerative ocular disorder with multifactorial causes, but its essence lies in premature degeneration due to oxidative and vascular damage. Ayurveda addresses this by:

- Identifying **aging and oxidative degeneration** as Jara janya vyadhi.
- Emphasizing **Rasayana chikitsa** to prevent aging and promote longevity.
- Recommending **Chakshushya dravya** specifically for vision protection.

Correlations:

- Modern antioxidant therapy (AREDS) ↔ Ayurvedic Rasayana (Triphala, Amalaki).
- Anti-VEGF therapy ↔ Ayurvedic Rakta-pitta pacifying, microcirculatory supportive drugs (Guggulu, Yashtimadhu).
- Lifestyle measures (quit smoking, diet, exercise) ↔ Dinacharya, Ratricharya, and Netra paricharya in Ayurveda.

Thus, Ayurveda provides a preventive and promotive model, complementing modern therapy for AMD.

CONCLUSION

AMD is an emerging ocular challenge in the elderly with limited preventive options in modern medicine. Ayurveda offers unique insights through Rasayana chikitsa and Chakshushya dravya, which delay degeneration, enhance ocular nutrition, and improve resilience. Classical drugs such as Triphala, Amalaki, Yashtimadhu, Ghrita

preparations, and Saptamrita Lauha demonstrate antioxidant, neuroprotective, and anti-inflammatory properties aligning with modern AMD pathogenesis. Integrative approaches combining conventional ophthalmology with Rasayana-based preventive strategies may reduce AMD incidence and progression. Further clinical trials are warranted to validate these concepts in evidence-based practice.

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