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# UNDERSTANDING OF AGE-RELATED MACULAR DEGENERATION (ARMD) - AN AYURVEDIC PERSPECTIVE

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## ABSTRACT

Age-related macular degeneration (ARMD) is a common eye condition characterized by progressive damage to the macula, leading to central vision loss. The prevalence of age-related macular degeneration (ARMD/AMD) ranges from 8% to 30% in individuals aged 65 and older, with higher rates among older age groups. ARMD can be categorized into dry (atrophic) and wet (neovascular) forms. Diagnosis is based on clinical examination, imaging tests, and visual function assessments. Current treatment options include anti-vascular endothelial growth factor (anti-VEGF) therapy, photodynamic therapy, and nutritional supplementation. In *Ayurveda*, ARMD is understood as a manifestation of vitiation in the *Pitta* and *Vata doshas*, leading to impairment of the *Rakta dhatu* (~blood tissue) and the nourishing aspect of *Rasa dhatu* (~nutrient plasma). The vitiated *doshas* and impaired *dhatus* lead to the formation of *Ama* (~toxins) and the accumulation of lipid and protein in the macular region. Ayurvedic treatment aims to balance *Doshas*, improve *Agni* (~digestive power), eliminate *Ama*, and strengthen *Ojas*. These approaches aim to slow down the progression of the disease, protect vision, and improve overall eye health. Further research and clinical studies are needed to explore the effectiveness of *Ayurvedic* interventions in managing ARMD.

**Key words:** *Drishtigata rogas, Alochakapitta, Timira*

## INTRODUCTION

Age-related macular degeneration (ARMD) is an age-related condition that causes degenerative changes in the macula, leading to significant central vision loss. It is caused by a combination of non-neovascular factors (like drusen and retinal pigment epithelium abnormalities) and the formation of abnormal blood vessels in the choroid (known as choroidal neovascular membrane).ARMD affects around 1.7% of individuals aged 50 and older, with the prevalence rising to about18% in those over 85 years. Multiple risk factors, such as heredity, diet, smoking, hypertension, and sunlight exposure, can impact the age of onset or progression of age-related macular degeneration (ARMD).[2] Laser therapy has been shown to disintegrate drusen in multiple studies, but it also often increases the risk of choroidal neovascularization. However, the impact of antioxidants on the underlying pathophysiology of ARMD have not yet been demonstrated. While some ophthalmologists may recommend vitamin, zinc, or lutein supplements to patients, no definitive evidence supports their effectiveness as a preventive treatment. [3] Therefore, developing an effective treatment for this illness will take time by focusing on its pathology. The aim is to identify and treat lesions even earlier to preserve and improve current vision. In Ayurveda, diseases where vision is affected are described in *Drishtigata rogas* and the macula can be considered the seat of *Pitta*. *Alochaka Pitta* is one among five types of *Pittas* situated in the Eyes and help in performing visual function through the faculty of vision. *Chakshurvaisheshika Alochaka pitta* and *Budhivaisheshika Alochaka pitta* are the two sections for *Alochaka-pitta.*[4] when light rays fall over the macula, the *Alochaka pitta* situated in the entire retina, particularly in the macula, undergoes a series of biochemical transformations to convert the light energy into the nerve impulse, which is the functional unit of vision[5] Since the macula is the point where light rays converge, and *Alochaka pitta* is the functioning factor in the macula, we can say that vitiation of *Alochaka pitta* is the first step in developing macular degeneration. When senility occurs as a supporting factor, it is called age-related macular degeneration. [6.]

## DISCUSSION

***Nidana* -Etiological factors of ARMD**

Old age relates to the preponderance of *Vata*, and neural tissue is considered a component of *Vata* in the body. Hence, the fact that this disease occurs in old age and there is degeneration and loss of neural tissue shows that *Vata dosha* is involved. [7]

- Lifestyle factors are also considered, such as excessive smoking is one of the risk factors for ARMD, and *Dhumapana upadrava* also lead to *Aandhyata.* [8] Suppression of natural urges such as abnormal sleeping patterns, getting anger and grief, *Achakshusya ahara vihara* in old age led to *pitta dosha* vitiation, as mentioned in samhitas. [9]
- Dietary factors such as amla (sour) intake also cause *Pitta* vitiations.
- Any systemic disease which may affect the *Alochakapitta* eg, Diabetes mellitus, hypertension.
- *Aadibalapravratta vikaras* (heredity) can also be causative factors of ARMD.

General pathophysiology

Age-related macular degeneration (ARMD) involves the photoreceptor cells in the outer retina, the retinal pigment epithelium (RPE), Bruch's membrane, and the capillary bed in the inner choroid known as choriocapillaris. There is a loss of choriocapillaris in ARMD. The decreased diffusion of VEGF from the retinal pigment epithelium (RPE) to the choroid may be accountablefor this loss. There is a potential for this damage to occur independently, without being influenced by other tissues. The accumulation of lipids leading to the thickening of Bruch's membrane has been a longstanding hypothesis in age-related macular degeneration (ARMD). Asa result, fluid movement from the retinal pigment epithelium (RPE) to the choroid is reduced. The decreased hydraulic conductivity leads to fluid buildup

beneath the retinal pigment epithelium (RPE) and subsequent detachment of the RPE. In this disease, lipofuscin accumulates in the retinal pigment epithelium (RPE), leading to altered metabolism of degraded photoreceptors. Consequently, deposits known as drusen accumulate beneath the retinal pigment epithelium(RPE). Age-related macular degeneration (ARMD) is also associated with losing photoreceptors and the shortening of their outer segments. [11]

**Rupa (symptoms) of Macular degeneration**

| ARMD Symptoms | Drishtigata patala Lakshnas |
|---|---|
| Blurring of vision | *Avyaktamikshate rupam- Prathamapatalagata timira*[12] |
| Distorted vision(metamorphopsia) | *Vyavidhamiva pashyathi – vataja timira*[13] |
| Impairment of central vision (Centralscotoma) | *Pashyathyasyamanasikam- vataja kacha* [14] *Karnanasakshiyuktani vipareethani vikshyathe- trithiya patalagta timira*[15] *Hinadhikangani pashyati- sannipataja timira*[16] |
| Micropsia | *Hrswavrdha viparyaya - dwitweeyapatalagata timira*[17] |

## CLASSIFICATION

### Non-Exudative or Atrophic ARMD:

It is also called dry or geographic ARMD for 90 % of cases. Usually, it results in a mild to moderate gradual loss of vision. Due to central shadowing, patients may experience blurred vision and reading difficulties. [18]

In Dry ARMD *Vata* may be the causative factor for the vitiation of other *Doshas* such as *Pitta* and ultimately result in *Tridosha* involvement. Macular Drusens, focal hyperpigmentation which are yellowish white [19] shows *pitta* predominance. RPE atrophy with variable loss of choriocapillaris in intermediate stage [20] shows involvement of *Vataja dosha*. In advanced stage, geographical atrophy occurs within which large choroidal vessels may become visible [21] due to *Vata pitta* involvement. Here *Pitta* vitiation is occurred by the factors capable of increasing *Pitta's Ushna* (~hotness), *Tikshna*(~sharpness), and *Laghu*(~lightness) properties. In that case, there will also be a possibility of associated vitiation of *Vata.* Hence dry ARMD can be predominantly *Vata pitta pradhana dosha.*

**Samprapti (Pathogenesis)of dry ARMD**

*Vata pitta* vitiating *Achakshushya ahara* and *vihara* along with *Vridhavasta* (senility)

↓

Vitiation of *Ushna, Tikshna, Laghu* properties

↓

*Sira anusarini urdhwam asrita*

↓

Reaches *Netra*(macula)

↓

Vitiation of *Alochaka pitta*

↓

Result in development of dry ARMD

Treatment of non-exudative ARMD: Dietary supplements and antioxidants significantly manage age-related macular degeneration (ARMD). Cessation of smoking can help prevent further deterioration. In advanced cases of geographic atrophy, low vision aids may be necessary.The Age-Related Eye Disease Study (AREDS) has suggested that specific antioxidants, vitamins, and minerals may prevent or slow the progression of ARMD. [22]

**Exudative or Wet ARMD:**

Wet or neovascular age-related macular degeneration (ARMD) is another term for a specific typeof ARMD. It accounts for only 10% of cases but is associated with a more rapid and significant loss of vision. Signs of this type include drusen with retinal pigment epithelial detachment (PED), characterized by a distinct, raised dome-shaped elevation. Choroidal neovascularization (CNV), a raised lesion in grayish green or pinkish yellow, is proliferating in the sub-retinal pigment epithelium (RPE) space.[23] In wet AMD also, *Vata* may be the causative factor for the detachment of RPE retinal pigment epithelium along with *Kapha dosha* involvement. In the later stage there occurs choroidal neovascularization, which may be due to the predominance of *Rakta pitta dosha*. Haemorrhagic PED and disciform sub-retinal scarring are due to *Rakta dosha* predominance. Here, vitiation of factors such as *Snigdha* (~unctuousness), *Visra* (~pungent smell), *Sara* (~mobility), *drava* (~liquidity) is involved. Hence, *Pitta, Kapha dosha, and Rakta dushti* are involved in wet ARMD.

**Samprapti (Pathogenesis)of wet ARMD**

*Pitta* vitiating *Achakshushya* factors.

↓

Vitiation of *Snigdha, Visra, Sara, and Drava* properties

↓

Causing *Kapha* and *Rakta dushti*

↓

Reaches macula, causing vitiation of *Alochaka pitta.*

↓

*Vimargagamana* (Choroidal Neovascularisation) and *Atipravatti* (hemorrhagic)

↓

Result in the development of wet ARMD

**Treatment of exudative ARMD:** Intra virtual anti-VEGF therapy, Intravitral steroids, and LASER photo coagulation are the treatment methods. [24]

Diagnostic methods:

Amsler grid regularly allows the patients to detect new or progressive metamorphopsia. Clinical diagnosis is achieved based on the typical symptoms mentioned earlier, best observed during macular examination using slit lamp biomicroscopy and angiography using indocyanine green. Fundus fluorescein aids in detecting choroidal neovascularization. OCT has emerged as a paradigm shift for AMD diagnosis and disease staging. [25]

**Roga Nirnaya (Diagnosis)**

According to *Charaka Samhita*, a single *dosha* may cause manifold diseases when aggravated, depending upon the site of manifestation and various etiological factors. Therefore, it is unnecessary to name all types of disease in definite terms. Clinical presentation of ARMD can be corelated to *Vataja timira, Vatika kacha, Trithiya patala gata timira, Pitta vidagdha Drishti, Hriswajadya etc.* [26.]

**Prognosis**

The prognosis of ARMD is good in the early stage when it can be cured entirely. In later stages, it becomes Palliable to incurable (*Yapya*)[27.]

***AYURVEDIC* TREATMENT PRINCIPLE OF ARMD**

Patients of ARMD will be predominantly of vitiated *Pitta dosha*, with loss of *Agni*, *Bala*, and *Ojas*. It also shows the role of the *Vata dosha* the pathophysiology involved, and the clinical symptoms at various stages of disease. In dry ARMD, *Vata vridhi* and *Kapha kshaya* with *Pitta* predominance will be there. In the case of wet ARMD, *Kapha* and *Pitta dosha* and *Rakta dushti* are involved. The involvement of *Pitta* causes *Rakta dusti* and *Kapha dusti*. In both cases, the functioning of *Alochaka pitta* will be impaired. Controlling *Pitta* vitiation, especially *Alochakapitta*, is the first step in treatment. A differential diagnosis of Dry ARMD and Wet ARMD by finding out the *Dosha* dominance plays a significant role.

Management can be done on the treatment principle of *Srotoshodhana* with *Pittasamana.* Treatment methods involve both *Antha- bahir kaya sodhana, Shira sodhana* procedures, and *Netra kriyakalpas. Shira sodhana* procedures help nourish the *Budhir vaisheshika alochaka pitta* and *Prana vayu—Netra kriyakalpas* help reduce the specific symptoms locally according to the *dosha* involved. I**n dry ARMD,** *Vata pitta samanacikitsa* can be planned. *Snehapanam, virechanam, Brahmana nasya, Shirotaila dhara, Shiro abhyangam, Netra tarpanam* etc are preferred with proper *Vata pitta shamana, Chakshushya* and rejuvenating drugs. **In wet ARMD** there is involvement of *Rakta pitta dosha* along with *Vata* as observed; *Vata pitta shamana* and *Raktapitta shaman* treatment can be planned. Treatments like *Shirodhara Ksheeradhara, Takradahara, Sirolepanam, Tarpanam, Sekam, Ashchotanam, Bidalaka, Anjanam* etc can be done with appropriate *Ropana* drugs. *Rasayana chikitsa* and *Chakshushya* medications helps in the balance of *doshas* and rejuvenation of ocular tissues. Further, treatment may vary based on the predominance of dosha and clinical stages. Oral medicines such as *Saptamritalauha, Triphlaghrita, Mahatriphlaghrita, Patoladighrita, Jivantyadighrita, Triphla Churna, Shatavari Churna, Amalaki Churna, and Rasayana Churna* can be taken as mentioned in various studies. Apart from these, there is also mentioning of beneficial food items for eye care and nutrition in some analyses which are essential as AMD is a *Swabavabalaroga that* occurs as age advances. [28]

***Upasaya anupasaya* - Dós and don't in AMD:** It mainly includes *Purana Ghrita* (old ghee), *Yava* (barley), *Mudga* (green gram), *Patola* (snake gourd), *Karavella* (bitter gourd), *Karkatoka* (spiny gourd), *Amalaki* (Indian gooseberry), *Shatavari* (Asparagus racemosa), *Vastuka* (Eclipta alba), *Godhuma* (wheat), *Shastikashali* (brown rice), *Triphala* decoction, *Saindhava* (rock salt), pomegranate, *Mulaka* (radish), drumsticks, etc. and that which possesses sweet and bitter taste. Sour food, Black gram, Horse gram, *Aranala, Katutaila, Dadhi* etc. are to be avoided [29 30.]

## CONCLUSION

As the initiation of vision development starts from the macula, and any pathology to the macular region may result in deterioration of vision and if untreated, may leads to blindness. The differenttreatment modalities explained in Ayurveda will be beneficial in promoting ocular health in general and ARMD in specific. The progression of ARMD can be managed by systematic Ayurvedic treatment and appropriate dietary and lifestyle changes. The complete curability of the disease is much less. Still, it can prevent the development of further visual defects, and the vision can be improved to a great extent by appropriate *Chakshushya* and Rasayana drugs.

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