

## **A review on Age related Macular Degeneration and it's Management in Ayurveda**

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### **Abstract**

Age Related Macular Degeneration or ARMD is a degenerative disease associated with ageing that affects the macula and causes gradual loss of central vision. It is the leading cause of the vision loss and blindness in developed countries, in population above the age of 65 years. It is caused by hardening of small arteries supplying oxygen and nutrients to the retina which deprives the macula of oxygen and nutrition results in a slow but progressive loss of vision. The condition is characterized by degeneration of light sensitive cells of the central region of the retina-the macula which malfunctions and eventually dies, resulting in gradual decline and loss of central vision, while peripheral vision is retained. Visual loss can occur within months, or over many years, depending on the type and severity of ARMD. There are two main types of ARMD- 'wet' and 'dry'. Visual loss caused by ARMD cannot normally be reversed. The overall results of modern treatment in both types of ARMD are not very encouraging. Ayurvedic herbal treatment has a significant role to play in the treatment of this medical condition, both for the dry and wet types. Ayurvedic herbal medicines prevent a deterioration of the retina as well as the optic nerve, and provide micronutrients to the macula which transmits the sensation of vision to the brain. This paper reviews the pathophysiology of ARMD with a view to understand the possible role of Ayurveda in the management of ARMD.

**Keywords** Degeneration, Macula, ARMD, Drusens, Ayurveda, *Tarpana*, *Triphla*



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## INTRODUCTION

Age-related Macular Degeneration (ARMD) is a chronic eye disease that occurs when the part of your retina that's responsible for central vision, deteriorates. It is the main cause of vision loss and blindness in developed countries in population above the age of 65 years. It causes a gradual loss of central (but not peripheral) vision. The disease does not lead to complete blindness. It is the most common cause of irreversible visual loss in the western world. The prevalence of severe visual loss increases with age. In the USA, at least 10% of individuals between the ages of 65 and 75 years have lost some central vision as a result of AMD. Among those over 75 years of age, 30% are affected to some degree. End stage (total blindness) AMD is found in about 1.7% of all individuals aged over 50 years and in about 18% in those over 85 years<sup>1</sup>.

Macular degeneration is caused when part of the retina deteriorates. The retina is the interior layer of the eye consisting of the receptors and nerves that collect and transmit light signals from the eye into the optic nerve, then to the brain for interpretation of vision. The macula is the central portion of the retina and is responsible for detailed vision (the vision to read, thread a needle, sign a check, or recognize faces) and color vision. The macula is a highly specialized part of the

nervous system and the eye in which the photoreceptors that react to light stimulus and the neurons that interpret and transmit these signals are precisely organized and densely compacted. It is the macula that allows humans to see 6/6, or an eagle to spot a small rodent on the ground hundreds of feet below<sup>2-3</sup>. Because overall life expectancy continues to increase, age-related macular degeneration has become a major public-health concern. The condition worsens as you become older, the retinal pigment epithelium may deteriorate and become thin (a process known as atrophy), which sets off a chain of events. The nutritional and waste-removing cycles between the retina and the choroid and the underlying layer of blood vessels are interrupted. Waste deposits begin to form. Lacking nutrients, the light-sensitive cells of the macula become damaged. The damaged cells can no longer send normal signals through the optic nerve to your brain, and your vision becomes blurred.

ARMD is of two types: 1) Dry or non exudative or atrophic and 2) Wet or neovascular or exudative. The atrophic form is more common than the exudative, with about 90 % of the patients being diagnosed with atrophic age related macular degeneration. The exudative form of the disease usually leads to more serious vision loss and is responsible for 90 % of the blindness due to this disease<sup>4</sup>.

There is no preventive or curative treatment available for dry form of ARMD. Wet form of ARMD is treated with anti-angiogenic drugs, thermal laser and photodynamic therapy. Drusen is the diagnostic sign and optical coherence tomography is the diagnostic tool for ARMD. The overall results of modern treatment in both types of ARMD are not very encouraging. Ayurvedic herbal treatment has a significant role to play in the treatment of this medical condition, both for the dry and wet types.

## ETIOLOGY/ RISK FACTORS

ARMD is an age related disease of worldwide prevalence. The exact cause is still unknown. Certain risk factor which may affect the age on onset and/or progression includes:

- Hereditary factor
- Age
- Smoking
- Cardiovascular disease
- Hypertension
- Exposure to sunlight
- Hypercholesterolemia
- Malnutrition<sup>5</sup>

## PATHOGENESIS

Age related macular degeneration is caused by sclerosis of the arteries that nourish the retina. This deprives the sensitive retinal tissue of the oxygen and nutrients that it needs to function and thrive. The atrophic form possibly results from the thinning of the macular tissues, amorphous deposits and pigmentation in the macula. Exudative macular degeneration occurs when new vessels form a choroidal new vascular membrane to improve the blood supply to oxygen deprived retinal tissue. These new vessels are friable and leak blood and fluid causing damage to surrounding tissue<sup>6</sup>.

## CLINICAL TYPES AND PRESENTATION OF DISEASE

Age related macular degeneration is classified into types:

1. Non-neovascular or non exudative or atrophic or dry
2. Neovascular or exudative or wet

### 1. Non-neovascular or atrophic or dry ARMD:

It is responsible for 90% cases of ARMD. It typically causes mild to moderate gradual loss of vision.

Common complaints are distorted vision, seeing a straight line such as the sides of doorway appears wavy, bent or fuzzy. There may be shadowed area in the central visual field causing difficulty in reading. Ophthalmoscopically the dry type is characterized by drusens and loss of pigment in the retina and the pigment epithelium. Drusen are small yellowish deposits on Bruch's membrane derived from the metabolic products of the visual receptors and retinal pigment epithelium deposited as mucopolysaccharides and lipids on Bruch's membrane. In later stages there occurs enlargement of atrophic areas within which the larger choroidal vessels may become visible (geographic atrophy)<sup>7</sup>. Drusens are of two types- 1). Hard drusen are small, round, discrete, yellow white spots associated with focal dysfunction of the RPE. 2). Soft drusen are larger and have indistinct margins and frequently become confluent<sup>8</sup>.

## 2. Neovascular or exudative or wet ARMD:

It is responsible for only 10% cases of ARMD but is associated with comparatively rapidly progressive marked loss of vision. Exudative ARMD

appears as an elevation of the neurosensory retina or pigment epithelium beneath which abnormal blood vessel fluid and haemorrhage are present. Sub retinal exudates and haemorrhage, retinal pigment epithelium detachment, choroidal neovascularisation and disciform scars are found in neovascular ARMD. Choroidal neovascularisation is the hallmark of neovascular ARMD<sup>9</sup>. Typically the course of exudative ARMD rapidly pass through many stages – stage of drusen formation, stage of retinal pigment epithelium detachment, stage of choroidal neovascularisation, stage of hemorrhagic detachment of retinal pigment epithelium, stage of haemorrhagic detachment of neurosensory retina, stage of disciform (scaring) macular degeneration<sup>10</sup>.

Macular degeneration does not cause complete blindness as it does not affect peripheral vision. Both eyes are usually affected but often asymmetrically.

## EARLY VERSUS LATE ARMD

**Early ARMD** includes drusens, and areas of

retinal pigment epithelium (RPE) hyperpigmentation and/ or depigmentation.

**Late ARMD** includes geographical atrophy of RPE with visible underlying choroidal vessels, pigment epithelium detachment (PED) with or without neurosensory retinal detachment, subretinal or sub-RPE neovascularisation, haemorrhage and disciform scars<sup>11</sup>.

## DIAGNOSIS

ARMD is diagnosed by fundoscopic examination. Visual changes can often be detected with an Amsler Grid. Fluorescein angiography is obtained when findings suggest wet ARMD. Angiography demonstrates and characterizes subretinal choroidal neovascular membranes and can delineate areas of geographic atrophy. Optical Coherence Tomography (OCT) aids in identifying intraretinal and subretinal fluid and can help assess response to treatment<sup>12</sup>.

## TREATMENT

The exact causes of ARMD are still unknown. There is no effective treatment for non exudative or dry ARMD, however some treatment option are available for exudative or wet ARMD. Zinc supplement and

antioxidant and vitamins may help to lower the risk for the progression of dry ARMD. Laser photocoagulation is effective in sealing leaking or bleeding sub retinal vessels in some eyes with exudative macular degeneration. This does not restore loss vision but it may prevent further loss<sup>13</sup>. Satisfactory treatment is yet not available.

Ayurvedic herbal treatment has a significant role to play in the treatment of this condition, both for the dry and wet types. The ayurvedic treatment of ARMD is aimed at preserving vision and preventing further damage to the eye. Ayurvedic herbal medicines prevent a deterioration of the retina as well as the optic nerve, and provide micronutrients to the macula which transmits the sensation of vision to the brain. Though description of macular degeneration is not clearly described in the classics, gradual loss of vision in *timira*, resembles it. ARMD should be considered as *Chaturth Patalgata roga*. As disease occurs in old age and there is degeneration and loss of neural tissue, which indicates that there is involvement of *vata dosha* as old age is associated with predominance of *vata* and also neural tissue is considered as a component of *vata* in the body. In later stages of disease, however the involvement of other *doshas* i.e. *rakta* and

*pitta* along with *vata* is also visible as neovascularisation and bleeding are caused by abnormality of *rakta* and inflammation is a feature of vitiated *pitta*. So in ARMD according to ayurveda there is involvement of *vata* and *pitta dosha*. All dry types of ARMD are purely *vata* type and wet type has *pitta dosha* along with *vata*. So *vata-pitta shamaka* treatment is to be given to patient in case of ARMD. Therapies which improve homeostasis and ocular strength should be practiced.

Management of ARMD should be done on the principles of *vata-pitta shamaka chikitsa* with *rasayana* drugs. *Abhyanga*, *swedana*, *shiroabhyanga*, *sneha nasya*, *sneha basti*, *virechana*, and *tarpana* are suggested. In wet ARMD, the treatment of *rakta-pitta* should be followed. The commonly adopted *Panchakarma* treatments for age related macular degeneration are *Virechana*, *Nasya* and *Snehana basti*. As in ARMD according to ayurveda there is involvement of *pitta dosha* so *Virechana* should be done, as main *panchkarma* treatment for *pitta dosha* is *virechana* as it is said that “*virechanam pittaharanam sreshtam*”<sup>14</sup>. *Nasya karma* or *Shirovirechan* is also prescribed because nose is said to be the gateway of *shira* as it is said that “*nasa hi sirso dwaram*”. So nose is also the gateway of drug administration in

case of *urdhavjatrugata roga*. Drugs given by nose are also beneficial in *urdhavjatrugataroga*<sup>15</sup>. *Snehana basti* should also be given to patients, as ARMD is also associated with *vata dosha*. *Netra Tarpanam* is an ayurvedic therapy especially suitable for the eyes. *Tarpana* is the foremost procedure for *dristigataroga*. It nourishes the eyes, improves & strengthens the *drishti shakti*. It is a very effective, preventive & curative procedure in *vataja* & *pithaja vikara*. The phrase *Akshitarpana* (also called *Netrabasti*) is from sanskrit where *Akshi* refers to eye (*Netra*=eyes) and *tarpana* stands for nourishment or rehydration process. So accumulatively the term means nourishment of eyes or in a way rehydration of eyes. *Netra Tarpana* is the ayurvedic purification and rejuvenation treatment provided especially as part of *Panchakarma* treatment in ayurvedic care facilities. *Netra Tarpana* is a procedure wherein lukewarm medicated *ghee* is made to stay stagnant in the eyes for a speculated time in a specific formed frame<sup>16</sup>. *Nethradhara* i.e. mild pouring of herbal decoction through the inner corners of the eyes is the core of this treatment. These all therapies should be followed by *rasayan chikitsa*.

The *Rasayana chikitsa* are

meant to nourish the body, to bring the *doshas* back to balance and to regenerate the body. Oral medicines are prepared specifically to restore the lost balance and to provide the needed inputs to cure macular degeneration. Oral medicines e.g. *Saptamrita lauh*, *Triphla ghrita*, *Mahatriphla ghrita*, *Patoladi ghrita*, *Jivantyadi ghrita*, *Triphla churan*, *Shatavari churan* should be taken. The herbal combination called *Triphala*, which includes *Amalaki* (*Embllica officinalis*), *Haritaki* (*Terminalia chebula*) and *Behada* (*Terminalia bellerica*), has considerable therapeutic value in ARMD. *Triphla* acts as the best *rasayana* and *chakshusya* drug without much comfort. *Triphla ghrita* is used for both local and internal administration in many forms for treating ARMD<sup>17-18</sup>.

The major treatment procedures done for the treatment of Age Related Macular Degeneration are as follows:

- *Lepa* over eyes
- *Netra seka* or *Netra dhara*
- *Takradhara*
- *Shirodhara*
- *Netra tarpana* (in dry types)

- *Shiro lepa* or *pichu* with *sheet stambhan aushadhi* and *thalam takradhara* in wet type ARMD.
- *Virechana*, *Nasya*, *Snehana basti*
- Oral medicines e.g. *Saptamrita lauh*, *Triphla ghrita*, *Mahatriphla ghrita*, *Patoladi ghrita*, *Jivantyadighrita*, *Triphla churan*, *Shatavari churan*, *Rasayan chikitsa*<sup>18-21</sup>.

## CONCLUSION

Age Related Macular Degeneration or ARMD is a degenerative disease associated with ageing that affects the macula and causes gradual loss of central vision. It is the leading cause of the vision loss and blindness in developed countries, in population above the age of 55 years. The overall results of modern treatment in both types of ARMD are not very encouraging. Ayurvedic herbal treatment has a significant role to play in the treatment of this medical condition, both for the dry and wet types. The disease cannot be cured 100% but can be kept stable in that condition. Ayurvedic drugs and therapy controls the disease and increases blood circulation and nourishes retina.



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