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Review Article

THE MANAGEMENT OF AGE-RELATED MACULAR DEGENERATION (ARMD) IN AYURVEDIC PROSPECTIVE- A CRITICAL REVIEW

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ABSTRACT

Age related macular degeneration a vision threatening disease is a degenerative disease affects man in fifth decade or onward. It is caused by irreversible damage of macula in old and risked patients like arteriosclerosis, smoking, Hypertension, DM etc. In fact ARMD appears to result from a combination of hereditary, environmental, and metabolic factors. The common complaints are difficulty vision in dim light, adaptation in different lighting condition, blurring or blind spot in central vision, and a straight line looks wavy etc. Macular degeneration is of two types –Dry and Wet type in which dry type is more prevalent. Although, macular degeneration is very common with age, *Ayurveda* advocates certain practice and drug which has proved better to get rid of macular degeneration. The drugs like *Triphala, Tulsi, Spirulina, Punarnava, Shatavari* having anti-oxidant and vitamin properties and yellow vegetable like carrot contain carotene are beneficial in ARMD. Drugs like *Yastimadhu, Amala,* Ginger, Cardamom, Rose, *Curcumin* etc. has been proven anti-angiogenic properties and are beneficial to prevent neo-vascular age-related macular degeneration (NVAMD). In one study found that *Tarpana*with *Triphala Ghrita* is beneficial and in another study those with the highest dietary intake of lutein had a 57% lower risk for ARMD such as *Kale, Spinach, Mustard green, Shatavari,* etc.

KEYWORDS: Age-related Macular Degeneration, *Tarpana*, Lutein. Neo-vascular Age-related Macular Degeneration (NVAMD).

INTRODUCTION

Age related macular degeneration also known as macular degeneration is one among the most common eye diseases generally prevalent in the people of older ages. Macular degeneration is the progressive deterioration of the macula, the light sensitive cell of the central retina. As these macular cells malfunction and die, central vision becomes gray, hazy, or distorted, and eventually is lost. But the peripheral vision is unaffected due to presence of photosensitive rod cell in the retina.

Needs of Review

Age-related macular degeneration, often called AMD or ARMD, is the leading cause of vision loss and blindness among Americans who are aged 65 and older. Because people in this group are an increasingly larger percentage of the general population, vision loss from macular degeneration is a growing problem. About 1.75 million U.S. residents currently have advanced age-related macular degeneration with associated vision loss, with that number expected to grow to almost 3 million by 2020.[1] In UK overall prevalence of late AMD was found 2.4 % (513000 peoples) and estimated to increase to 3.17% (679000 peoples) by 2020. [2] In one of study of global prevalence of AMD including 39 studies worldwide showed the pooled prevalence of early, late, and age related macular degeneration (ARMD) to be 8.01%, 0.37%, and 8.69% respectively. It was found a higher prevalence of early and any ARMD in Europeans than in Asian. Whereas, early, late and ARMD degeneration to be more prevalent in Europeans than in Africans. There was no difference in prevalence between Asian and Africans. Globally the projected number of people with ARMD in 2020 is 196 million, increasing to 288 millions in 2040. [3] The Indian prevalence has been reported as 1.1% from south India and 4.7% from north Indian study[4]. White and Asian are more susceptible than blacks. Women and those with lighter-coloured eyes are more susceptible. So the knowing burden of disease need of interference of alternative medicine because there is no proper available treatment in modern science to check the

progression and even cure of disease. There are some drugs and techniques available in modern science to check the progression of disease but not successful. So researcher looking toward natural science to find out solution because lots of drugs mentioned in *Ayurvedic* drugs having properties like antioxidant, vitamins like A,E, C, minerals, anti-angiogenic factors, lutein and zeaxanthin are proving beneficial in recent research and need to be evaluate more in this regard to help the mankind from World of *Ayurveda.*

CAUSES

ARMD is basically associated and grow with aging. ARMD appears to result from a combination of hereditary, environmental, and metabolic factors. The body antioxidant systems that destroy free radicals become less effective with aging. Over time, highly reactive free-oxygen radicals damage and destroy macular cells. Free radicals are produced by bombardment of light on the macula, particularly long-term exposure to ultraviolet and blue light, including sunlight and sun lamps[5]. Others factors[5] like Hypertension[6], Smoking[7,8], which increase the risk of AMD two-to-four-folds.

- A high fat diet[9]- diets high in saturated fat and cholesterol.
- Low dietary consumption of anti-oxidant
- Cataract surgery increase the risk of AMD progressing to wet AMD

Disease Description

Macular degeneration is classified in to two types:

Dry macular degeneration

In the dry form also known as atrophic type, gradual impairment of vision over months or years caused by slowly progressive atrophy of photoreceptor, Retinal pigmented epithelium cell (RPM) and choriocapillaris. Both eyes are usually affected but often asymmetrically. The signs in chronological order are focal hyper pigmentation or atrophy of the RPE in association with macular drusen, sharply circumscribed, circular areas of RPE associated with variable loss of the choriocapillaris, enlargement of atrophic area where choroidal vessels may become visible and pre-existed drusen disappear (geographical atrophy). Visual acuity is severely impaired (decline of at least two lines i.e. 20/80), if the fovea is involved.

Wet macular degeneration

It is also called neo-vascular age-related macular degeneration caused by choroidal neovascularisation originating from the choriocapillaris which grows through defect in Bruch membrane. This is thought to be the result of imbalance between VEGF, that stimulates vascular growth, and pigment epithelium derived factor (PEDF), that suppresses growth. This condition leads to leaking of blood and fluid in retina through fragile new blood vessels. Thus, it results in the damage of retina leading to metamorphopsia, a positive scotoma and blurring of central vision to loss of central vision permanently.

DIAGNOSIS

In AMD vision loss is irreversible, early detection may halt or slow the progression of dry to wet AMD. The tests for AMD are:

Amsler grid test–Drawn on paper or board, a checkerboard pattern with a black dot at the centre. While staring at the dot with one eye, AMD causes the straight lines to appear wavy or disappear or some areas to appear blank.

Fundoscopy – A dilated pupil examination with mydriatic of retina reveals gross macular changes, including scarring, thinning or atrophy, may indicate (Macular degeneration) MD. Numerous mid-size yellow bumps called drusen, or one or more drusen, can indicate intermediate-stage AMD.

Fluorenscein angiography of eye: An indicator dye is injected and photographs are taken to detect dye leakage from retinal blood vessels.

Indocyanine green angiography - It is used to examine choroid blood vessels that cannot be seen with fluorescein dye.

Optical coherence tomography (OCT) –Light wave are used to obtain cross-sectional views of eye tissue to detect thickness, oedema atrophy etc. This is easier and quicker than fluorescein angiography and most commonly used by the ophthalmologist.

Electroretinogram - Whereby a weak or missing electrical signal from an illuminated point in the macula indicates MD.

In a family history of MD suggesting hereditary Juvenile macular degeneration (JMD), macular genetic screening can reveal the presence of JMD causing genes, facilitating early detection.

Treatment

In *Shalakya Tantra*, one of branch of *Ashtanga Ayurveda* deals with Eye, ENT, Oro-dentistry and Diseases of Head, no one disease is mentioned with such name. But some text and scholar has correlated it with *Pitta Vidagdha*

Drishti, a *Drishti-gata Pittaja Sadhya Roga* and carried out research on small number of patients shown that use of *Nasya, Tarpana*, and *Rasayana* drug orally with *Anu Tail, Triphal Ghrita* and *Rasayana Churna, Saptamruta Lauh, Shatavari Churna* along with *Triphala Ghrita* respectively are better in result (significant) against the combination of Anti-oxidant, Multivitamins drugs. [10]

In *Ayurvedic* literature regarding the treatment of eye it has been coated that the first treatment "in short abstains/prevent from aetiology is foremost treatment." So reduce the fat consumption, because in modern medical science it proved that high Fat consumption (70 gm versus 24 gm daily) triples the risk of advancement, trans-fat consumption (4 gm versus 0.5 gm daily) doubles the risk, consumption of commercial baked foods (two or more servings weekly) doubles the risk of advancement.[5] Foods containing omega-3 fats, [11] such as nuts and fish, lower the risk of progression to advanced MD. Use of sunglasses with UV protection, maintaining normal blood pressure, avoiding the risk factors, including smoking and second hand smoke, [5] will commit better in treatment of AMD. In many researches over globe in the field of modern ophthalmology it is proven that vitamin E, C, Zn, mineral, carotene, Lutein and Zeaxanthin[12,13] and Anti-Angiogenic factors are beneficial to prevent progression of both types of ARMD.

The drugs like *Triphala, Tulsi, Spirulina, Punarnava, Shatavari* having anti-oxidant and rich in vitamin E, C and Zn, properties[14,15] and yellow vegetable like carotene contain carrot are beneficial in ARMD.

In one study found that those with the highest dietary intake of lutein had a 57% lower risk for AMD. Foods high in lutein and zeaxanthin[11] include: Kale, Spinach, Mustard greens, Collard greens, Romaine lettuce, Leeks, Celery, Broccoli, Peas, Corn, Zucchini, Yellow Squash, Cucumbers, Orange bell peppers, Red Grapes, Mangoes, Oranges[16]. These fruits and vegetable are very rich in lutein and zeaxanthin. The drugs[17] like *Satavari, Amala, Draksha, Elaichi*, Piper, *Macoya (Punica granatum)*and Animal fat like *Ghrita*, Flesh of Animal and Fish are widely used with herbal drugs for *Anjana* (Collyrium), *Putapaka* and *Tarpana* preparation are also rich in lutein and zeaxanthin[18] and also mentioned by *Acharya* as *Chakshusya* (strengthen to eye vision). The drugs mentioned for treatment of disease of retina in *Ayurvedic* text[19] like Cinnamon, *Glycyrrhiza glabra*, Ginger, Curcuma, Garlic, *Punicagranatum, Alpinia oxyphylla* (Cardamom), *Curcuma zeoderia* (Kachur), *Rosa multiflorarosasae* (Rose), Cannabis, Snake Venom[20]20, Pepper, Quercetin containing *Melia Azadiracta*, *Emblica officinalis* (Indian gooseberry),are having proven Anti-angiogenic[21] properties can help to prevent neo-vascularisation in retina. [22]

Other than above there are some drug proven beneficial in treatment of AMD as follow:

Saffron -The Australian human study was conducted by Sydney professor of Neurology Jonathan Stone and similar study by Italian research, were similar in scope and dosages involving 25 macular degeneration sufferers reveals that after a year or more ingesting only 20 mg of saffron daily, vision improvement should stabilize without requiring more saffron dosing.[23]

Ginkgo biloba (Dosages 160 – 240mg per day) - An herb contains flavonoids, which researchers think may also help in AMD. Two studies showed that people with AMD who took ginkgo were able to slow their vision loss. Ginkgo can increase the risk of bleeding, so people who take blood-thinners such as warfarin etc should not take without talking to their doctor. [24]

Green tea (*Camellia sinensis*) – It contain antioxidants, which mop up free radicals-substances that create the so called oxidative damage underlying many chronic diseases, including glaucoma, macular degeneration and cataract. Furthermore studies show that treating retinal cells with green tea's polyphenols protects them from damage from ultraviolet light which raises the risk of macular degeneration. [25]

Coriander (*Coriandrum sativum*) – Commonly used in *Ayurveda* is high in beta-carotene and anti-oxidants, plays a vital role in improvement of eye sight and also helpful in ARMD and Cataract. **Parsley** (*Petroselinum crispum*) – It is rich in nutrients such as bet-carotene, vitamin **A**& potassium. Lutein and zeaxanthin potent compounds are found in parsley which lower the risk of ARMD & Cataract caused due exposure to UV rays. [26]

Marigold–Harry Marsland, 73-years-old a retired optician lost vision in his right eye to wet AMD in 2001, and soon after began to suffer from dry AMD in his left. Eventually, he lost so much vision that he could no longer move around on his own. He treated for same with laser, vitamin and supplement but nothing made any difference. In 2007 he treated with AMD supplement contained marigold extract meso-zeaxanthin, as well as the

spinachderivative lutein and corn derivative zeaxanthin. He reported that he recovered almost completely (95 percent) from the effect of the dry AMD in his left eye. [27]

On the basis of above evidence and meta-analysis of distinguish research paper it can be said that a lots of potential and efficacy available in the *Ayurvedic* drugs. Which were used by the Ancient Sage to treat the difficult eye diseases. So its need of time to do extensive research work on old formulation mentioned in *Ayurvedic* Text to prove it clinically and also new formulation of *Ayurvedic* drugs should be developed with course of time (understanding with aetiology, pathogenesis of newer and older diseases) on modern parameters along with ancient parameters in the favour of mankind.

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