

**A CONCEPTUAL STUDY OF PATHOLOGY AND CLINICAL  
FEATURES OF AGE RELATED MACULAR DEGENERATION AND  
CO-RELATION WITH PATALGATVYADHI MENTIONED IN  
AYURVEDA**

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**ABSTRACT**

Age related macular degeneration is an acquired degeneration of the retina that causes significant central visual impairment through a combination non-neovascular (Drusen and retinal pigment epithelium abnormalities) and neovascular derangement (choroidal neovascular membrane). AMD is the most common cause of irreversible, visual loss, in individuals over 50 years of age and it is the leading cause of blindness in elderly people. Globally the projected number of people with ARMD in 2020 is 196 millions, increasing to 288 millions in 2040. In Ayurvedic text there is a detailed description of *Netragatvyadhi* according to various sites. In this study an approach

has been made to understand the pathology of ARMD, its sign and symptoms through Ayurvedic point of view and co-relation between *patalgatvyadhi* mentioned in Ayurveda.

**KEYWORDS:** *Vataj Timira, ARMD, Patalgat Vyadhi.*

**INTRODUCTION**

Age related macular degeneration ARMD is a disease of macular area often clinically apparent after 50 years of age ARMD is a condition where there is presence of some degree of visual loss in association with Drusen and geographical atrophy of retinal pigment epithelium (RPE) or changes associated with the retinal neovascularisation in an individual aged more than 50 years.<sup>[1]</sup> RPE degeneration is associated with variable loss of both the

overlying Photoreceptors namely the rods and the cones and underlying choroidal perfusion.

It is a leading cause of blindness in elderly people. It is a non hereditary degeneration involving choriocapillaries, Bruch's membrane, photoreceptors (rods and cones) and retinal pigment epithelium, resulting in central vision loss.

### **Etiopathogenesis<sup>[2]</sup>**

ARMD is affected by sclerosis of arteries that nurtures the retina. This deprives the sensory retinal tissue of oxygen and nutrients that are needed for its nourishment.

- The atrophic form of ARMD results from thinning of macular tissue and amorphous deposits between basal lamina of Retinal Pigment Epithelium (RPE) and inner layer of Bruch's Membrane.
- The exudative form of ARMD occurs when new vessels form a choroidal neovascular membrane (CNVM) to improve blood supply to oxygen deprived retinal tissue. The new vessels are weak and leak blood and fluid to surrounding tissue.

For ages 50 to 97 years in the global prevalence of late ARMD is 0.37% and early ARMD is 8.01% for ages 60 to 79 years in India.<sup>[3]</sup> It is a leading cause of blindness in elderly people. Presently there are increasing numbers of patients of ARMD due to increased life expectancy. Despite of its worldwide spread and its extensive ocular morbidity the pathogenesis of ARMD remains poorly understood.

### **Risk factors**

- 1) Age
- 2) It is most prevalent in Caucasians.
- 3) Genetic and environmental factors appear to modify the risk of visual loss although the relative importance of those is unclear.
- 4) Cigarette smoking is the only modifiable risk factor.
- 5) Other risk factors like Cardio vascular disease, Hypertension, Obesity, female gender, Hyperopia, Light iris.

### **Histopathology**

Loss of central vision in ARMD is the result of changes that occurs in response to deposition of abnormal material drusen, in Bruch's membrane. This material is derived from the RPE and its accumulation is thought to result from failure to clear the debris discharged into this

region.<sup>[4]</sup>

Drusen consist of discrete deposits of this abnormal material located between the basal lamina of RPE and inner collagenous layer of Bruch's membrane. The abnormal material also accumulates diffusely throughout Bruch's membrane. Thickening of the inner part of basement membrane is compounded by excessive production of basement membrane like material by RPE. It has been postulated that lipid content of drusen may be a determinant for subsequent behaviour.<sup>[5]</sup>

### **Clinical types**

- 1) Nonexudative ARMD: Dry, Atrophic or Geographic ARMD.
- 2) Exudative ARMD: Wet or Neovascular ARMD.

### **Clinical Features / Symptoms**

- 1) Blurred vision
- 2) Central scotoma: Missing areas of vision or shadows.
- 3) Metamorphosia: Distorted vision.
- 4) Difficulty in Dark Adaptation: Slow recovery of visual function after exposure to light.
- 5) Sudden painless loss of vision in exudative form.
- 6) Difficulty in colour discrimination.
- 7) Micropsia: Decrease in image size.
- 8) Macropsia: Increase in image size.

### **Signs**

1. Drusen
2. Pigmentary Alterations
3. Atrophy-Incipient and Geographic
4. Choroidal Neovascularization (CNV)
5. Subretinal Hemorrhage
6. Retinal Pigment Epithelium(RPE) detachment
7. Drastic decrease in visual acuity

Clinical diagnosis is made from the typical signs described above, which are best elucidated on examination of the macula by slit-lamp biomicroscopy with a +90D/+78D non-contact lens or Direct ophthalmoscopy or Indirect Ophthalmoscopy.

Fundus fluorescein angiography helps in detecting choroidal neovascularization (CNV) in relation to foveal avascular zone. Which may be subfoveal, juxtafoveal or extrafoveal CNV may be classical or occult.

### Treatment<sup>[6]</sup>

According to AREDs (age related eye diseases study) formula is –

- 500 milligrams of vitamin C
- 400 IU of vitamin E
- 80 milligrams of zinc as zinc oxide
- 2 milligrams of copper as copper oxide
- 10 mg Lutein and 2 mg zeaxanthin
- No beta carotene

### Ayurvedic perspective of age related macular degeneration

Though description of Macular degeneration is not described in Ayurvedic classics, but symptoms like gradual loss of vision in *patalgat Netravvyadhi*, *TIMIR* can be assumed with ARMD. As the *patalas* are situated in concentric circles, the entry of *doshas* to second *patala* is possible only after its involvement and crossing through first *patala*, similarly when it is said that *doshas* are lodged in the third *patala* it implies that *doshas* have already invaded the first two *patalas*. Hence *Timira*, *kach*, *Linganasha* are the three stages of the same disease and they all have same pathologies.<sup>[7]</sup>

### *Drishti mandal*

According to *Acharya Sushruta*, *Drishti* is composed of all five *Mahabhutas* and *Tejo Mahabhuta* is Predominant among them.

*Dristi* appears like glowing. This glow is compared to “*Khadyota*” the glow worm and ‘*vishpulinga*’ the spark. This description is comparable with retina which reflects light, fundal glow spark like glow at macula i.e. foveal reflex.<sup>[8]</sup>

Affected *doshas* through *siras* spread in the *patalas* of eyes causes various “*drishtigatavyadhi*.”<sup>[9]</sup>

These *patalas* are the site of severe eye disease called *Timira*.<sup>[10]</sup> severity increases with the progression of vitiated *doshas* in the further *patalas*.

Aacharya Sushruta described that when vitiated *doshas* insert in the *dvitiyapatala*, blurring of vision increases, also patient visualizes false images of flies, hairs webs, circles gametes, flags, mirrors and ear rings. Various objects are moving around him, his vision gets reduced further and sees objects as if they are covered by rain or cloud.<sup>[11]</sup>

Where as Aacharya Vagbhata described *dvitiyapatalgat doshdushti* as *Timira Vyadhi* and symptoms explained like blurring of vision, scotoma may be superior, inferior, medial or lateral.<sup>[12]</sup>

### Vataj timira

The symptoms explained in *Vataj Timira* by *Aacharya Vagbhata* can be correlated with symptoms of Age related macular degeneration.

In *Vataja Timira* Acharya Vagbhata describes:<sup>[13]</sup>

- *Vyavidhyadarshana* – The straight line of the object appears to be curved / broken.
- *Chala – Avila – Arunabhasdarshana* – The object appears as they are moving, hazy and of red colour.
- *Prasannamchekshatemuhu* – Sometimes vision becomes normal.
- *Jalani-keshan-mashakanrashmi-chaupekshite* – The non existing objects like cob-webs, hairs, flies and sun rays appears in vision field.

These symptoms of *Vataj Timir* can be co-related with Dry ARMD.

Ageing is *vatapradhan* process in which degeneration of tissues takes place, due to *Ama* formation, i.e. free radicals. The normal process of nutrition and excretion hampers at the level of choriocapillaries, due to *Prana* and *Apanavayu Dushti*, which leads to *ama* formation in between the RPE and Bruch's membrane i.e. deposition of drusen.

Hence Dry ARMD can be correlate with *Vataja Timira* caused mainly due to vitiations of *vata pitta dosha* affecting *Rakta, Mansa, Meda, Asthi* and *Majja dhatu*.<sup>[14]</sup>

According to Ayurveda the Retina can be considered the seat of *Chakshuvaisheshik Alochaka pitta*. In Retina, Macula is the point where light rays converge and *Alochaka pitta* is the functioning factor in the Macula, so it can be said that vitiation of *Alochaka pitta* is the first step in developing macular degeneration.

**Vitiating factors of *alochaka pitta***

These are mainly two types:

1) Dietary factor:

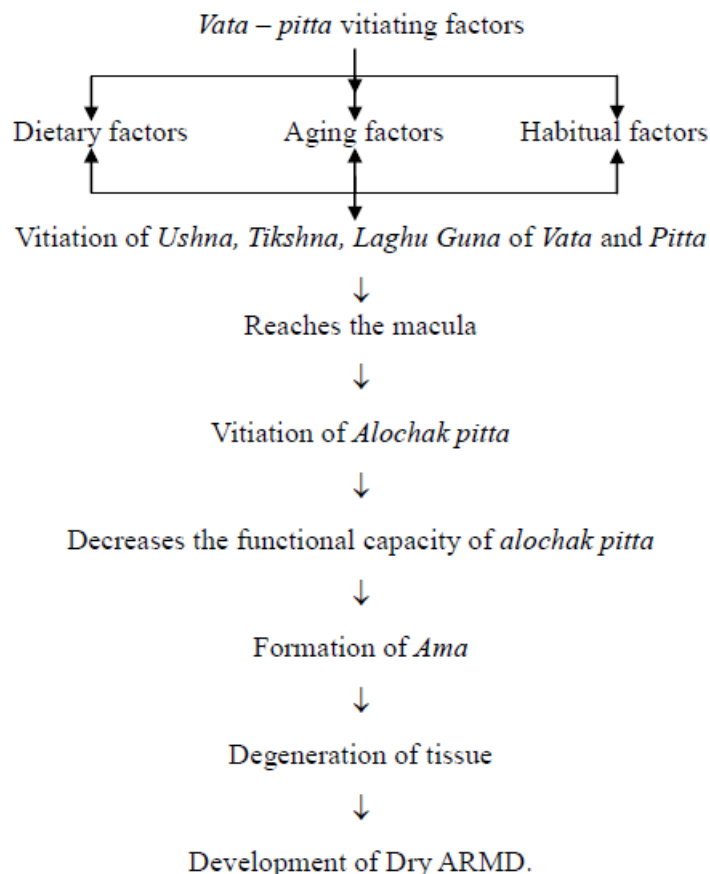
- Hot and spicy food items.
- Deep-fried food item
- Not taking enough quantity of food.
- Not taking food in the scheduled time.

2) Habitual factors:

- Over strain (Atiyoga),
- Exposure to Sunlight and working in bright light.
- Lack of proper sleep.
- Strainful work in the night.
- Focussing light sources, especially on the colourful light.
- Overwork on Screen of mobiles, laptop, etc.
- Smoking
- Exposure to dust and smoke.

**Samprapti of Dry ARMD**

Above Achakshushya / pitta vitiating factors can vitiate both *vata* and *pitta* together. *Pitta* has different properties, among these *Tikshana ushna* and *laghu* properties are common for *vata* and *pitta*.



### Samprapti of Wet ARMD

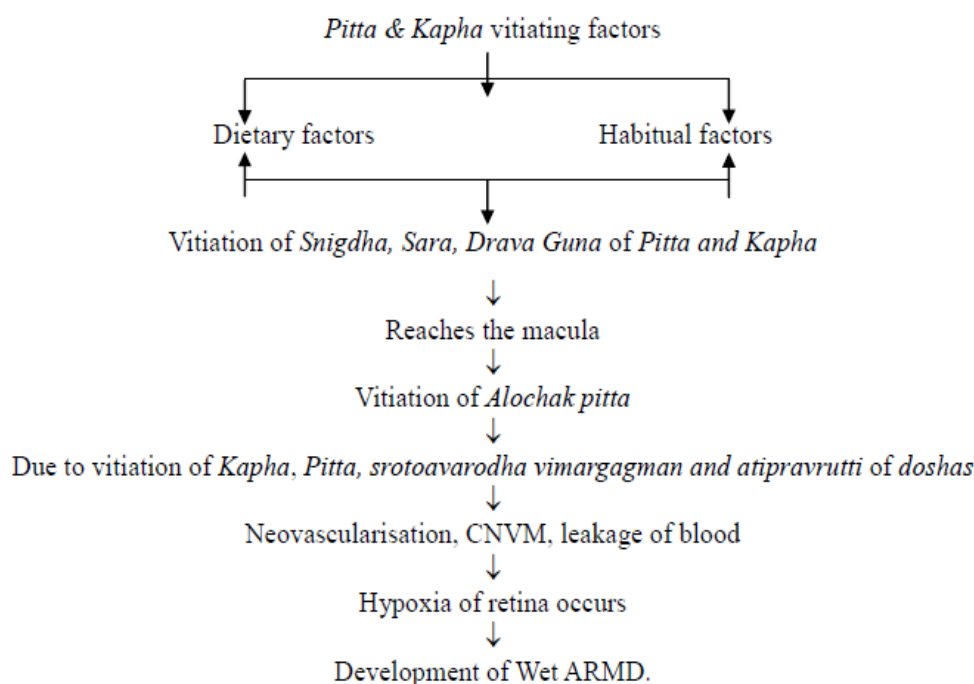
The symptoms of **wet ARMD** can be correlated with *pitta vidhagdha-dushti*, a *pittaja-sadhya drishtigat vyadhi* described by Sushruta and other Ayurvedic literatures.

*Pitta Vidagdhadushti*, the vitiated *pitta* is confined to the third *patalas* of the *drishti*.

*Pitta* is the main culprit in this type, but the difference is that in wet ARMD, *Snigdha*, *sara* (spreading) and *drava* (liquid), qualities of *pitta* are increased which vitiates the *rakta* (blood). When there is a *rakta dushti* simultaneously *rakta updhau* i.e. *sira* (blood vessels of retina) get also damage and fluid / blood leak into retinal layer. As *kapha* is also having the properties of *sara* and *Snigdha*, it also vitiates *kapha*. This *vikruta kapha* causes obstruction (i.e. *srotoavarodha*). Now Vitiated *pitta* causes *dusti* of *rakta* due to its similar properties. All these vitiated *dosha* undergo *vimarag-gamana* (Neo Vascularisation), which leads to *Atipravrutti* (Leakage of blood and fluid).<sup>[15]</sup>

In Wet ARMD, *pitta* is the predominant *dosha* and *kapha* is accompanying (*Anubandha*), while *rakta* is the *dushya*. There will be new vessels growing towards macula, fluid

accumulation in the macular area (Macular odema) and haemorrhages in and around the macula.



## CONCLUSION

Age related the macular degeneration is now one of the major cause blindness. It is a degenerative eye disease where patients easily miss the early stage. In fact ARMD appears to result from a combination of hereditary, environmental and Metabolic factors.

The effect of current modern treatment in both types of ARMD is not very satisfactory. So by understanding the exact Patho-Physiology of ARMD, according to Ayurvedic principle we are going to know *dosh*, *dushya*, *samprapti* of ARMD. Ayurveda advocates certain practice and drugs which has proved better to get rid of macular degeneration. There are lots of drugs (which having anti-oxidant, vitamin, carotene containing drugs which can add in the line of treatment of ARMD for better results.

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