



A Hospital Based Study of Lens Opacities and Risk of Age Related Macular Degeneration

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Abstract: The present study was aimed to study the demography and risk of age related macular degeneration. Age-related macular degeneration (AMD) is one of the main socioeconomic health issues worldwide. This is prospective study include all patients of age related macular degeneration above 50 years of age presenting in the Department of Ophthalmology at Dr.RPGMC Tanda. Total 86 patients were examined. 172 eyes were examined, 115 (66.86%) had immature senile cataract, 49 (28.49%) had pseudophakia and 8 (4.65%) patients had normal lens. Finding showed that prevalence of early ARMD was higher in patients who had ISC while Pseudophakic eyes had advanced ARMD

Index Terms - Lens Opacities, Age-related Macular Degeneration.

I. INTRODUCTION

Age related macular degeneration (ARMD) represents a spectrum of gradual ageing resulting in degenerative changes in the human macula. It is a major cause of blindness and severe visual loss in older people in developed countries¹. It is the third leading cause of blindness worldwide and accounts for 8.7% of blind persons globally. In India, the prevalence of ARMD ranges between 1.4% to 1.8% in different epidemiological studies. It results in progressive and irreversible loss of central vision affecting the macula of the eye and involve the retinal pigment epithelium (RPE), Bruch's membrane (BM) and choriocapillaries².

Macular degenerative changes have been classified into two clinical forms, dry or wet, both of which can lead to visual loss. In the dry form visual loss is usually gradual. Ophthalmoscopy reveals yellow subretinal deposits called drusen, or retinal pigment epithelial irregularities, including hyperpigmentation or hypopigmentary changes. Larger drusen may become confluent and evolve into drusenoid retinal pigment epithelial detachments (PEDs). These drusenoid RPE detachments often progress to geographic atrophy and less frequently to neovascular ARMD. Geographic atrophy involving the centre of the macula leads to visual loss. Each of these signs can be further subdivided according to the number and size of the lesions.³

In the wet (exudative) form, vision loss can occur suddenly, when a choroidal neovascular membrane leaks fluid or blood into the sub pigment epithelial or sub retinal space. Serous RPE detachments with or without coexisting choroidal neovascularization (CNV) are also classified as the wet form. According to international classification and grading system⁴, early age related maculopathy (ARM) is defined as the presence of drusen and RPE irregularities, and the terms late ARM and AMD are limited to the occurrence of geographic atrophy and neovascular disease.³

Brighter iris has higher ARMD risk. However, high energy visible light has influenced its development in another report. Smoking increases ARMD risk by 2 times. Hypertension increases the risk of developing exudative ARMD by 1.5 times⁹. Obese individuals have ARMD twice as frequent. High intake of animal fats is related to increased risk of ARMD whereas intake of fish products or any kinds of nuts reduces ARMD risk^{6,7,8,9,10,11,12}.

Pathogenesis of the ARMD is that lipids are deposited in Bruch's membrane possibly from failure of the retinal pigment epithelium to process cellular debris. These deposits are known as basal linear and basal laminar deposits. Only later in the disease process are drusen visible. Drusen that elevate the RPE reveal that they contain lipid, amyloid, complement factors and additional cellular components. The appearance of drusen is preceded by thickening of Bruch's membrane, degeneration of elastin and

collagen with in Bruch's membrane with calcification of Bruch's membrane with increased level of advanced glycation end products and accumulation of lipids and exogenous proteins. These changes lead to hydrophobic barrier to impede the passage of fluid and nutrients between the choroid and outer retina resulting in relative ischemia.¹⁶ Treatment strategies for ARMD includes dietary supplementation of anti-oxidants, laser therapy (thermal photocoagulation, photodynamic therapy and surgery), anti-vascular endothelial growth factor (VEGF) and combination therapy (laser along with anti-VEGF treatment) are the current treatment modalities available in ARMD.

2 Methods

Place of Study

Department of Ophthalmology, Dr.RPGMC, Tanda.

Study Population

All patients of age related macular degeneration above 50 years of age presenting in the Department of Ophthalmology at Dr.RPGMC Tanda.

Study Design

Prospective study.

Study period

One year.

Inclusion criteria

- All the patients of age related macular degeneration of age above 50 years presenting in Department of Ophthalmology, Dr.RPGMC Tanda.

Exclusion criteria

- Patients with predominantly other types of retinopathies.
- Patients who refuse to give consent.
- Patients with dense corneal and lenticular opacities.

Study Procedure

All the patients of age-related degeneration attending the Out Patient Department of Ophthalmology at Dr. RPGMC Kangra at Tanda whether symptomatic (i.e. complaining of diminished vision, scotoma, micropsia or macropsia) or asymptomatic (i.e. with ophthalmoscopic features suggestive of ARMD) were included in the study. Patients particulars like name, age, sex and address was recorded. A detailed ocular history from all the patients was recorded. Family history along with personal history of smoking was taken. They were enquired about the number of packs/years he/she had been smoking. Packs/years were calculated by multiplying the number of packs with years of smoking. The number of bidis taken by the patient per day were converted to cigarettes as four bidis are equal to one cigarette. One pack of cigarette is equal to twenty cigarettes. In India a packet has 10 cigarettes rather than 20 so the number of packs were divided by two.⁶⁰

Social history, in which the occupation of the patient and educational status was noted. Any medical history, diabetes and hypertension was recorded.

Detailed local examination of both the eyes was done, which included the following:-

- Visual acuity using Snellen's chart.
- Retinoscopy using Self-illuminated retinoscope was done after full dilatation of pupil using Tropicamide 1% eye drops.
- Detailed examination of anterior segment with slit lamp was performed.
- Amsler grid chart was used to detect micropsia, macropsia and metamorphosia. Type-1 Amsler grid chart was used to evaluate 10° of visual field surrounding fixation. Type-1 chart comprised of 10 cm square containing 400 small squares each of size 5 mm which when viewed at one-third of meter subtends an angle of 1°.

- Direct ophthalmoscopy with 90D and Indirect ophthalmoscopy was done after full dilatation of pupil with Tropicamide 1% eye drops.
- Intraocular pressure was recorded.

Following criteria were used to define ARMD and Drusen size:

Small Drusen:

Drusen which were less than 63um.

Medium:

Drusen which were of the size of 63um to 125um.

Large:

Drusen which were 125um in size or more i.e. the width of a major vein at the disk edge.⁶¹

Early ARMD

When there were few (approximately <20) medium size drusen or pigment abnormalities i.e. increased or decreased pigmentation.

Intermediate ARMD

When there was at least one large drusen or numerous medium size drusen 20 or more when drusen boundaries were indistinct or soft and approximately 65 or more when the drusen boundaries were distinct or hard or the presence of geographic atrophy that did not extend under the centre of the macula.

Advance/Late/exudative

When geographic atrophy extended under the centre of the macula or there were CNV (choroidal neovascularisation) or exudative maculopathy.

Fluorescein angiography was done whenever required by injecting 3ml of 20% fluorescein dye in the antecubital vein and photographs taken with the help of fundus camera available in the department.

3 Results:

The present study was aimed to study risk factors for age related macular degeneration. All patients of age related macular degeneration above 50 years of age presenting in the Department of Ophthalmology Dr. RPGMC Tanda during the period of one year were included in the study. Total 86 patients were examined. In BDES (Beaver Dam Eye Study) it was found that nuclear sclerosis was associated with early ARMD but not with late ARMD⁵¹. Chaine G et al in their study which was a case control study of 1844 cases and 1844 controls indicated that lens opacities or cataract surgery were associated with an increased risk of ARMD⁵². Freeman EE et al in their study found that a history of cataract surgery may be associated with an increased risk for advanced ARMD⁵³. Hence, our study correlates with the above studies^{51,52,53}.

Lens Opacities

There were 86 patients, 172 eyes were examined. Of which 115(66.86%) eyes had immature senile cataract. 82(47.67%) of them had early ARMD and 33(19.19%) had intermediate/exudative ARMD. 49(28.49%) eyes had pseudophakia, 24(13.95%) of them had early and 25(14.53%) had intermediate/exudative ARMD. 8(4.65%) eyes had normal lens, of them 4(2.33%) had early and 4(2.33%) had intermediate/exudative ARMD. It was found statistically significant. (P=0.017).table.

Table.Distribution of lens opacities with early, intermediate and exudative ARMD..

Lens status N=172	Stage of ARMD			Total No.(%)	P value
	Early	Intermediate	Exudative		
ISC(Immature senile cataract)	82(47.67%)	15(8.72%)	18(10.46%)	115(66.86%)	(0.017)
Pseudophakia	24(13.95%)	12(6.98%)	13(7.56%)	49(28.49%)	
Normal	4(2.33%)	3(1.74%)	1(0.58%)	8(4.65%)	

4 Discussion:

In the present study we found that out of 172 eyes examined 115(66.86%) had ISC, 49(28.49%) had pseudophakia, and 8(4.65%) were normal. Early ARMD was more among eyes who had ISC(47.67%) where as intermediate/exudative ARMD was more among Pseudophakic eyes(14.53%).It was found statistically significant($P=0.017$).

5. Conclusions:

This study further confirms the prevalence of early ARMD was more in ISC where as intermediate/exudative ARMD was more in Pseudophakic eyes.

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