A Hospital Based Study on The Association between Risk of Age-Related Macular Degeneration and Serum Lipids

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Abstract: **Age-related macular degeneration is a leading cause of irreversible visual loss among older adults in developed countries. Lipid metabolism may be involved in the pathogenic mechanism of age-related macular degeneration. The purpose of this study was to evaluate The Association between Risk of Age-Related Macular Degeneration and Lipids Level in Blood .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 Himachal pradesh. Total 86 patients were examined. There were 57 (66.28%) patients who had abnormal serum while 29(33.72%) patients had normal serum lipid level. Qualitative analysis were used. The finding indicated   that the high level of Serum lipid   in blood were significantly associated with the risk of Age-Related Macular Degeneration and significantly increase in the Age-Related Macular Degeneration risk .**

Keywords: Age-related macular degeneration; Serum lipids ; Qualitative analysis.

I. INTRODUCTION

Age-related macular degeneration is a leading cause of irreversible visual loss among older adults in developed countries [1]. Altered lipid metabolism is implicated in the pathogenesis of Age-related macular degeneration. Lipid pathway genes, dietary lipid intake, and elevated high-density lipoprotein are associated with increased risk of Age-related macular degeneration [2]. Age-related macular degeneration is characterized by early deposition of lipids in Bruch's membrane and by drusen, focal deposits of extracellular debris composed of lipids [2]. Whether lipid abnormalities characteristic of Age-related macular degeneration might be associated with alterations in systemic lipids is not well understood [2].

In developed and developing countries, age-related macular degeneration (AMD) is the leading cause of vision loss in those aged 60 years or older,3 and the morbidity is expected to rise with the increase in life expectancy. India has about 77 million people at or above the age of 60 years representing a large group vulnerable to vision-related disorders, and the number is estimated to reach 180 million by 2026. As reported in population-based studies, the prevalence of AMD in India ranges from 39.5% to 0.3%.[4, 3, 5]

Age-related macular degeneration is the leading cause of blindness among the elderly in the United States, representing 54% of legal blindness [6]. Currently, 1.75 million people are affected by advanced AMD, and due to the aging population, 3 million people will be affected by 2020 [7]. At present, 7 million people are at risk of developing advanced AMD, and 1 in 3 persons ≥70 years old with early AMD will develop advanced disease over 10 years [6, 8]. The devastating impact to both the individual and general public is staggering. In Canada and Australia, the financial impact is estimated to be $2.6 billion on the gross domestic product [9, 10].

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.

2 OBJECTIVES

To study the **Association between Risk of Age-Related Macular Degeneration and Serum Lipids**

3 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 50years 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 macular degeneration attending the Out Patient Department of Ophthalmology at Dr.RPGMC Kangra at Tanda whether symptomatic(i.e. complaining of diminished vision, scotoma,micropsia ormacropsia) 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.

Dietary history was taken from all the patients. Subjects consuming Non Vegetarian food three times a week or more were grouped as Non Vegetarians and those who consumed it less than this were classified as Vegetarians.

A personal history regarding smoking habits was taken from the patients. 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 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. History of chronic diseases including diabetes and hypertension were recorded.

Complete systemic examination of the patients was done i.e. pulse rate,blood pressure,respiratory rate and cardiovascular system examination.

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 10^0 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 1^0.

- Slit lamp biomicroscopy with 90D and Indirect ophthalmoscopy was done after full dilatation of pupil with Tropicamide 1% eye drops.

- Intraocular pressure was recorded with Schiotz tonometer.

Following criteria were used to define ARMD and Drusen size:

Small Drusen:

Drusen which were less than 63μm.

Medium:

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

Large:

Drusen which were 125μm in size or more i.e. the width of a retinal vein as it crosses the optic nerve head.[61]

4 RESULT AND ANALYSIS

The present study was aimed to study the **The Association between Risk of Age-Related Macular Degeneration and Serum Lipids**. 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. Qualitative analysis was computed to see the **Association between Risk of Age-Related Macular Degeneration and Serum Lipids** between patients who had abnormal serum lipid levels and Paitent who had normal serum lipid levels. Age and gender distribution of subjects are shown in fig.1 and fig. 2

Table 1. Distribution of Age-group with Early, Intermediate and Exudative ARMD

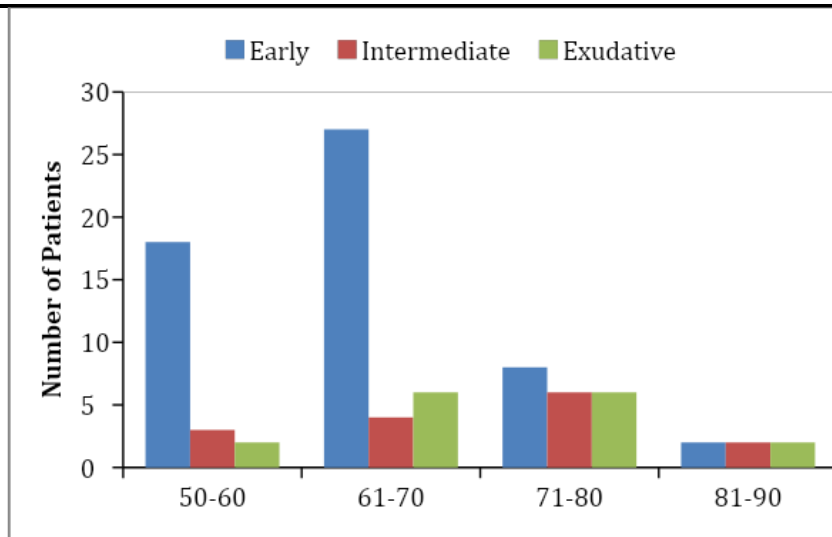| Age group (Years)	Stages of ARMD			
	Early No. (%)	Intermediate No. (%)	Exudative No. (%)	Total No. (%)
50-60	18 (20.93%)	3 (3.49%)	2 (2.32%)	23 (26.74%)
61-70	27 (31.39%)	4 (4.65%)	6 (6.98%)	37 (43.02%)
71-80	8 (9.30%)	6 (6.98%)	6 (6.98%)	20 (23.26%)
81-90	2 (2.32%)	2 (2.32%)	2 (2.32%)	6 (6.98%)
Total	55	15	16	86

Fig.1 Distribution of age group with Early, Intermediate and Exudative ARMD

**The Association between Risk of Age-Related Macular Degeneration and Serum Lipids .**

There were 57 (66.28%) patients who had abnormal serum lipid levels while 29 (33.72%) patients had normal serum lipid levels. (table 6; fig 7)

Among 57 (66.28%) dyslipidemic patients, 32 (37.21%) were in early ARMD followed by 14 (16.28%) in exudative, and 11 (12.79%) in intermediate ARMD. Among 29 (33.72%) non-dyslipidemic patients, 23 (26.74%) were in early ARMD, followed by 4 (4.65%) in intermediate, and 2 (2.33%) patients in exudative ARMD.

Table 2. Distribution of dyslipidemia with Early, Intermediate and Exudative ARMD

Lipid status N=86	Stages of ARMD			
	Early No. (%)	Intermediate No. (%)	Exudative No. (%)	Total No. (%)
Dyslipidemic	32 (37.21%)	11 (12.79%)	14 (16.28%)	57 (66.28%)
Non-dyslipidemic	23 (26.74%)	4 (4.65%)	2 (2.33%)	29 (33.72%)
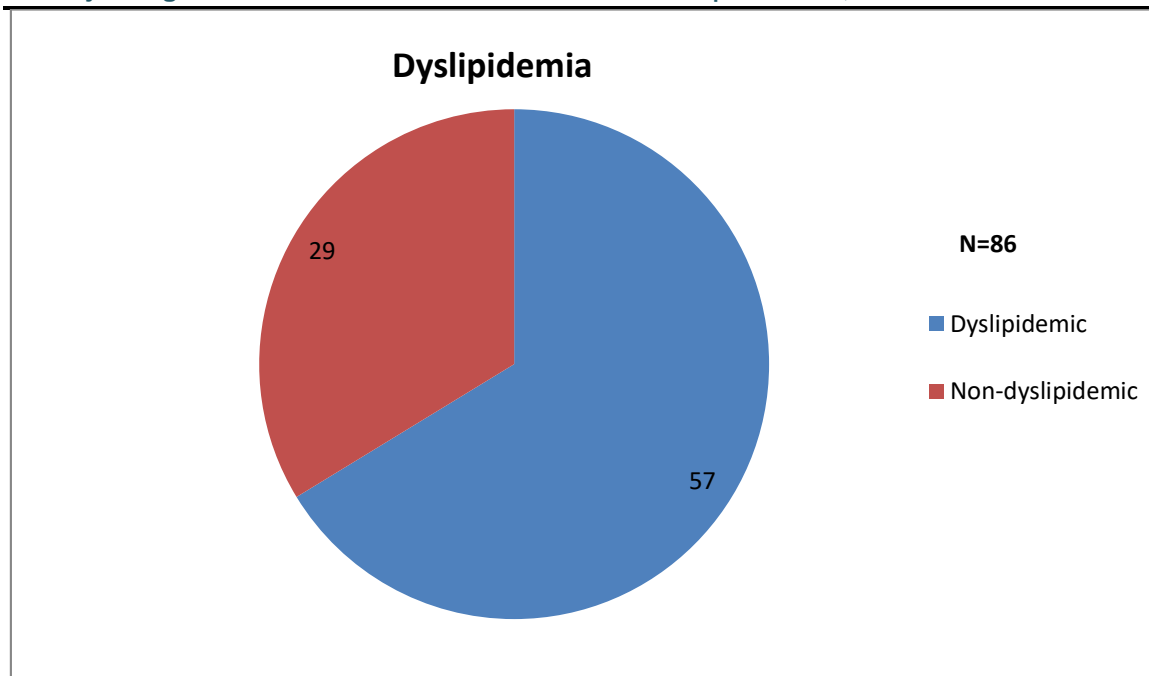
Fig.2 Distribution of ARMD patients with Dyslipidemia

Thus, the age distribution among ARMD patients shows that Among 57 (66.28%) dyslipidemic patients, 32 (37.21%) were in early ARMD followed by 14 (16.28%) in exudative, and 11 (12.79%) in intermediate ARMD. Among 29 (33.72%) non-dyslipidemic patients, 23 (26.74%) were in early ARMD, followed by 4 (4.65%) in intermediate, and 2 (2.33%) patients in exudative ARMD . The finding indicated   that the high level of serum ilipid in blood were significantly associated with the risk of early **Age-Related Macular Degeneration** and increase the **Age-Related Macular Degeneration** risk.

5 Discussion

The aim of the present study was to ascertain risk factors for age related macular degeneration. All patients of ARMD above 50 years of age presenting in the Department of Ophthalmology Dr. RPGMC Tanda for one year were included in the study. A total of 86 patients with age ranging from 50 to 90 years were included. Males were 47.67% and 52.33% were females. Most of the patients were in early ARMD (63.95%), followed by exudative (18.60%) and intermediate ARMD (17.44%). Results of this study confirm the strong association of serum lipid with ARMD. Since the early 1960s, the correlations of AMD with concentrations of plasma cholesterol or apolipoproteins have been evaluated.Several clinical studies of the associations between lipids and ARMD. Klein et al[11] reported that carotid artery intima-media thickness and carotid plaques had a weak relationship with the incidence of late ARMD. The Eye Disease Case Control Study reported a 4-fold increased risk of exudative ARMD in patients with high total cholesterol levels (≥6.749 mmol/L)[12] Reynolds et al.[13]. reported lower mean HDL cholesterol levels and higher LDL cholesterol levels in patients with advanced ARMD than in controls. In addition, high total cholesterol and LDL cholesterol levels were found to be related to an increased risk of ARMD after adjusting for environmental and genetic covariates.

5 Conclusion: The present study demonstrated that the participants with high Serum Lipid were associated with risk of ARMD. Future studies are needed to better understand the underlying biological mechanisms of ARMD related to serum lipid. large prospective studies are needed before definitive conclusions regarding the potential associations between these lipid levels and the risk of ARMD can be drawn.

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