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Evaluation of Modifiable Risk Factors in the Development of Age Related Macular Degeneration in Kashmiri Population

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Abstract

Age Related Macular Degeneration (ARMD) is the leading cause of irreversible visual loss, adversely affecting the quality of life. It is a degenerative disorder of the macula involving the choriocapillaries, Bruchs membrane, retinal pigment epithelium and the photoreceptors. It is a multifactorial disease occurring due to a complex interplay of genetic and environmental factors. Gender, ethnicity, smoking, obesity, hypertension, diabetes, history of cardiovascular disorders, high fat intake, low intake of carotenoids, history of cataract surgery, blue iris colour, high sunlight exposure are some of the risk factors, many of which are very well documented and some still remain controversial due to lack of evidence.

Objective: The aim of our study was to evaluate the role of some of the modifiable non genetic risk factors in the causation of ARMD and the role of healthy lifestyle in preventing the visual loss due to ARMD.

Materials & Method: This is a case control study which was conducted on the outdoor patients attending Al Kabir eye care center, Srinagar. The ARMD status of the patients was confirmed by thorough ophthalmological examination by a single opthalmologist. Height, weight BMI, history of smoking, history of hypertension, hyperopia, and cataract surgery was taken. Iris color was noted. Detailed dietary history regarding intake of fruits, vegetables, beef, lamb, and fish was taken. Data was analysed using Chi square test.

Result: We found that prevalence of ARMD increases after 60 years of age. History of smoking, history of higher intake of beef and lamb is strongly associated with ARMD (p value <0.01and <0.03 respectively). We did not find any association between ARMD and history of cataract surgery, hyperopia or hypertension nor did our study find any significant difference in the association of ARMD and iris colour.

Conclusion: From our analysis we can conclude that ARMD is a disease of the older population and cigarette smoking, excessive consumption of beef and lamb are significant risk factors for the causation of ARMD.

Keywords: *ARMD, Smoking, Diet, Lifestyle.*

Introduction

Age related macular degeneration (ARMD) is a degenerative disorder of the macula involving the choriocapillaries, Bruchs membrane, retinal pigment epithelium and the photoreceptors. It is the leading cause of irreversible visual loss, adversely affecting the quality of life and causing many people to lose their independence in their retirement years. In the U. S, it is responsible for 54 % of severe visual loss. It is believed that, more than 1 in 10 white individuals aged 80 and above will have advanced ARMD. Patients with advanced ARMD in one eye have 50 % chance of developing it in the other eye in 5 years time.[1,2,3,4]

ARMD has two main types; dry/non exudative and wet/exudative. Dry ARMD is more common and

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results in macular thinning, amorphous deposits and pigmentation in the macula. Opthalmoscopically, it is characterized by the presence of drusen. Drusen are small yellow deposits of mucopysaccharides and lipids deposited on the bruchs membrane. These are derived from the metabolic products of the visual receptors and the retinal pigment epithelium. Wet ARMD occurs when new vessels form choroidal neovascular membrance. These vessels are friable and may leak blood and fluid into the surrounding tissue and thus causing damage. Opthalmoscopically this appears as an elevation of the pigment epithelium beneath which abnormal blood vessels, fluid and blood can be seen. [1,2,3]

ARMD is a multifactorial disease occurring due to a complex interplay of genetic and environmental factors. As the name indicates, advancing age is a very important etiological factor. The symptoms are rare in patients less than 50 years of age. Genetic factors, gender, ethinicity, smoking, obesity, hypertension, diabetes, history of cardiovascular disorders, high fat intake, low intake of carotenoids, history of cataract surgery, blue iris colour, high sunlight exposure are some of the risk factors, many of which are very well documented and some still remain controversial due to lack of evidence.[5,6,7,8,9, 10,11]

Due to the difference in the genetic makeup and so many personal and environmental factors, a well collected population based data is lacking and the local data available is very scarce. Therefore in the present study, our aim was to evaluate the role of some of the modifiable non genetic risk factors in the causation of ARMD and the role of healthy lifestyle in preventing the visual loss due to ARMD.

In order to develop preventive strategies so as to reduce the global burden of the disease we need to understand why some people develop ARMD while others of the same age do not.

Materials and Method: This is a case control study which was conducted on the outdoor patients attending Al Kabir eye care center, Srinagar, from august 2018 to December 2018. Informed written consent was taken from all the subjects that fulfilled the inclusion exclusion criteria. **Inclusion criteria**: cases of ARMD, aged above 50 years. The ARMD status of the patients was confirmed by thorough ophthalmological examination. All the patients were examined by a single ophthalmologist using indirect opthalmoscopy and slit lamp biomicroscopy. All the patients with positive findings underwent Optical Coherence Tomography (OCT) and Fundus Florescein Angiography (FFA) for confirmation and quantification of the disease.

Age and gender matched people with no signs and symptoms of ARMD were taken as controls. Height was measured in meters and weight was measured in kilograms (Kg) and then BMI was calculated as weight in Kgs divided by height in meter square. History of smoking was taken. History of hypertension, hyperopia, and cataract surgery was taken. Iris color was noted. Detailed dietary history regarding intake of fruits, vegetables, beef, lamb, and fish was taken.

Statistical analysis: The association of the various lifestyle related factors with ARMD was then evaluated using statistical test Chi square test.

Results: Our study found a positive association of ARMD with age showing greater prevalence after 60 years of age as is shown in table 1. Mean age of the cases was 66.4 years and that of controls was 65.12. The mean BMI of cases was 24.31 and that of controls was 23.64. However these two differences were not statistically significant. Males were found to be affected more than females (p value.0.05). Figure 1 shows the OCT image of a wet ARMD patient.

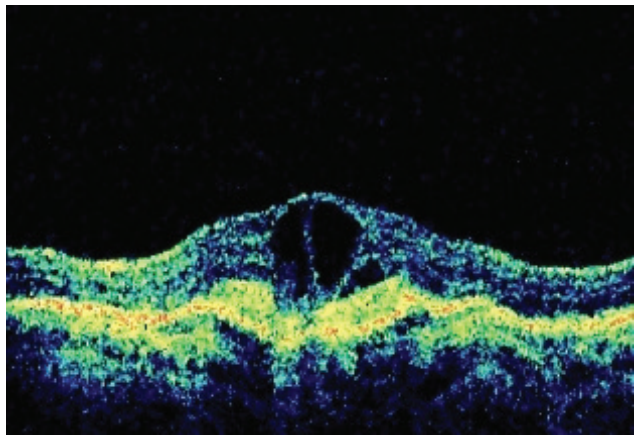

Figure 1: OCT image showing Choroidal neovascular membrane with Intra-retinal fluid in a case of WET ARMD

Our results show that History of smoking is strongly associated with ARMD as is shown in table number 2 and this association is statistically significant (p value<0.01). We did not find any association between ARMD and history of cataract surgery, hyperopia or hypertension nor did our study find any significant difference in the association of ARMD and iris colour.

We also found that history of higher intake of beef and lamb was positively correlated with ARMD as

is shown in table 3 and this association is statistically significant (p value < 0.03). However we did not find a positive association between higher consumption of fish and low incidence of ARMD.

Table 1: Age wise distribution of subjects

Age Group	ARMD N (%)	Non ARMD N (%)	Total N (%)
50-54	01 (02)	00 (00)	01 (01)
55-59	04 (08)	10 (20)	14 (14)
60-64	13 (26)	12 (24)	25 (25)
65-69	20 (40)	22 (44)	42 (42)
70-74	09 (18)	05 (10)	14 (14)
≥75	03 (06)	01 (02)	04 (04)
Total	**50 (100)**	**50 (100)**	**100 (100)**

Chi Square = 5.85, P Value=0.321

Table 2: Distribution of subjects as per their History of Smoking

	Non Smoker N (%)	Present Smoker N (%)	Total N (%)
Armd	18 (36)	32 (64)	50 (100)
Non Armd	29 (58)	21 (42)	50 (100)
Total	47 (47)	53 (53)	100 (100)

Chi Square= 4.87, P Value = 0.01

Table 3: History of Intake of Beef/Lamb

	Present N (%)	Absent N (%)	Total N (%)
Armd	43 (86)	07 (14)	50 (100)
Non Armd	34 (68)	16 (32)	50 (100)
Total	77 (77)	23 (23)	100 (100)

Chi Square= 4.57, P Value= 0.03

Discussion

ARMD is a disease of the old age, therefore our study population included subjects > 50 years of age and we also found ARMD to be more prevalent after 60 years of age and this is well supported by literature. [8] We did not find a significant association between BMI and ARMD and this is supported by some other studies as well. [21] However some studies have found BMI as a moderate risk factor for ARMD. [5, 8] Debra A et al in their study have found that the relation between ARMD and BMI is independent of age and cigarette smoking and obesity is a significant risk factor for dry ARMD [18]. In our study population males were affected more than females but the results in this regard differ and are inconclusive. [8, 10, 17]

We found that history of smoking is positively and significantly associated with ARMD. This is in accordance with previous studies. [8, 15, 16, 21] J R Evans et al in their study found that current smokers were twice at risk of ARMD as compared to non smokers and ex smokers are at an intermediate risk. People who have quit smoking more than 20 years ago were not at an increased risk of ARMD causing visual loss. [12] As per the Brever Dam study also, the risk of ARMD is higher in current smokers as compared to Ex smokers and non smokers. [14]

Our study did not find a significant association between between hypertension, cataract surgery iris color and history of ARMD. Many other studies have shown similar results [13, 16, 20, 21]. Literature is still divided on whether or not these factors pose a risk for the development of ARMD and many researchers have found contradictory results. [8, 10]

Diet also seems to play an important role in the causation of ARMD. Studies have found higher intake of fruits and vegetables is inversely related to ARMD [9]. Higher intake of carotenoids is recommended as a preventable dietary modification for ARMD [13]. Higher intake of dietary lutein is associated with reduced risk of ARMD [15]. Our results show higher intake of beef and lamb to be positively related with ARMD. History of higher consumption of beef, pork or lamb (>one serving per week) is associated with 35 % increased risk of ARMD when compared to people who take < one serving per month. On the other hand, higher intake of fish seems to play a protective role. Consumption of fish > 4 times a week was associated with lower risk of ARMD as compared to people who consumed fish < 3 times per month. Positive association has been found between intake of linolenic acid (found in food sources like beef, pork, and lamb) and ARMD and an inverse relation between DHA (found in food sources like fish) and ARMD [19].

Conclusion

From our analysis we can conclude that ARMD is a disease of the older population and cigarette smoking, excessive consumption of beef and lamb are significant risk factors for the causation of ARMD.

Hence, in an adjunct with prescribing therapies it is important to make lifestyle and environment modifications. Creating awareness about some of the lifestyle modifications like quitting cigarette smoking, reducing body weight, role of exercise, role of antioxidants in the diet will help to lower the burden of the disease and help people lead a healthy life. Patients should be encouraged to eat diet rich in fruits and vegetables and cut down on intake of beef/lamb as a main dish.

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