



A Comparative Risk Factor Analysis of Variants of Agerelated Macular Degeneration

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ABSTRACT

Introduction: *Wet Age related Macular Degeneration (AMD) accounts for majority of severe visual loss due to AMD. A knowledge of risk factors associated with wet Agerelated Macular degeneration will help in prevention of the disease by control or modifying these risk factors.*

Aim: *To study whether there is any difference in risk factors for dry and wet AMD.*

Materials and Methods: *This was a cross sectional comparative study of risk factors between patients with dry and wet AMD. Patients above 50 years of age who presented to our outpatient department with age related macular degeneration on clinical examination were included in the study and diagnosed as either wet or dry AMD based on clinical findings. Age, gender, sunlight exposure, history of hypertension, cardiovascular disease, diabetes mellitus, trauma, radiation, smoking , serum cholesterol and dietary history were noted and compared between the two groups. Statistical analysis was done using SSPS software using chi squared test.*

Results: *Diabetes mellitus was found to be a significant risk factor in wet AMD (p value 0.045). Other factors were not statistically significant though age was higher in the wet AMD group.*

Conclusion: *The finding of diabetes as a risk factor for wet AMD supports the vascular pathogenesis of the disease. Further larger studies and longer follow-ups are required to study why some AMDs become wet while others remain dry .*

Key Words: *Wet or neovascular Age related macular degeneration, Dry Age related macular degeneration, risk factors.*

INTRODUCTION

Age-related macular degeneration (AMD) is the leading cause of blindness in the elderly world wide.^{1,2} With improved healthcare, life expectancy of the population is increasing leading to increased incidence of age related macular degeneration. At present there is no known cure

for the disease, treatment is meant to control progression only. A knowledge of the risk factors associated with AMD may come a long way in helping to understand the pathophysiology and thereby help in prevention of occurrence or progression of the disease. Various risk factors like increasing age, smoking, sunlight exposure,

hypertension, altered lipid profile, increased body mass index, family history, cardiovascular disease, intake of micronutrients etc have been described. While there are several studies which have studied the risk factors associated with AMD, most have studied both wet and dry together as a single group or only wet AMD. Though neovascular or wet AMD accounts for only 20% of total cases³, it is responsible for 90% of severe visual loss⁴. In this study we plan to compare the risk factors between those with dry AMD and those with Wet AMD and thereby analyse whether there is a possible difference in pathogenesis of the two types or not.

MATERIALS AND METHODS

This was a cross sectional comparative study between patients with dry and wet AMD. Patients above 50 years of age who presented to our outpatient department with visual complaints and diagnosed to have age related macular degeneration on clinical examination were included in the study. A detailed history including age of patient, gender, type of visual complaints, occupation with reference to high exposure to sunlight, hypertension, cardiac disease, diabetes mellitus, dietary history, history of trauma, exposure to radiation, family history of ARMD, smoking both active and passive and alcoholism were taken and recorded. Those who worked outdoors for 8 hrs / day were included in the group with high sunlight exposure. History of smoking >10 cigarettes /beedis /day and daily alcoholism were taken as positive history. A fasting lipid profile, fasting and postprandial blood sugar and blood pressure measurement was done for all patients. Those with blood pressure >160/90 mm or history of hypertension were taken to have hypertension. Similarly those with fasting blood sugar >127 mg% or postprandial >200mg % or history of diabetes were taken to have diabetes mellitus. Those with serum cholesterol < 200mg% were taken as normal and >200mg% as elevated.

A detailed ocular examination was done for these patients including best corrected visual acuity for distance and near, intraocular pressure, slitlamp examination for anterior segment pathologies and a dilated slitlamp biomicroscopy using 90D lens for retinal examination. A slit beam was used to determine macular edema. The patients were divided into 2 groups – dry and wet ARMD. The presence of drusen, presence of hyper or hypo pigmentation of retinal pigment epithelium, geographic atrophy or combination of these with a bestcorrected visual acuity of 6,9 or less not due to any other cause was included under diagnosis of Dry AMD. Wet AMD included presence of choroidal neo-vascular membrane (CNVM), exudative pigment epithelial detachment (PED) serous or haemorrhagic, serous sensory or hemorrhagic retinal detachment, disciform macular scar or combinations of any of these in any one eye. Patients with corneal and lens opacities, obstructing the view of posterior retina, were excluded from the study. Also patients in whom lens or corneal opacity was present in one eye precluding view of that eye were excluded if the other eye was having dry AMD as the definitive diagnosis of wet or dry AMD in the patient could not be made. Patients with other retinopathies affecting the macula and those with other causes of choroidal neovascular membrane like high myopia, angioid streaks, etc were excluded from the study.

Statistical analysis was done using the SSPS version 18 software. Risk factors between the two groups were compared using chi squared test with the Fischer exact test. P value < 0.05 was taken as significant.

RESULTS

A total of 50 patients were studied. Of these 4 were excluded due to lens opacity precluding view of fundus in one eye, thereby making a diagnosis of dry or wet AMD not possible. Of these 21 (45.65%) patients had dry AMD and 25 (54.35%) wet AMD. 27 (58.7%) were males and 19 (41.3%) females and mean age was 63.71

years(50-86 years). Demographic features are given in Table I

There were 14 males and 7 females in dry AMD group and 13 males and 12 females in the wet AMD group . On statistical analysis, gender was not found to be significant (p value 0.241) between the groups . In the dry group , mean age was 61.86 years(50-86 years) while in the wet group mean age was 65.28 years (50-85 years).Though the mean age was higher in the wet AMD group, it was not statistically significant (p value-0.976).

Vision was > 6/36 in 39.13% and < 6/60 in 60.87% in at least one eye of AMD patients. Dry AMD accounted for 14.3% cases of vision <6/60 all having geographic atrophy while wet AMD constituted 85.7% cases. Vision was > 6/60 in 63% and < 3/60 in 37% of which dry accounted for 11.8% and wet for 88.2% as seen in Table II

On analysis of risk factors (TableIII), sunlight exposure, hypertension and cardiovascular disease were not found to be significantly different in both the groups .Diabetes mellitus was found to be a risk factor (p value 0. 045) for development of wet AMD with odds ratio of 5.33 .Since history of trauma and exposure to radiation was seen only in one patient each , its significance was not studied . Though 7 patients gave history of defective vision in the family, as records were unavailable to confirm the diagnosis of AMD, this was not included in the analysis. All patients gave a history of taking a nonvegetarian mixed diet.

Smoking was present in 67.39 % of patients with AMD, there was no statistically difference between the two groups (0.538) though wet AMD was found to be more common in smokers than non smokers . Raised serum cholesterol levels did not appear to be significantly different in the two groups (p value -0.827).

Table I Demographic features of patients with dry and wet AMD

	Wet AMD	Dry AMD	Total	P value
Mean age	65.28 yrs	61.86 yrs	63.71 yrs	0.976
Range	50-85 yrs	50-86 yrs	50-86 yrs	
Gender - Male	13	14	27	
Gender Female	12	7	19	
Total	25	21	46	0.241

Table II: Vision in patients with AMD

Vision	Dry AMD	Wet AMD	TOTAL
>6/60	19	10	29
<3/60	2	15	17

Table III: Risk factor analysis in wet and dry ARMD

Risk factors	Wet AMD	Dry AMD	Total	P value
Sunlight exposure	10	7	17	
Absent	15	14	29	.762
Hypertension	13	11	24	
Absent	12	10	22	1.000
Cardiovascular disease	4	4	8	
Absent	21	17	38	1.000
Diabetes mellitus	9	2	11	
Absent	16	19	25	.045
Smoking	18	13	31	
Absent	7	8	15	.538
Alcohol intake	4	5	9	
Absent	21	16	37	.711
S Cholesterol	15	11	26	
Absent	10	10	20	.827



Figure I : showing disciform scarring in wet AMD



Figure II : Drusen in dry AMD



Figure III : Choroidal neovascular membrane with subretinal haemorrhage in wet AMD

DISCUSSION

Of the 46 patients studied, 45.65% patients had dry AMD and 54.35% wet AMD. This differs from the Framingham study in which wet AMD was found to account for 20% of total AMD³. This may be due to the study being of select populations from a community and not of patients presenting to the outpatient department with defective vision as in this study.

Though the male: female ratio was not significantly different between dry and wet AMD, it was found that overall, males were more commonly affected. Various studies have reported differing results with more males in some⁵, more females in some⁶ and no difference in some⁷.

The mean age of patients with wet AMD was found to be higher than those with dry AMD in this study (65.28% Vs 61.86 yrs) though not statistically significant. Other studies have also described age as the strongest risk factor for late AMD with occurrence in those aged seventy and above.^{8,9}

Sunlight was not a significant risk factor for development of wet AMD compared to dry AMD in this study. Other studies have described sunlight exposure as a risk factor for AMD^{10,11}. Hypertension and cardiovascular disease were not found to be significantly different in both the groups. Smoking though not significant between the two groups was found to be more prevalent in when both groups were taken together (Smokers Vs nonsmokers - 31 Vs 15). The AREDS study has shown increased risk of neovascular and advanced AMD with hypertension and smoking¹². It is thought that smoking leads to damage to choroidal vessels or choroidal blood flow by causing atherosclerotic and hypoxic changes in the choroidal vessels or by vasoconstriction. It is also described to reduce antioxidants and luteal pigments. The pulse pressure, duration of hypertension, intake of antihypertensives have all been described as risk factors for advanced AMD. However these details were not included in our study. Another study has shown cardiovascular disease to be a risk factor thereby suggesting the hypothesis that AMD may have an underlying vascular basis¹³. Alcohol intake and raised serum cholesterol were not significantly different in the two groups in this study. Some studies have shown alterations of lipid levels in AMD¹⁴ while another has shown a negative correlation between serum cholesterol and neovascular AMD¹⁵. Diabetes was found to be a significant risk factor in wet compared to dry AMD (p value -0.045). The AREDS study has reported an association between incidence of neovascular AMD and diabetes.¹⁶ The Beaver Dam Eye Study has also described an association between diabetes and AMD.¹⁷ Tomany et al however found no correlation between diabetes mellitus and AMD¹⁵.

while a Korean study found an inverse correlation between diabetes and AMD¹⁸ The 10-year incidence of neovascular AMD was lower in patients with newly diagnosed type 2 DM than in control subjects,¹⁹ and the prevalence of neovascular AMD also was lower in patients with DR than in the general population.²⁰ The prevalence of neovascular AMD was much lower in those who received retinal laser photocoagulation to treat DR.²⁰ In the present study, the presence of diabetic retinopathy or laser treatment for the same were not included.

This finding of association with diabetes seems to point towards the vascular etiology as pointed out by previous studies. Further larger studies and longer follow-ups are necessary to understand the risk factors involved in wet AMD. This will go a long way in prevention or control of the wet form of the disease which is largely responsible for severe visual loss by modification or control of risk factors.

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