Research Article

Prevalence of Age-Related Macular Degeneration at a Tertiary Care Hospital in Pakistan

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Abstract:

Purpose: To evaluate the frequency of Age Related Macular Degeneration (ARMD) in the patients presenting to a teaching hospital in Pakistan, and to find the most common factors associated with high frequency of ARMD.

Study Design: Descriptive Cross-sectional study

Place and Duration of Study: Layton Rehmatullah Benevolent Trust Free Eye Hospital Township Lahore from 1st January 2019 to 30th June 2020

Methods: A total of 720 patients with ages more than 60 years were included. Participants with no media opacity were selected randomly from the outpatient department. After which Informed consent was taken from all participants for taking retinal images. 45 degree retinal images were taken using an Eight megapixel fundus camera (Topcon). Fundus fluorescein angiography and Optical coherence tomography (OCT) were conducted in patients clinically diagnosed with ARMD. A specifically designed proforma was used to document data like age & gender, smoking pattern, visual acuity for far and near vision, and staging of ARMD (if Present). Also recorded were Blood pressure, fasting blood sugar level, cholesterol levels, and height of patient.

Results: The number of subjects participating in the study was 720, among which 350 (48.61%) were male while 370 (51.39%) were female. The prevalence of ARMD turned was found to be 5.27% (38/720) in the local population. The frequency of patients having signs of dry ARMD was 25 (65.7%), which were more than those having wet ARMD i.e., 13 (34.3%).

Smoking was found to be most commonly associated with ARMD (36%). The second most common association was with hypertension (21%). While Hyperlipidaemia (11%), Diabetes Mellitus type II (10%), and obesity (6%) had a lesser association with ARMD.

The prevalence of depression in patients of ARMD was 92.1%.

Conclusion: ARMD is most frequent in smokers and they should be educated about this risk.

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Key words: Age-Related Macular Degeneration, Hypertension, Diabetes, Obesity.

Introduction

Age-Related Macular Degeneration (ARMD) is among the leading causes of blindness world over. The primary pathology lies in the central part of the retina termed macula, which is the part responsible for the maximal resolution of images transmitted to the brain[1]. The disease course is chronic and so is the visual loss. A systematic review by Wong[2] found an overall prevalence of ARMD to be 8.69%. Wherein the condition was found to be more prevalent in Europeans as compared to Asians or Africans; being 11.2%, 6.8%,

and 7.5%, respectively.

As the name states, age is the primary risk factor for ARMD, while others like smoking, obesity, hypertension, hypercholesterolemia, excessive ultraviolet light exposure have also been associated with the condition.[3] ARMD is classified into two subtypes based on characteristic features i.e., Dry and Wet ARMD. The dry form is considered a precursor to the Wet variety, and therefore much more prevalent. ARMD is further classified upon the basis of severity i.e., early, intermediate and advanced ARMD. Early ARMD is characterized by small to intermediate size drusen with one or more large-sized drusen (>125μm)[4]. Whereas the advanced form includes Geographic atrophy and exudative ARMD. The usual presentation in patients with dry ARMD is with difficulty in visualization on changing ambient light condition, while the patients with wet ARMD present with metamophopisa and central visual field defect[5]. The management of dry ARMD is primarily on prevention or putting a hold on further progression of the disease by antioxidant supplements like Lutein, Zeaxanthin, and Omega-3 fatty acids, and visual rehabilitation by low vision aids [6,7]. Whereas there are more definitive treatment modalities available for wet ARMD like intravitreal Anti-VEGF, and Laser photocoagulation[8].

The purpose of this study was to find the most common factors associated with a high frequency of ARMD in the Pakistani population furthermore an assessment of presence of depression among patients of ARMD was done.

Methods:

This analytical study was conducted at Layton Rehmatullah Benevolent Trust Free Eye Hospital, Lahore Pakistan from 1st January 2019 to 30th June 2020. After approval from hospital ethical review board of LRBT, Lahore, a total of 720 participants with ages above 60 years with clear ocular media were selected by consecutive sampling technique from the out-patient department. Patients with the history of retinal surgery, retinal laser, and signs of trauma and uveitis on clinical examination were excluded.

The patients of ages above 60 years were part of this study. People who had a history of age-related macular degeneration with hypertension, diabetes, smoking, obesity, and hyperlipidemia were included. Participants with a blood pressure of > 150/90 mm Hg were labelled as hypertensive, whereas those with FBS level > 7 mmol were labelled diabetics and those with a fasting triglyceride level of more than 250 mg/dL were labelled as having hyperlipidaemia.

Data Collection

A proforma was designed for the collection of basic figures including age & gender, the status of the retina. All images and data were collected by the same technologist. Variables thought to associate with ARMD i.e. smoking, Hyperlipidaemia, hypertension, diabetes, and obesity were assessed. Depression in patients was assessed by using a self-modified PHQ-9 Questionnaire. Weight and height were noted to calculate the Body mass index.

Diagnosis of disease was made based on clinical examination by slit lamp biomicroscopy and an 8-MP Retinal imaging system was applied to take 45-degree images. The Imaging was done after Informed consent. Snellen's chart was used to measure distance visual acuity and Jaeger near vision chart was used to record near vision. Both coloured and red free images were taken. Fluorescein angiography and images of each individual were assayed by readers for size, density, number, and grading of ARMD (dry and wet) was performed according to Holz (14) Dry ARMD included drusen, pigmentary retinal changes, and geographic atrophy. Wet ARMD included disorders of choriocapillaris plexus including choroidal neovascular membranes (CNVM) and detachment of the retinal pigment epithelium (PED) associated with fluid in the neurosensory retina (15). The assumed proportion of ARMD was 6.8% according to a published study (2), thus a sample size of 720 patients was calculated to achieve a 98% confidence interval with an acceptable 3% margin of error. SPSS version 23 was used for analysis.

Results:

The subjects included in the research were 720, among which 350 (48.61%) were male while 370 (51.39%) were female. There was no significant correlation between male and females with p value of 0.44 (Chi-square test). The prevalence of ARMD turned was found to be

5.27% (38/720) in the local population. The frequency of patients having signs of dry ARMD was 25 (65.7%), which were more than those having wet ARMD i.e., 13 (34.3%).

Smoking was found to be most commonly associated with ARMD (36%), however, this association was not statistically significant (P-value 0.66) **(Chi-square test)**. The second most common association was with hypertension (21%). While Hyperlipidaemia (11%), Diabetes Mellitus type II (10%), and obesity (6%) had a lesser association with ARMD. The patients of different age groups with the frequency of ARMD were elucidated in table.1 and table.2 shows that 92.2%

Table 1: *Age-wise distribution of ARMD*

Age Groups	Frequency/720	Percentage	ARMD/38	Percentage
60-65	310	43.06	9	23.69
66-70	216	30	15	39.47
71-75	122	16.74	8	21.05
75-80	72	10	6	15.79

Table 2: *Percentages of ARMD patients suffer from depression*

Age Groups	Number of patients who suffered from depression	Percentage
60-65	305	42.36%
66-70	209	29.02%
71-75	102	14.16%
75-80	48	6.66%
Total	**664/720**	**92.2%/100%**
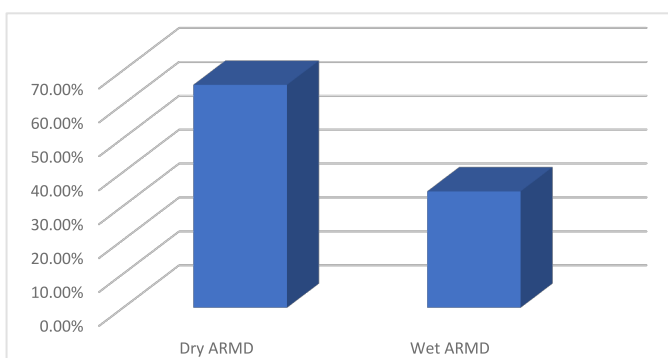
Figure 1: *Type Prevalence of ARMD*
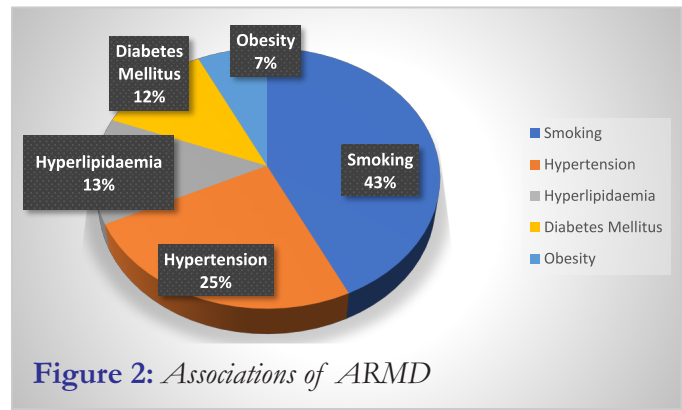
Figure 2: *Associations of ARMD*

of patients had the experience of depression along ARMD.

Moreover, no association was found between gender of patients and the type of AMD (P-value 0.22) **(Chi-square test)**.

The prevalence of depression in patients of ARMD was 92.2%.

Discussion

ARMD is grossly prevalent in the older population above 50 years of age. The prevalence of Age-related Macular degeneration was less than the estimated prevalence for our region (6.8%) being 5.27%. A previous study in Pakistan[5] showed the prevalence to be 1.560% which is much less than our study, the reason may be that our centre is more established regarding the management of retinal diseases thereby a greater load of patients with retinal diseases presents to our setup. In the United States, the prevalence of ARMD is 5.6%[9]. A meta-analysis by Wong[2] estimated the global prevalence of ARMD to be 8.7%, meaning around 196 million people will have the disease in 2020, whereas 288 million people have predicted to have the disease by the year 2040, with the European race being affected more than the Asian and African ones.

A cohort study demonstrated the association of AMD with obesity, men had a lesser association with development AMD in relation to obesity while obese women were at greater risk to develop ARMD[10].

Vingerling et al reported a significant association of cigarette smoking with ARMD, the smoker had a 6.6 times greater risk to experience age-related macular degeneration specifically neovascular ARMD as compared to a non-smoker. The smoker who smoked

more than 10 packs in a year had a high prevalence of ARMD[11-12]. One more study on Korean adults of age more than 50 years concluded a positive relationship between diabetes mellitus and early age-related macular degeneration[13].

Regarding types of ARMD, the prevalence of Dry ARMD was 65.7%, while that of wet ARMD was 34.3%. The findings are consistent with most studies reported in the literature[16-18]. However, a study found no statistically significant difference in prevalence between the types[19].

In our study, the disease was found to be most prevalent among the patients in the 66-70 years age group, which is consistent with findings of another study in Pakistan[5]. However, studies have also reported 60-65-year-old patients to have a maximal prevalence of ARMD[16].

The pattern of visual loss differs in the two types. The dry ARMD presents with painless gradual loss of vision while wet ARMD with a painless sudden profound visual loss. Authorities state that if not managed the dry ARMD can progress to the wet form. In spite of extensive research, no causal factor has been established for the development of ARMD, however certain factors have been associated with the development of the diseases. These factors include conditions that cause oxidative stress on the body or result in vascular compromise; namely, smoking, hypertension, hyperlipidemia, diabetes, and obesity. Smoking was most strongly associated with ARMD in our study, while hypertension was the second most common association. In the adult population in the USA smoking has the maximum association while hyperlipidemia has the second slot[16]. There are multiple studies that show the association between hypertension and ARMD[16], wherein one study showed the effect to be caused by reduced lysozyme levels by drugs used to control hypertension for e.g., beta-blockers[16].

Patients with chronic ailments are prone to develop clinical depression. Our study reports that about 92% (table.2) of patients suffered from depression partly due to the defective central vision with loss of reading and other near work, but mostly due to the fear of losing their sight completely. Certain studies have shown that such depression can be managed by rehabilitating patients of ARMD with low vision aids, counselling from therapists, and increased attention to their needs by families, physicians, and society to alleviate mobility challenges[20]. A cross-sectional study done at Greece have shown that ARMD patients score higher on BDI-II than Age Related Cataract (ARC) patients due to poor visual prognosis in ARMD21. Some other studies have shown that sub-threshold symptoms of depression in visually impaired old age individuals is twice as high as normally sighted general older population i.e., 33% and 15% respectively[22,23,24,25,26].

Conclusion:

Finally, we concluded that smoking was the most common factor, hypertension was the second common factor observed among patients, and hyperlipidemia, diabetes mellitus, and obesity had an association with ARMD. Age-related macular degeneration is getting prevalent as life expectancy is increasing in patients, moreover, there are modifiable risk factors that need to be addressed by patients to prevent complications associated with ARMD, and thus the patients must be educated about these factors to reduce morbidity caused by it.

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