Original Article

Epidemiology of Age Related Macular Degeneration (AMD) and It's Associated Ocular Conditions and Concomitant Systemic Diseases

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Purpose: To find the prevalence of AMD and its accompanying ocular or systemic diseases.

Material and Methods: Epidemiological survey was conducted amongst the patients presented at different ophthalmology clinics in Lahore. Data was collected from AMD patients (n=100) through prescribed forms and was analysed for statistical significance.

Results: Dry AMD (82%) was more prevalent than wet AMD (18%). Women (66%) seemed to be affected more than men (34%). In majority, AMD was found associated with other ocular conditions like cataract (78%), pseudophakia (27%), glaucoma (2%) and vitreous degeneration (3%). Interestingly, a high proportion of systemic diseases accompanied AMD like hypertension-hypercholesterolemia (72%), obesity (40%) and depression (90%). Ophthalmologists usually adopted preventive interventions against further vision loss like vitamins and minerals for dry AMD. Likewise, in wet AMD anti-VEGF, laser photocoagulation or photodynamic therapies were implied.

Conclusion: AMD had a high prevalence and was often observed with other ocular conditions. Moreover, an effect of age, gender and cardiovascular diseases seemed to exist as the predisposing factors in AMD development. This study opens perspectives to conduct research to develop effective therapies for AMD.

Age – related macular degeneration (AMD) is the deterioration of "macula" which is responsible for the central vision. There are two types of macular degeneration: first, dry or non-neovascular macular degeneration which is characterized by the formation of drusens (fat deposits) on retina and second, wet or neovascular macular degeneration which is developed due to the formation of abnormal blood vessels underneath the retina. Each type of AMD has its associated clinical manifestations like dry AMD causes blurring of vision which includes inability to recognize faces and blank spot in central vision. Likewise, the wet AMD causes distorted vision which consists of the appearance of straight lines as bent, crooked or irregular[1] AMD may only be diagnosed by an ophthalmologist through clinical examination and in certain cases by additional complementary tests, particularly, fluorescein angiography, indocyanine green angiography and/or an optical coherence tomography[2,3].

At the moment, the exact cause for AMD is not known. However, few factors are thought to contribute towards AMD development like age, gender, genetics, life style and exposure to the

sunlight[4]. AMD is a debilitating disease which usually affects patients over 50 years[5,6] and has been considered to be a significant cause of blindness in United States[7]. Although the prevalence of AMD is the highest among Caucasians in Western countries, its prevalence among Asians is also quite high[8].

In Pakistan, however, little information is available on the epidemiology of AMD. This study provides a) the prevalence of AMD amongst the ophthalmic cases presented at ophthalmology clinics in Pakistan, b) the diseases most commonly associated with AMD and c) the different treatments and/or management options followed by the ophthalmologists in this condition. Additionally, a corollary objective was to elucidate the role of pharmacist at the ophthalmology clinics – a comparatively less focused domain by the health professionals.

MATERIAL AND METHODS

In this study we carried out a cohort survey to observe the prevalence of AMD and analyzed the management options followed by the ophthalmologists to treat AMD. This project was primarily based upon collection of data from the patients presenting at the ophthalmology clinics and who were diagnosed to have AMD by an ophthalmologist. The sample population followed up in this study included the ophthalmic patients of three hospitals in urban area of Lahore district. The information from these patients was obtained by filling up a previously designed "Data Collection Form". Later on this information was critically analyzed and conclusions were drawn.

Clinical Observations

First AMD was diagnosed on the basis of clinical signs and symptoms and then fluorescein angiography was performed. A bolus injection of sodium fluorescein (3mL) was injected intravenously to the patients. The photos of retina were taken when the dye reached the ocular circulation (nearly 10 seconds after injection).

Statistical Analysis

In order to observe any significant results one way ANOVA was performed through the use of SPSS software.

RESULTS

The results of this retrospective survey study indicate that AMD had a high rate of prevalence amongst the patients (5%) presenting at the ophthalmology clinics. Most of these cases (82%) were having dry form, while an important proportion was also having wet AMD (18%). Interestingly, women constituted a higher proportion (66%) of AMD patients compared to men (34%). In majority of patients the onset of condition was progressive (82%) while an important population had an abrupt onset (18%) with either one (18%) or both eyes affected (82%).

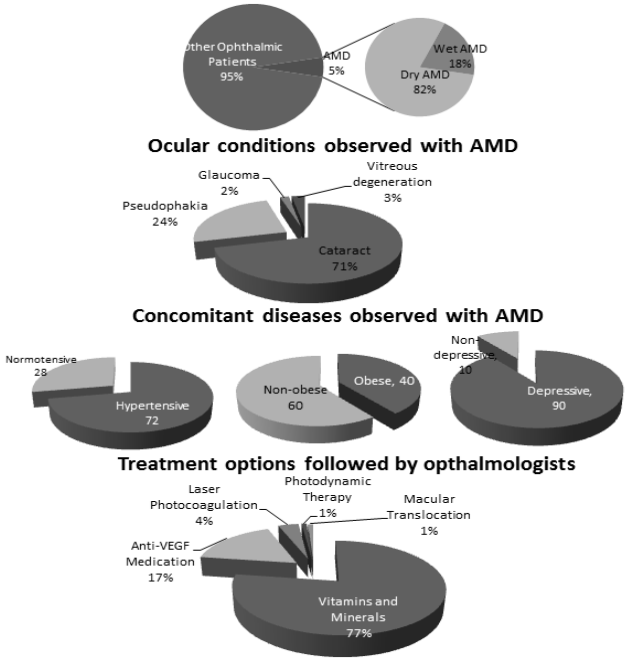

Fig. 1: Ocular conditions observed with AMD

In this study we observed that AMD is associated with other ocular conditions like cataract (78%), pseudophakia (27%), glaucoma (2%) and vitreous degeneration (3%). The loss of vision cause severe psychological disturbances in affected people. In addition to the associated ocular disorders, we observed that a high proportion of AMD patients had accompanying systemic diseases (70%). These conditions included hypertension, hypercholesterolemia (72%), obesity (40%) and depression (90%).

The clinicians mostly used supportive therapies to avoid further vision loss in affected subjects. These treatments included vitamins and minerals (72%) for dry AMD and in wet AMD anti-VEGF (10%) and laser photocoagulation (10%). However, these treatments did not contribute towards the improvement of vision already lost.

DISCUSSION

Age – related macular degeneration (AMD) affects a significant percentage of the population and was considered to be the most significant cause of acquired blindness in United States involving more than 8 million people[9].

In this study we observed a high proportion of AMD among ophthalmic patients (nearly 5%) and they reported a problem of significant vision loss Elderly subjects had a higher incidence than the young. This is the most significant factors which also lead to assign the name of condition as "age – related" degeneration. The patients included men and women. However, women seemed to be more prone to AMD. This sex predilection is unexplained so far, however, an association with cyclic hormonal changes or the use of contraceptives may be found.

We observed that most of these cases were having dry AMD (82%), while a comparatively smaller population had wet AMD (18%). This is consistent with earlier findings. Moreover, dry AMD, if not treated, leads to the wet form which explains a higher proportion of dry form. The exact etiology of AMD is difficult to be attributed; however, various predisposing factors are known. For instance, in our study we observed most of patients were taking a high fat diet which contained a lesser portion of beta-carotene and leutin (data not shown). The deficiency of these two compounds is associated with development of dry AMD.

Interestingly, AMD was associated with other ocular conditions in most of the cases. The most common condition was cataract which probably is also manifestation of older age like AMD. Pseudophakia, or the ocular surgery mostly in cataract, was another important condition associated with AMD. In fact, cataract surgery involves intra ocular lens implantation, which might not contain yellow chromophore responsible for blue light absorption. This inflicts regular apoptosis inhibition in eye cells causing drusen formation and hence, leads to AMD.

In the present study we observed AMD was associated with other systemic diseases in addition to the ocular problems. Depression was most common condition observed in patients reporting AMD. This is in concordance with previous reports[10]. This is probably due to a fear factor of becoming blind forever. In fact, greater attention from families, physicians, and society to the mental health needs and also alleviation of mobility challenges may help improve the condition.

The most striking feature of this study was the identification of hypertension as the second most common concomitant disease. Interestingly, an association between AMD and cardiovascular disease has been proposed; however, case control and genetic analyses have been quite ambiguous. However, chronic hypertension and various environmental risk factors like smoking have strongly been associated with ocular conditions including AMD. It is observed that antihypertensive drugs like systemic beta blockers reduce lysozyme levels and they reduce the requirement for intravitreal anti-VEGF injections in patients with wet AMD. This is an interesting observation which opens the way for further research in the development of cardiovascular treatments which may prevent AMD incidence[11].

CONCLUSION

The presented study provides a preliminary report on a major ophthalmic condition (AMD) in Pakistan. This study highlights that AMD is a multifactor problem which may be associated with other ocular or systemic diseases. The improved efficiency of AMD treatment in the patients receiving the cardiovascular medicines suggests existence of similar pathological mechanisms and highlights the significance of development of hypertension therapies which help improve AMD as well.

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