



Pattern of Macular Disorders in Himachal Pradesh, India (Original Article)

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Abstract

Background: To study the pattern/distribution of Macular Disorders in the hilly terrain of Himachal Pradesh (altitude ranging from 500-4500 metres above sea level).

Methods: It is a retro/prospective study of patients with retinal diseases attending the general ophthalmology clinic of a tertiary care facility from August 2008 to April 2013. Out of 5600 subjects, 4323 were taken as a sample. The data was taken from the hospital records and thereafter analyzed to determine their age, sex distribution and diagnosis. All patients underwent visual acuity, refraction, slit lamp examination and fundus evaluation. The diagnosis was confirmed from fundus clinic records and evaluation of fundus photographic records retro-prospectively. The photographs were taken on the fundus camera (KOWA'S FUNDUS CAMERA VX-10) and fundus fluorescein angiography (FFA) done where ever indicated.

Results: Amongst the 905 (20.95%) subjects of Macular Disorders, Age related macular degeneration (ARMD- 7.20%) was the most common while Angioid Streaks (AS-0.02%) was the least common disease.

Conclusion: Age Related Macular Degeneration was the commonest among macular disorders. Retinal disorders appear to be a major public health problem in India. The present study shall help us in planning the management of such disorders in the hilly state of Himachal Pradesh to reduce the visual morbidity arising out of such disorders.

Keywords: himachal pradesh, retroprospective, hilly, macula, disorders.

Introduction

Vitreo-retinal diseases as a group are one of the more common ocular morbidities leading to blindness in the adult population, while being the most common cause of blindness worldwide in children. Population based studies reported an overall prevalence of vitreo-retinal disorders of 8.56%, with a range between 10.4% and 21.02% for the 40 years and over age group. In the developing world, which harbours almost 90% of the world's blind population, retinal diseases are among the leading cause of blindness after cataract.^[1]

Retinal disease has had a low priority in prevention of blindness programmes in developing countries mainly because retinal diseases were considered an uncommon cause of blindness in the developing world. Population-based surveys reported vitreo-retinal disorders to be responsible for 8.56% and 12.7% in Iran and India respectively.^[2] There has been a significant increase in the burden of vitreo-retinal disorders globally. In Nigeria, vitreo-retinal disorders constitute a significant cause of ocular morbidity and vision loss with reported hospital prevalence rates ranging from 4.5% to 13.0%. Elsewhere in Ethiopia, a 12.5% hospital prevalence of vitreo-retinal disorders was reported whereas a population-based survey in Iran documented a prevalence of 8.56%.^[3]

The 1981 Nepal Blindness Survey estimated that there were 117,623 blind people in Nepal. The retinal diseases were found to be an important cause accounting for 3.3% of blindness.^[4] Nearly 80% of the considerable burden of blindness in India is attributed to curable causes, such as cataracts and refractive errors. A recent study found that retinal disorders are an important cause of blindness in India. It is estimated that there will be 244 million people (14.9% of the population) 65 years and older by 2050 compared with 42 million (4.5% of the population) in 1995.^[5]

Age-related macular degeneration (ARMD) accounts for 8.7% of the total blindness globally, and is the third common cause of visual

impairment. It is the primary cause of visual impairment in industrialized countries. The persons with ARMD are likely to increase from three to six million by the year 2020. It has therefore been included in the action plan of the World Health Organization, to address avoidable blindness in VISION 2020 program.^[6]

Age-related maculopathy (ARM) is the main cause of adult blindness in developed countries.^[7]

It is the most common cause of visual impairment in individuals over the age of 55 years in developed countries. Age-related macular degeneration accounts for more than 54% of all vision loss in the white population in the USA. In the UK, age-related macular degeneration is the cause of blindness in almost 42% of those who go blind aged 65–74 years.^[8]

In the latest estimates of global blindness and visual impairment undertaken by the World Health Organization, in 2010, age-related macular degeneration (AMD) is the third most common cause of blindness worldwide behind cataracts and glaucoma. It has remained an important cause of blindness globally since the last World Health Organization survey in 2002, in which it was identified as the leading cause of blindness in high-income countries.^[9]

In this retro/prospective study of retinal diseases, we determined the pattern of Macular Disorders among the patients who reported for photographic evaluation.

Material and Methods

A total of 5600 subjects from all districts of Himachal Pradesh (H.P) visiting the fundus clinic of a tertiary care institute were evaluated during a period from August 2008 to April 2013. From these 5600 patients, 4323 subjects were taken as a sample. It is a retrospective and prospective study. We confirm adherence to the guidelines of the Declaration of Helsinki as well as the hospitals ethics committee where study was conducted.

In brief, the present study involved 4323 subjects residing in H.P (altitude ranging from 500-4500 metres above sea level). H.P is a hilly terrain and

has a very distinct population that is composed of ethnolinguistic groups of tribals and socials. Most of the natives belong to Aryan origin while the people of Lahaul and Spiti district are essentially descendants of Mongols. Patients coming from all districts of H.P underwent visual acuity, refraction, slit lamp examination and pupil dilatation for detailed fundus evaluation. The diagnosis was confirmed from hospital records, fundus clinic records and evaluation of fundus photographic records retro-prospectively. Inclusion criteria included proper and complete records of the patient with clear fundus photographs and FFA where as exclusion criteria included fundus photographs/FFA taken on fundus camera not clearly visible for making a diagnosis and patients presenting with opaque ocular media. In all the subjects, ophthalmological examination was performed. Visual acuity was measured by using Snellen's chart, Slit lamp biomicroscopy was done to assess the ocular adenexa and the anterior segment of eye using a slit lamp biomicroscope (Haag Striet-900), Fundus examination was done by using the direct and indirect ophthalmoscope.

Fundus photographs were taken on the fundus camera (KOWA'S FUNDUS CAMERA VX-10, KOWA Company Ltd, 4-14, Nihonbashi-honcho 3-chome, Chuo-ku, Tokyo 103-8433 Japan). The subject was instructed to be seated in front of the fundus camera. Height of the optical bench was adjusted to let the chin on the chin rest and forehead on the forehead rest in a natural posture. The examined eyes were set at the eye level mark. Fundus camera was positioned such that the luminous spots for alignment can come in the centre and the luminous spot is smallest and sharpest. Then by pressing the shutter button for photographing, the images taken were displayed on the monitor.

Fluorescein Angiography was performed (where ever indicated) by injecting a 6 second bolus injection of 2-5 cc of sodium fluorescein into a vein in the arm or hand. A series of black-and-white or digital photographs were taken of the

retina before and after the fluorescein reaches the retinal circulation (approximately 10 seconds after injection). Photos were taken approximately once every second for about 20 seconds, then less often. A delayed image was obtained at 5 and 10 minutes. A filter was placed in the camera so only the fluorescent, yellow-green light (530 nm) was recorded.

Results

During the period from August 2008 to April 2013, 5600 patients visiting the fundus clinic of the tertiary care institution were evaluated. From these 5600 patients, 4323 subjects were taken as a sample for the study. Since the study was aimed to find out the pattern of Macular Disorders, other retinal disorders were not included. Table 1 shows that of the total 4323 cases studied, there were more males 2563 (59.28%) than females 1760 (40.72 %) with fundus diseases.

Table 1 (Gender distribution of cases)

Male / Female	Total	Percentage
Male	2563	59.28 %
Female	1760	40.72 %
Total	4323	100

Table 2 depicts that out of the 905 (20.95%) subjects of Macular Disorders, Dry Age Related Macular Degeneration (D.ARM) was present in 232 (5.37%), Wet Age Related Macular Degeneration (W.ARM) in 79 (1.83%), Choroidal Neovascular Membrane (CNVM) in 88 (2.04%), Macular Hole (M.HOLE) in 58 (1.34%), Central Serous Chorioretinopathy (CSC) in 35 (0.81%), Macular Edema (ME) in 49 (1.13%), Epiretinal Membrane (ERM) in 37 (0.86%), Angiod Streaks (AS) in 1 (0.02%), Bulls Eye Maculopathy (BULLS EM) in 2 (0.05%), Macular Atrophy (MA) in 13 (0.30%), Degenerative Myopia (DEM) in 290 (6.71%), Pigmentary Maculopathy (PiM) in 5 (0.12%), Crystalline Retinopathy (CR) in 2 (0.05%), Macular Scarring (MS) in 4 (0.09%) and Choroidal Folds (CHF) in 9 (0.21%) subjects.

Table 2 (Macular Disorders)

Disease	Total	Percentage
D.ARMD	232	5.37 %
W.ARMD	79	1.83 %
CNVM	88	2.04 %
M.HOLE	58	1.34 %
CSC	35	0.81 %
ME	49	1.13 %
ERM	37	0.86 %
AS	1	0.02 %
BULLS EM	2	0.05 %
MA	13	0.30 %
DEM	290	6.71 %
PiM	5	0.12 %
CR	2	0.05 %
MS	4	0.09 %
CHF	9	0.21 %
Total Acquired Macular Disorders	905	20.95%

Discussion

The prevalence of AMD increased dramatically with age, with more than 15% of the white women older than 80 years having neovascular AMD and/or geographic atrophy.^[10] The adjusted prevalence of AMD was significantly higher in those 60 years of age or older and history of prior cigar smoking. Presence of cortical cataract and prior cataract surgery were significantly associated with increased prevalence of AMD respectively.^[11] The prevalence of early ARM, late ARM, and exudative ARM, respectively, increased from 0.61%, 0.07%, and 0.07% in the 40-to-44-year age group, to 1.66%, 0.26%, and 0.26% in the 55-to-59-year group, and to 2.99%, 0.90%, and 0.60% in the group aged 75 years and older. Visual impairment due to ARM was relatively uncommon in the adult Chinese population in rural and urban regions.^[12] The prevalence of ARM was significantly higher in older subjects.^[7] The prevalence of early AMD increased from $1.3 \pm 0.3\%$ per subject in the 30-year-old to 40-year-old group, to $3.6 \pm 0.5\%$ in the 41-year-old to 50-year-old group, to $7.9 \pm$

0.9% in the 51-year-old to 60-year-old group, to $10.0 \pm 1.1\%$ in the 61-year-old to 70-year-old group, to $8.3 \pm 0.2\%$ in the 71-year-old to 80-year-old group, and to $8.0 \pm 5.5\%$ in the ≥ 81 -year-old group.^[13] In our study, D.ARMD was 5.37% and W.ARMD was 1.83%. Age and risk factors were not included in our study.

The prevalences of early and late age-related macular degeneration were 2.7% and 0.6% respectively.^[5] The prevalence of early-stage age-related macular degeneration was 13.8% , geographic atrophy was present in 0.4% and neovascular age-related macular degeneration in 0.8%.^[14] The prevalence of any ARMD was 4.72 % with 3.82 % early ARMD and 1.70 % late ARMD.^[15] Early and late AMD prevalence were 11.2% and 1.2%, respectively.^[9] The proportion of overall ARMD was 1.38% .The proportion of age-related maculopathy (ARM) and late ARMD was 1.14% and 0.24% respectively.^[6] The prevalence of ARMD in our study was 7.20%.The difference between our study and the previous studies may be due to the difference in classification of ARMD.

The proportion of patients with age-related macular degeneration was only 2.7% whereas in our study it was 5.37% (D.ARMD) and 1.83%(W.ARMD).^[16] The difference may be due to sample size. Age Related Macular Degeneration was the most frequent of the macular diseases (38.6%).^[17] Age-related macular degeneration (10.7%) were the leading vitreo-retinal diseases.^[3] The findings of our study was similar to those identified by previous studies.^[3,17]

ARMD accounted for 9.3% of retinal diseases.^[2] AMD was the most common vitreo-retinal disorder with a prevalence of 1.50%.While in our study, ARMD accounted for 7.20% of retinal diseases. The proportion of dry and wet AMD were found in 62.4% and 37.6% respectively.^[18] Where as in our study, the proportion of dry and wet ARMD were found in 5.37% and 1.83% respectively. The difference may be due to the size of the sample of previous and our studies. The common diseases noted were macular diseases

(35.6%), comprising AMD, macular scar and holes.^[19] In the present study, macular diseases were also present in 20.93%, comprising ARMD, macular scar and holes.

The prevalence of ERM increased significantly by age group and was similar in males and females after adjusting for age.^[20] The prevalence of epiretinal membranes was significantly associated with age.^[21] ERMs were present in 18.5% of the participants. Of the participants with ERMs, 19.9% had bilateral ERMs. The prevalence of ERMs increased from 10.1% in persons 40 to 49 years of age to 35.7% in those aged 70 to 79 years and was 22.5% in persons aged 80 years or more. The prevalence was similar in men and women.^[22] There were 84 right eyes with ERM, representing 5.44% of this sample.^[23] ERMs were present in 3.4% of participants, bilateral in 20.3% of the cases. ERM prevalence was similar in women and men (3.6% vs. 3.1%), strongly associated with increasing age.^[24] The prevalence of idiopathic epiretinal membrane (iERM) was 1.02%. iERM was significantly associated with diabetes. The eyes with iERM had poorer visual acuity than the eyes without iERM.^[25] The age-standardized prevalence of ERM was 7.6%.^[26] The prevalence of ERM in our study was 0.86% which was comparatively less as compared to the previously published in the literature. More over the variables such as age, sex, bilateral involvement and associated diseases were not taken in our study. The disparity may be due to the difference in the size of the sample.

Full-thickness macular holes were found in eight (0.092%) eyes of seven (0.16%) patients (six women). Prevalence was 0.09 +/- 3.04%.^[27] Thirteen subjects comprising six males and seven females were diagnosed with macular holes equating to a risk of 0.17%. Bilateral macular holes were found in two subjects. There was no difference in the prevalence of macular hole between the rural and urban communities.^[28] The female to male ratio was determined to be 3.3 to 1, and bilateral idiopathic macular holes occurred in 11.7% of patients and accounted for 20.9% of

the affected eyes.^[29] In our study, macular hole was present in 1.34% of the subjects. Bilaterality of the disease, sex, rural and urban distribution were not included in our study.

The incidence of CSC was approximately 6 times higher in men than in women. There were no significant risk factors identified for CSC.^[30] In our study, incidence of CSC was 0.81%. Sex and risk factors were not taken as a variable.

Conclusion

The present study provides large-scale, population-based evidence to estimate the incidence of macular disorders in the hilly terrain of Himachal Pradesh. The results of this study gave an insight into the pattern of macular eye diseases. Age related macular degeneration (ARMD-7.20%) was the most common while Angioid Streaks(AS-0.02%) was the least common among macular diseases. These findings reveal a considerable prevalence of macular diseases in the population. Promoting awareness in the population in regard to regular eye examination and also addressing risk factors that could lead to vitreo retinal disorders will play a significant role in reducing blindness from this group of eye diseases. Retinal disorders appear to be a major public health problem in India. The present study shall help us in planning the management of such disorders in the hilly state of Himachal Pradesh to reduce the visual morbidity arising out of such disorders.

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Conflicts of Interest: The authors declare that they have no competing interest.

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