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Original Research Article

Analysis of Demographic Pattern of Patients with Disorders of Posterior Segment of Eyeball

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Abstract

Introduction: The International Agency for the Prevention of Blindness (IAPB) and WHO together created the global program VISION 2020 in 1999 with the goal of eradicating preventable blindness. Three of the nine leading causes indicated are NCDs, which are located in the posterior section. Worldwide, 90.2% of people with VI reside in low-income nations. Because infectious diseases have been successfully controlled, NCDs are the main cause of VI.

Aims and Objectives: To analyze the demographic characteristics of the patients with disorders of posterior segment of eyeball.

Methods: This cross-sectional study was carried out on 123 patients suspected of having opaque or hazy ocular media clinically or by previously performed ultrasonography, underwent will be evaluated using a standard USG. using this, pathologies were diagnosed and studied based on the gender and age. This was done to analyze the demographic status of the diseases.

Results: There were 61.5% in the range of 80 Male patients while 38.5% of 50 were female patients and 100% were total of 130 patients. The study investigated the age distribution of cases. In total, there was 72 males with non-traumatic lesion while 8 males with traumatic lesion. Again, there was 41 females in non-traumatic lesions and 9 females with traumatic lesions. The study has investigated the distribution of pathologies with respect the genders. Vitreous membrane was found in 46 males and 30 females. There was significant number of males with VD, VM and VH as compared to females ($p<0.05$).

Conclusion: The study has concluded that the prevalence of diseases of posterior eyeball was significantly higher in the population and males have much higher incidences than females, specially the pathologies like VD, VM and VH.

Keywords: Posterior Disease, Demography, Eyeball, Vitreous, Traumatic.

Introduction

According to how they appear in the eye, diseases of the vitreous, fundus, and optic nerve are explained and depicted. Vitreal changes are typically caused by age-related, traumatic, inflammatory, developmental, or degenerative processes, and therefore have little clinical significance [1,2]. Those that impact the fundus, however, may also cause blindness or visual impairment. It is important to distinguish between fundic lesions of inflammatory and traumatic origin from congenital (congenital stationary night blindness, colobomatous defects, and retinal dysplasia), degenerative (cystic retinal degeneration), metabolic (equine motor neuron disease), neoplastic, and age-related changes (senile

retinopathy). Blindness results from inflammation (acute neurochorioretinitis) and ischemia (ischemic neuro chorioretinopathy) of the optic nerve [3,4]. The ligation of the palatine and carotid arteries can cause the optic disc to become aplastic/hypoplastic, excavated, or impacted by glaucoma or coloboma. Optic disc masses can develop as a result of trauma, neoplasia, significant systemic hemorrhage, or inflammation. Borna virus infection, toxic insult, fungal granuloma, halicephalobiasis, significant blood loss, trauma, and sphenopalatine sinus infection are among the conditions that can result in retrobulbar optic nerve lesions [5-9].

The considerable increase in life expectancy during recent decades has caused a significant epidemiological shift in communities all across the world. Major public health challenges will be exacerbated by these developments in low- and middle-income nations. According to current predictions, non-communicable diseases (NCDs) will be responsible for two-thirds of all deaths worldwide by 2030. Compared to populations in high-income countries, NCDs in LMIC have exhibited significant variance in incidence, prevalence, natural history, and risk factors [10-12].

Worldwide, 285 million people have vision impairment (VI). Worldwide, 90.2% of people with VI reside in low-income nations. Because infectious diseases have been successfully controlled, NCDs are the main cause of VI. In respect of disability-adjusted life-years (DALYs), VI is placed sixth among the top 10 causes of disease burden in low-, middle-, and high-income countries [13-16].

The top causes of vision impairment (VI) and blindness were reported by the WHO in 2010. Three of the nine leading causes indicated are NCDs, which are located in the posterior section (i.e. affecting the back of the eye) [17]. Age-related macular degeneration (AMD), glaucoma, and diabetic retinopathy are the three main diseases that are included in posterior segment eye disease (PSED), which is epidemiologically defined as diseases of the retina, choroid, and optic nerve (DR) [18].

The International Agency for the Prevention of Blindness (IAPB) and WHO together created the global program VISION 2020 in 1999 with the goal of eradicating preventable blindness. VISION 2020 offers advocacy and technical assistance to preventative efforts around the world. It hopes to stop 100 million individuals from going blind over the course of two decades [19].

VISION2020 has generally concentrated on the eradication of anterior segment illnesses, particularly cataract, which accounts for over half of blindness globally and is surgically treatable. Because of the paucity of information on the severity of these illnesses and the lack of appropriate treatment options, VISION2020 has not prioritized PSED to this point [20-23].

Materials and Methods

This cross-sectional study was carried out in the Radio-Diagnosis Department, K J Somaiya Medical College and Research Centre, Mumbai and using approval for this study was obtained from the institutional ethical and scientific committee from November 2015 to November 2016. 123 consecutive patients suspected of having opaque or hazy ocular media clinically or by previously performed ultrasonography, underwent will be evaluated using a standard USG machine (PHILIPS HD 7) equipped with a real-time high-frequency (8-12HZ) probe with the contact method. Images were labelled and saved on work station in our department. All patients who were subjected to B-scan ultrasonography for evaluation the malignant and benign lesion of posterior chamber of eye in hazy ocular media., were evaluated using a standard USG machine (PHILIPS HD 7) equipped with a real-time high-frequency (8-12HZ) probe with the patient in the

supine position and contact method. The probe is placed over the closed eyelid after application of coupling gel. It is usually done with the eye lid closed and other eye kept open fixing at a target. Coupling medium like methylcellulose is applied on the probe. (In case of trauma or recent ocular surgery, probe has to be cleaned before use.). Patients, who were in a supine position on the examining couch, underwent Ultrasound with the transducer placed gentle on the closed eyelid. Through-the- lid contact imaging was employed with a standard water-soluble coupling gel, using a very gentle technique to cause minimal discomfort to the eye.

The contact (or applanation method) of biometry is accomplished by gently placing the probe on the corneal vertex and directing the sound beam through the visual axis. This handheld method is most easily and accurately performed with the patient in a reclined position with the patient's head placed in front of the display screen. The examiner is seated on an adjustable stool to the other side of the patient, resting his or her arm on the patient's shoulder and the side of his or her hand on the patient's cheek. The patient is instructed to look at a target affixed to the ceiling. Using a gentle on-and-off technique allowed for less corneal compression since the examiner's hand will be braced more firmly. It is also easier for the patient to brace the head against the headrest in this reclined position and for the examiner to simultaneously monitor both the display screen and the patient's fixation.

The sonographic were analyzed under the following headings:

- Axial length of each eye
- Location of the lesion
- Margins of lesion
- After movement pattern of lesions
- Presence of calcification and air foci.
- Extension into adjoining structures
- Presences or absences of vascular involvement
- Unilateral or bilateral involvement
- Associated systemic involvement

The sample size has been estimated using Open Epi software on:

- Prevalence of various posterior segment pathologies are different, among the hazy ocular media, of which least prevalent is staphyloma and foreign body with prevalence 1.2% and 0.6%.
- Absolute precision is 12 ±5%. At 95% confidence level and 80% power of study, the estimated Sample size is 123

In the present study we have included 130 patients.

Inclusion criteria and exclusion criteria

The patients clinically presenting with opaque light conducting ocular media, patients clinically presenting with opaque light conducting ocular media and those who had the event of non-visualization of fundus, were all included in the study. The patients who were excluded had active extra ocular infection and those with high risk of / with extrusion of intraocular contents. All patients, who did not give consent to be a part of the study

Statistical analysis

Data will be entered in the Microsoft excel –frequency, percentage, bar diagram, pie diagram will be used for data summarization and presentation. Cohen kappa statistics with P value, chi square test will be used to assess agreement and sensitivity, specificity, positive predictive value and negative predictive value calculated to assess validity of CT-SCAN. Significance of the result assess by using SPSS (statistical package social sciences) software version 17.

Ethical Approval

The written consent was obtained from each patient before the collection of data. The study method was explained to the patients and the the hospital's Ethical Committee has approved the study method.

Results

The present study was conducted in the Department of Radio-diagnosis in co-ordination with the Ophthalmology Department at K.J. Somaiya Hospital, Mumbai. A total of 130 patients underwent B scan sonography. The imaging diagnosis was confirmed with surgery and other clinical evidence.

The study investigated the Sex distribution of cases. There were 61.5% in the range of 80 Male patients while 38.5% of 50 were female patients and 100% were total of 130 patients. The study investigated the age distribution of cases. There were 46% of patients in the age range of 41 to 60 years old while 24.6% of patients were between 61 years and 80 years old. Only 2.4% of patients were 81 years old and above and only 8.5% of patients were from first year to 20 years old age and 18.5% of patients were between 21 years to 40 years old, hence.

Table 1: Age and Sex distribution of cases in this study

Sex of the patients		
Sex	**Number of patients**	**Percentage**
Male	80	61.5%
Female	50	38.5%
Total	130	100%
Age of the patients		
Age	**Number of patients**	**Percentage**
1 to 20	11	8.5%
21 to 40	24	18.5%
41 to 60	60	46%
61 to 80	32	24.6%
81 to above	03	2.4%

The study also evaluated the distribution of pathologies in each eye. The retinal detachment were seen in 53% of traumatic patients. and 13.2% of non-traumatic patients with female predominence; of M:F ratio of 1:2. Around 22% of cases were of vitreous deattchment with male predominance; showing M:F ratio of 2:1. Out of the cases showing PVD; 80%showed peripheral deattachment, however only 20% showed posteior pole and peripheral PVD. PVD was seen in only 17% in traumatic patients and 30% in non-traumatic patients. About 22% patients had acute vitreous haemorrhage. Out of which male predominance was seen with a M:F ratio of 2.4:1. Out of these, dispersed echos were seen in 45% cases, localised collection in 35% cases and diffusely scatterdechos in 20% cases. Also 42% patients had vitreous membranes (old organized vitreous haemorrhage); which also showed male predominance with M:F raio of 1.5:1. Around 9% cases showed posterior staphyloma. Male predminence was noted with M:F ratio of 2.75:1. The mean axial length was 2.788 ± 0.225cms. Significant correlation between the depth and the diameters of posterior staphyloma was demonstrated. Figure 1 shows the detailed distribution of pathologies in each eye separately.

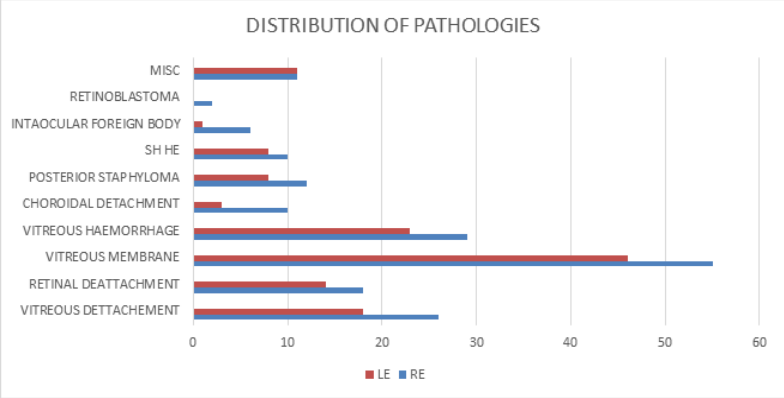

Figure 1: Distribution of pathologies in each eye

The study investigated the gender and age distribution with respect to the type of lesion including non-traumatic and traumatic. It was found that there were 4 males in non-traumatic lesions between 1 to 20 years as compared to 6 females. In traumatic lesions, the number of males between 1 to 20 years old was found to be 1 and no females. The study has found that there are 34 males between 41 to 60 years in non-traumatic males while 17 females in non-traumatic In total, there was 72 males with non-traumatic lesion while 8 males with traumatic lesion. Again, there was 41 females in non-traumatic lesions and 9 females with traumatic lesions. Table 3 shows the detailed findings of age and gender distribution in each type.

Table 3: Age and gender distribution of traumatic and non- traumatic lesions

Age (years)	Non traumatic		Traumatic	
	Male	Female	Male	Female
1 to 20	4	6	1	-
21 to 40	11	10	2	1
41 to 60	34	17	5	4
61 to 80	22	6	-	4
81 & above	1	2	-	-
Total	72	41	8	9

The study has investigated the distribution of pathologies with respect the genders. Vitreous membrane was found in 46 males and 30 females. Again, vitreous hemorrhage was found in 29 males and 12 females while 26 males and 12 females had vitreous detachment. There was significant number of males with VD, VM and VH as compared to females (p<0.05). Table 4 shows the detailed findings.

Table 4: Gender and pathology wise Incidence of posterior segment lesions

Pathology	Male	Female	*p*-value
RD	8	16	0.045
VD	26	12	0.032
VM	46	30	0.048
VH	29	12	0.025
CD	9	4	0.581
Post staphyloma	11	4	0.049
IOFB	03	4	0.754
Subhyloid Haemorrhage	05	9	0.050
Retinoblastoma	0	2	0.051
Misc.	04	3	0.06

Discussion

There is currently little information available about how major eye disorders in Asia differ based on ethnicity. The Singapore Indian Chinese Cohort (SICC) Eye Study, a population-based study of ethnic South Asian (Indians) and East Asian (Chinese) older persons in Singapore, was recently the subject of a paper that describes the rationale and study design. The SICC study, which is being conducted in conjunction with the Singapore Malay Eye Study, will enable a thorough analysis of the prevalence, risk factors, and effects of major eye diseases in Indian, Chinese, and Malays, three different Asian ethnic groups that together makeup half of the world's population [24,26].

In a rural population in southern India, a study was carried out to ascertain the incidence of glaucoma and potential risks for primary open-angle glaucoma. In contrast to ocular hypertension, which was described as intraocular pressure (IOP) significantly larger than 21 mmHg without glaucomatous optic disc damage or visual field defects in the presence of an open angle, definitive primary open-angle glaucoma (POAG) was described as angles open on gonioscopy and glaucomatous optic disc changes with corresponding visual field defects. Anterior chamber angle that is partially or completely closed, appositional angle closing or synechiae in the angle, and a lack of secondary angle closure symptoms are all characteristics of manifested primary angle-closure glaucoma (PACG). Glaucoma incidence in this population is comparable to that in other white populations, according to reports. Many POAG patients had not previously received a diagnosis. One in five people with POAG developed glaucoma-related blindness in one or both eyes. The prevalence of blindness in India will decline thanks to early identification of glaucoma in this group [27].

To ascertain the incidence of glaucoma in Melbourne, Australia, the research was conducted. Glaucoma prevalence increased significantly with age, rising from 0.1% in people between the ages of 40 and 49 to 9.7% in people between the ages of 80 and 89. According to the study, glaucoma incidence in Melbourne increases noticeably as people age. Glaucoma is a serious issue for eye health that affects only 50% of individuals and will become more prevalent as the population ages [28].

The purpose of the study was to ascertain the incidence of open-angle glaucoma and ocular hypertension in a community of Australians with a median age of 49 years or older. With aging, an exponential spike in prevalence was seen. 3.9% of this sample had ocular hypertension, which is defined as intraocular pressure more than 21 mmHg in either eye without corresponding disc and field abnormalities, however there was no appreciable aging-related increase in prevalence. After controlling for age, women had a greater frequency of glaucoma. Age-adjusted prevalence of ocular hypertension did not differ by gender. These data offer precise prevalence estimates for ocular hypertension and open-angle glaucoma in an older Australian population, depending on age and gender [29,30].

Conclusion

The study has concluded that the prevalence of diseases of posterior eyeball was significantly higher in the population and males have much higher incidences than females, specially the pathologies like VD, VM and VH. However, there is no significant differences in the number of males and females having IOFB, sybhyloid hemorrhage, retinoblastoma. Most of the occurrences of these diseases have been found between 41 years to 60 years of age. The study also concluded that vitreous membrane was found to be more in right eye and most of the pathologies were found to be prevalent in the right eye.

This study is limited by the number of patients considered for evaluation. There is

a need to conduct more studies like this to ensure better and more varied conclusion. However, this current study has brought forward an important clinical findings which would contribute in the screening of posterior diseases and help the healthcare communities to formulate policies and take initiatives in the future.

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