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ORIGINAL ARTICLE

Assessment of the effect of Posterior Sub-capsular cataract on the refractive status of the eye at the outpatient department of Hayatabad Medical Complex, Peshawar

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A B S T R A C T

Introduction: Cataract-induced refractive change is the refraction change caused by a cataract. It can reach multiple diopters (D). It modifies expected refraction errors during cataract surgery by modifying axial length measurement.

Objective: To find the effect of the Posterior subcapsular Cataracts on the refractive status of the eye.

Methodology: A cross-sectional study was progressed in Eye OPD in Hayatabad Medical Complex, Peshawar. 102 patients having Posterior Subcapsular Cataracts were part of this study. The detailed history and eye examination of the patient were recorded. The anterior segment was examined with a slit lamp for evaluation of the posterior subcapsular cataract. The refractive status of an eye having a posterior subcapsular cataract was determined using Retinoscopy and subjective refraction techniques. The axial length of the eye was measured using A-Scan. Keratometric reading was measured using Keratometer. The data was entered and analyzed through the SPSS version 16.

Results: A total of 102 patients were included in this study. Of these, 27 (26.5%) were males and 75 (73.5%) were females. The mean age was 60.5 years with 5.8SD. Results from the study showed refractive error due to Posterior Subcapsular Cataracts were mainly myopic astigmatism (97.1%) and spherical myopia (2.9%) with 0.16SD. Patients with PSCs had myopic astigmatism with a mean value of (1.7diopters, 15.7%) with 0.93SD and spherical myopia with a mean value of (0.1D, 2.9%) with 0.67SD. The mean uncorrected visual acuity was 1logMAR with 1.6SD. The mean corrected visual acuity was 0.3logMAR with 1.2SD.

Conclusion: The most common refractive error found in PSCs was Astigmatism followed by Myopia. These results may help to clarify the Types of refractive errors in patients with PSCs and the prediction of visual outcomes with spectacles.

Keywords: *Posterior sub-capsular cataract, Visual acuity spherical myopia, Astigmatism*

Introduction

The goal of this study was to determine the effect if any, that the three primary morphological types of age-related cataracts have on refractive error. It is fairly obvious that some people who have nuclear cataracts will have a shift toward myopia as a result of the condition.[1-3] This shift is responsible for the so-called "second sight of the aged," in which the myopic shift allows normal reading skills without the need for spectacles, yet distance vision

diminishes. It is not entirely understood how cataracts, both cortical and posterior subcapsular (PSC), affect a patient's refractive error. Planter made the assertion that cortical opacity can cause large hyperopic changes, but nobody else has been able to confirm or refute this finding.[4, 5]

There is some evidence in the form of review articles that suggests that changes in astigmatism can be caused by cortical opacity.[6-8] These reports, on the other hand, were based solely on clinical perception, without any facts to back them up. In the early days of experimental research, researchers looked for proof that age-related cataracts caused astigmatic shifts in refractive error, but they came up empty.[9, 10] Despite this, it is important to revisit this topic since newly developed techniques, such as vector analysis of astigmatism and improved cataract grading systems, should boost the sensitivity to identify these alterations, provided that they are present.

Methodology

This hospital-based cross-sectional study was done to assess the effect of Posterior Subcapsular Cataracts on the refractive status of the eye at the outpatient department of Hayatabad medical complex Peshawar. The duration of the study was 6 months. The main objectives were to determine the common type of refractive error present in patients with posterior subcapsular cataracts. Cataracts were defined as presenting visual acuity of less than 6/36 in the better eye caused by lens opacity is called cataract or Cataract refers to dense lens opacity that can explain the vision of less than 6/36.[11] Posterior subcapsular opacity was regarded as cataract, as it can be very visually disabling even in its early stages.[12] Refractive Error, also known as refraction error, is a problem with the focusing of light on the retina due to the shape of the eye. The inclusion criteria were all patients having posterior subcapsular cataracts.[13]

Exclusion Criteria were Mentally retarded, Unwilling patients, History of intraocular surgery, ocular trauma, Corneal scar or opacity, and Patients with the following conditions which are likely to affect the refractive status of the eye: keratoconus, trauma, orbital mass, pterygium and eyelid mass such as chalazion. A total of 102 patients are taken using a consecutive sampling technique. Informed consent was taken from each patient and was informed by the aims and objectives and salient features of the protocol. The data was collected and kept confidential and used for research purposes only. No examination was done beyond the ethical limits. Legal approval was taken from the Research, Publication, and Thesis committee of the Pakistan institute of community ophthalmology, HMC, Peshawar. As per the protocol of the hospital, the VA of the patient was recorded at a standard distance with Snellen's visual acuity chart in male and female cubicles of Eye OPD, Hayatabad Medical Complex, Peshawar. Slit lamp biomicroscopic examination for the diagnosis of PSCs was done by an ophthalmologist present on duty in rooms 2 and 3.

Any patient having signs of PSCs was referred for refraction. The refractive status of the patient was determined using objective and subjective refraction techniques. Objectively, refractive status was obtained with the help of an Auto refractometer and Retinoscope. Subjective verification of refractive status was done after retinoscopy and VA was again recorded after complete refractive correction. After complete refraction in refraction rooms, axial length and keratometry were determined in room 37 of Eye OPD. The vector analysis method was used to determine lenticular astigmatism i-e, lenticular astigmatism was obtained by subtracting corneal astigmatism from total astigmatism. Data was entered in SPSS version 16 and analyzed in the form of tables and charts.[14, 15]

Results

A total of 102 patients of PSCs were included in the study. Out of 102, 27 were male (26.5%) and 75 were female (73.5%). The mean age of patients with PSCs was 60.5 years with 5.8 SD. The maximum no. of patients was between 50-60 years with 41.2%. Results from the study showed refractive error due to PSCs were mainly myopic astigmatism (97.1%) and spherical myopia (2.9%) with 0.16 SD. Patients with PSCs had myopic astigmatism with a mean value of (1.7diopters, 15.7%) with 0.93 SD, and spherical myopia with a mean value of (0.1D, 2.9%) with 0.67 SD. The mean uncorrected visual acuity was 1logMAR with 1.6 SD. The mean corrected visual acuity was 0.5logMAR with 1.2 SD.

Discussion

This study showed that female patients are more prone to PSCs than males because the frequency of female patients is 75 (73.5%) and that of female patients is 27 (26.5%). It shows that female patients are more affected than males. The overall frequency of posterior subcapsular cataracts was 41% in the study of the frequency of the PSCs in hereditary retinal degenerations.[14] The Beaver Dam Eye Study showed 6.1% of PSCs and females are more affected than males. The Beaver Dam Eye Study and Population-based study on prevalence and risk factors of age-related cataracts in Peitou, Taiwan also revealed that females are at greater risk of PSCs. [15] The age groups are from 50 to 75 years. The no. of patients in group 50-60 is 43 (41.2%), in the age group of 60-65 years they are 31 (30.4%), and in of 65-75 years, they are 29 (28.4%). The above study also shows that the maximum no. of patients is between the age group of 50-60 years. The Beaver Dam Eye Study showed maximum age affecting PSCs is above 50 years.[11]

According to this study, the types of refractive error found among patients with PSCs are mainly astigmatism followed by myopia. The frequency of patients with PSCs with myopic astigmatism is 99 with 97.1% and the frequency of patients with PSCs with spherical myopia is 3 with 2.9%. British journal of ophthalmology showed a significant astigmatic shift in PSC cataracts (14%) Figure 1.

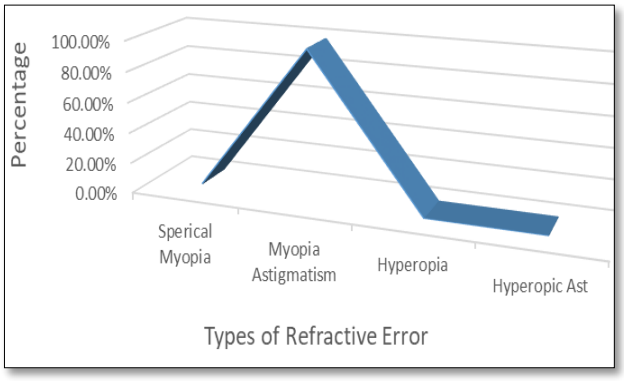

Figure 1: Types of Refractive Error

Myopic Astigmatism range from 0.5D-4D. The no. of patients in the range 0.5-1.00D are 31 with a percentage of 30.4, in the range of 1.00-2.00D they are 43 with 42.2%, in the range 2.00D-3.00D are 17 with 16.7% and from a range of 3.00D-4.00D, they are 6 with 5.9%. The result shows that the maximum no. of patients who have myopic astigmatism is in the range of 1.00-2.00D (Figure 2).

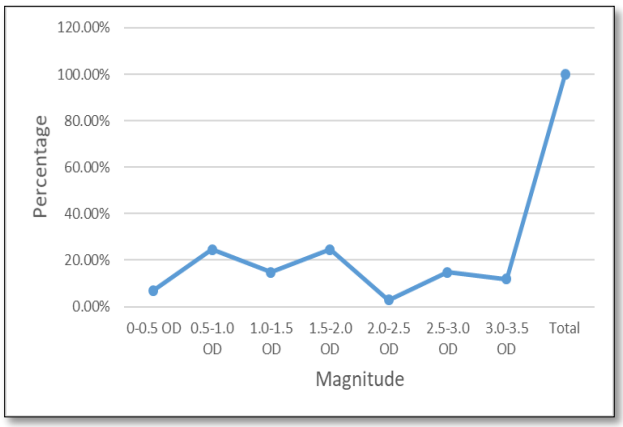

Figure 2: Magnitude of Myopic Astigmatism

Meanwhile, the magnitude of Myopic Astigmatism in male and female patients affected with PSCs is shown in Figure 3 with the range of 0.5D-4.00D. In the range of 0.5D-1.00D, 7 males and 24 females are present.13 males and 30 females are present in the range from 1.00D-2.00D. In the range 2.00D-3.00D, 4 males and 13 females are present and 2 males and 4 females are present in the range from 3.00D-4.00D.

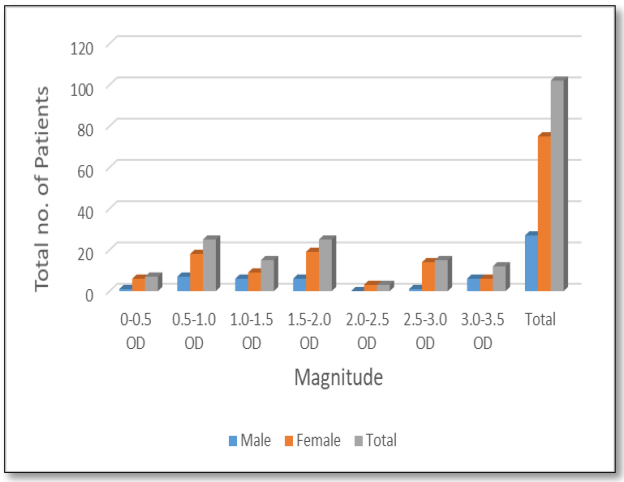

Figure 3: Gender-wise magnitude of Myopic Astigmatism

The range of Spherical Myopia is 1.00DS-4.00DS. The no. of the patient in the range 1.00DS-2.00DS is 1 (male patient) with 33%, in 2.00DS-3.00DS,1 female patient is present with 33% and in 3.00DS-4.00DS, no. of a patient is also 1 (female) with 33%.

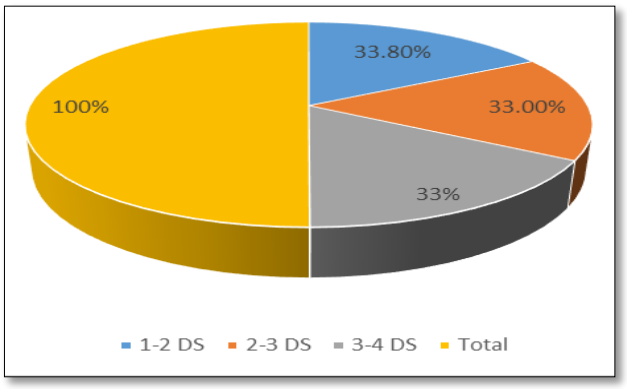

Figure 3: Magnitude of Spherical Myopia

Table 1 has shown the visual acuity which is presented in logMAR with the gender-wise distribution. One male patient has visual acuity of 0.3logMAR with 1%, 8 patients have 0.5logMAR with a percentage of 7.8%, 9 patients have 0.6logMAR with 8.8%, 17 patients have 0.8logMAR with 16.7%, 16 patients have 1logMAR with 15.7%, 20 patients have 1.3logMAR with 19.6% and 31 patients have visual acuity of less than 1.3logMAR with 30.4%. The visual acuity of maximum patients is less than 1.3logMAR.

Table 1: Gender-wise distribution of patients with unaided Visual Acuity

Unaided Visual Acuity		
Sr.	**logMAR**	**No. of patients (gender)**
1	0.3logMAR	1 (male)
2	0.5logMAR	8 (2 males and 6 females)
3	0.6logMAR	9 (2 males and 7 females)
4	0.8logMAR	17 (5 males and 12 females)
5	1logMAR	16 (3 males and 13 females)
6	1.3ogMAR	20 (4 males and 16 females)
7	<1.3logMAR	31 (10 males and 21 females)

Out of 102, 8 patients have corrected visual acuity of 0.1logMAR with 7.8%,18 patients have 0.2logMAR with 17.6%, 26 patients have 0.3 logMAR with 25.5%, 41 patients have 0.5logMAR with 40.2%, 2 patients have 0.6logMAR with 2% and 7 patients have corrected visual acuity of 0.8logMAR with 6.9%. Maximum corrected visual acuity is 0.5logMAR (Table 2).

Table 2: Gender-wise distribution of patients with corrected Visual Acuity

Corrected Visual Acuity		
Corrected Visual Acuity		
Sr.	**logMAR**	**No. of patients**
1	0.1logMAR	8 (2 males and 6 females)
2	0.2logMAR	18 (5 males and 13 females)
3	0.3logMAR	26 (5 males and 21 females)
4	0.5logMAR	41 (11 males and 30 females)
5	0.6logMAR	2 (2 males)
6	0.8logMAR	7 (2 males and 5 females)

Conclusion

The following study shows the significance of various types of refractive errors which are found among patients with PSCs. The most significant refractive error found in patients with PSCs was Astigmatism followed by Myopia. Females were affected more than males. The visual acuity was improved to some extent with spectacles. These results may help to clarify the Types of refractive errors in patients with PSCs and the prediction of visual outcomes with spectacles.

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