ORIGINAL RESEARCH

Assessment of Etiopathogenesis of presenile cataracts in a known population

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ABSTRACT:
Background: Cataract is defined as opacity within the clear lens inside the eye that reduces the amount of incoming light and results in deterioration of vision. Hence; the present study was conducted for assessing the etio-pathogenesis of presenile cataracts in a known population. **Materials & methods:** 100 consecutive patients diagnosed with cataract and posted for cataract extraction were included in the study. Slit-lamp examination was done to classify and grade the cataract, dilated fundus examination was done in all cases, and B-mode ultrasound scan was done in indicated cases. Cataract was graded according to the Lens Opacities Classification System III. Axial length of the eye was measured using intraocular lens master. **Results:** Idiopathic cause was seen in 42 percent of the patients. Diabetes mellitus, Trauma, High myopia and Thyroid disorder were the risk factor in 25 percent, 12 percent, 13 percent and 8 percent of the patients respectively. Posterior capsular cataract, Mature cataract, Nuclear sclerosis, Combined cataract and Cortical cataract were seen in 53 percent, 21 percent, 11 percent, 9 percent and 6 percent of the patients respectively. **Conclusion:** From the above results, the authors concluded that the most common cause of presenile cataract was idiopathic.
Key words: Cataract, Presenile

INTRODUCTION

Cataract is defined as opacity within the clear lens inside the eye that reduces the amount of incoming light and results in deterioration of vision. Natural lens is a crystalline substance and a precise structure of water and protein to create a clear passage for light. Cataract is often described as being similar to looking through a waterfall or waxed paper. Blindness causes human suffering is economically devastating, and many early deaths. According to WHO, one-third of the world's 45 million blind and half of the world's 1.5 million blind children live in South-East Asia region. The blind persons are often leading a miserable life and are disenfranchised.[1-4] The Beaver Dam Eye Study was a study conducted in Wisconsin in a rural community in the United States in 1988 to estimate the prevalence and incidence of age-related cataract and also the etiology of age-related cataract. An important finding from the study was the association of cigarette smoking with cataract. The Blue Mountains Eye Study was a similar study conducted in urban community of Australia which was conducted to identify the risk factors for age-related cataract formation such as dietary factors, smoking, alcohol consumption, medications, and refractive errors.[5-7] Hence; the present study was conducted for assessing the etio-pathogenesis of presenile cataracts in a known population.

MATERIALS & METHODS

The present study was conducted for assessing the Etiopathogenesis of presenile cataracts in a known population. 100 consecutive patients diagnosed with cataract and posted for cataract extraction were included in the study. Patients who had congenital or

106

developmental cataracts were excluded from the study. Complete demographic and clinical details of all the subjects were obtained. Slit-lamp examination was done to classify and grade the cataract, dilated fundus examination was done in all cases, and B-mode ultrasound scan was done in indicated cases. Cataract was graded according to the Lens Opacities Classification System III.[7] Axial length of the eye was measured using intraocular lens master. All the results were recorded in Microsoft excel sheet and was analysed by SPSS software.

RESULTS

In the present study, a total of 100 patients were analysed. Mean age of the patients was 45.6 years. Idiopathic cause was seen in 42 percent of the patients. Diabetes mellitus, Trauma, High myopia and Thyroid disorder were the risk factor in 25 percent, 12 percent, 13 percent and 8 percent of the patients respectively. Posterior capsular cataract, Mature cataract, Nuclear sclerosis, Combined cataract and Cortical cataract were seen in 53 percent, 21 percent, 11 percent, 9 percent and 6 percent of the patients respectively.

Table 1: Risk factors

Risk factors	Number of patients	Percentage
Idiopathic	42	42
Diabetes mellitus	25	25
Trauma	12	12
High myopia	13	13
Thyroid disorder	8	8

Table 2: Morphological types

Morphological types of cataract	Number of patients	Percentage
Posterior capsular cataract	53	53
Mature cataract	21	21
Nuclear sclerosis	11	11
Combined cataract	9	9
Cortical cataract	6	6

DISCUSSION

Cataract prevalence varies with age as well as by country and ethnicity. Cataract formation is, in general, multifaceted. It is unclear what precise biological mechanisms are involved in the development of the three primary types of age-related cataracts: nuclear, cortical and subcapsular cataracts. Nuclear cataracts, the most common senile cataracts, are characterized by sclerosis and yellowing of the central portion of the lens. Cortical cataracts occur in the lens cortex and are characterized by white, wedge-shaped, spoke-like opacities that widen toward the lens periphery.[5-8] Presenile cataract is defined as the opacification of lens and/or its capsule before the age of 40 years when all other known causes of cataract have been ruled out. This will definitely add on to the already existing burden of age-related cataract in India and worldwide. Some of the landmark studies have

clearly established several factors contributing to both age related as well as presenile cataract formation.[9, 10] Hence; the present study was conducted for assessing the etio-pathogenesis of presenile cataracts in a known population.

In the present study, a total of 100 patients were analysed. Mean age of the patients was 45.6 years. Idiopathic cause was seen in 42 percent of the patients. Diabetes mellitus, Trauma, High myopia and Thyroid disorder were the risk factor in 25 percent, 12 percent, 13 percent and 8 percent of the patients respectively. Das GK et al determined the various types of presenile cataract and determined the probable risk factors associated with the occurrence of presenile cataract. Patients in the age group of 18–40 years attending the Out-Patient Clinic of the Ophthalmology Department who were found to have presenile cataract were recruited as cases. An equal number of consecutive patients of the same age group were included in the control group. Those who gave consent to participate in the study were interviewed through a preformed questionnaire and underwent a complete ocular examination and set of blood investigations. In total, 90 cases and 90 controls that fulfilled the inclusion criteria were recruited. Most common type of cataract was found to be posterior subcapsular cataract. Presenile cataract was observed to be significantly associated with tobacco intake (P = 0.035), hypercholesterolemia (P = 0.002), fuel exposure (P = 0.004), and lower socioeconomic status (P = <0.001). Tobacco chewing, hypercholesterolemia, and excessive fuel exposure are risk factors for early development of cataract.[11]

Posterior capsular cataract, Mature cataract, Nuclear sclerosis, Combined cataract and Cortical cataract were seen in 53 percent, 21 percent, 11 percent, 9 percent and 6 percent of the patients respectively. Nam SW et al identified risk factors for the development of presenile nuclear cataract in health screening test. The cross sectional study included a total of 532 eyes of 266 participants aged 30 to 49 years of Samsung Medical Center from February 2013 to April 2015. Presence of nuclear cataract was defined when the log MAR visual acuity with correction was greater than or equal to 0.2 and one or more of the following were met: Pentacam Nuclear Staging (PNS) grading score ≥ 1, average value of nuclear density $\geq 15\%$, maximum value of nuclear density $\geq 30\%$. Possible risk factors were obtained from blood tests and questionnaires of a health screening test of Samsung Medical Center. Association between nuclear cataract and risk factors was investigated using univariate and multivariate logistic regression analysis by generalized estimating equation (GEE) models. Five factors were significantly associated with presenile nuclear cataract: current smoking, non-exercise and high amount of daily physical exercise, asthma, tuberculosis, and higher total iron binding capacity. Presenile nuclear cataract is related to current

smoking, non-exercise or high amount of physical exercise, asthma, tuberculosis, and iron deficiency status.[12]

CONCLUSION

From the above results, the authors concluded that the most common cause of presenile cataract was idiopathic.

REFERENCES

1. Robert S, Randall LK, editors. Cataracts-Overview (Internet) Life Extension. [Last accessed on 08.09.10]. Available from: http://www.garynullforum.com/articles/pdf/foundarticles1/lef/CATARACTS.pdf .
2. World Health Organization. Strategic Plan for Vision 2020: The Right to Sight. Elimination of Avoidable Blindness in the South-East Asia Region, SEA-Ophthal-117, World Health Organization Regional Office for South-East Asia New Delhi. 2000. [Last accessed on 27.3.11]. p. 6. Available from: http://www.searo.who.int/LinkFiles/Publications_SEA-Ophthal-117.pdf .
3. Murthy G, Gupta SK, John N, Vashist P. Current status of cataract blindness and Vision 2020: The right to sight initiative in India. Indian J Ophthalmol. 2008;56:489–94.
4. Limburg H, Foster A, Vaidyanathan K, Murthy GV. Monitoring visual outcome of cataract surgery in India. Bull WHO. 1999;77:455–60.
5. Klein BE, Klein R, Lee KE. Diabetes, cardiovascular disease, selected cardiovascular disease risk factors, and the 5-year incidence of age-related cataract and progression of lens opacities: The Beaver Dam Eye Study. Am J Ophthalmol 1998;126:782-90.
6. Mitchell P, Cumming RG, Attebo K, Panchapakesan J. Prevalence of cataract in Australia: The blue mountains eye study. Ophthalmology 1997;104:581-8.
7. Chylack LT, Wolfe JK, Singer DM, Leske MC, Bullimore MA, Bailey IL, et al. The lens opacities classifi cation system III. Arch Ophthalmol 1993;111:831-6.
8. Rahman A, Yahya K, Shaikh A, Fasih U, Zuberi BF. Risk factors associated with pre-senile cataract. Pak J Med Sci. 2011;27:145–8.
9. Vasudevan M, Premnath G. A prospective observational study to analyze the causes and types of pre senile cataract in South Indian patients. J Evol Med Dent Sci. 2014;3:12308–15.
10. Chen SN, Lin KK, Chao AN, Kuo YH, Ho JD. Nuclear sclerotic cataract in young patients in Taiwan. J Cataract Refract Surg. 2003;29:983–8.
11. Das GK, Boriwal K, Chhabra P, Sahu PK, Kumar S, Kumar N. Presenile cataract and its risk factors: A case control study. J Family Med Prim Care. 2019;8(6):2120-2123.
12. Nam SW, Lim DH, Cho KY, Kim HS, Kim K, Chung TY. Risk factors of presenile nuclear cataract in health screening study [published correction appears in BMC Ophthalmol. 2018 Nov 30;18(1):308]. BMC Ophthalmol. 2018;18(1):263.