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Original Research Article.

The Study of Morphology of Cataract in North West Region of India

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ABSTRACT

Background: Population-based studies of lens opacity have suggested that the distribution of lens opacity types may differ between races. We report the prevalence of the different types of age-related cataract based on the LOCS III (Lens opacification classification system III) grading cataract among adults in the western Indian state of Rajasthan.

Materials and Methods: Cataract was classified on examination of eyes with dilated pupils. Demographic data included age, sex, occupation, dietary habits (vegetarian or non-vegetarian), and tobacco use.

Results: A total of 198 patients were included in the present study. The highest prevalence was that of nuclear sclerosis (NS), in its pure form (45.5%) or as mixed occurrence [3% NS+CC (cortical cataract) and 11.1% NS+PSCC (posterior sub-capsular cataract)]. The prevalence of NS was significantly higher (57.4%) in higher age group as compared to that in lower age group (33.7%). On the other hand, prevalence of NS+PSCC cases was more than double (26.5%) in lower (< 65 years) age group as compared to that in higher (>65 years) age group (11.1%). The type of occupation was significantly associated with type of cataract ($\chi 2$ = 11.64, P = 0.003); majority (50%) of the CC type and NS+PSCC type (41.2%) were farmers, whereas 50.8% of NS type were housewives. Majority of the diabetic patients (71.1%) belonged to NS type. Among the tobacco users 56.8% had the nuclear sclerosis type of cataract.

Conclusions: Nuclear sclerosis was the most prevalent morphology of cataract in the study group.

Key words: Cataract, Morphology, Nuclear Sclerosis.

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INTRODUCTION

Age-related cataract is the leading cause of visual impairment in older adults.[1] The pathogenesis of age-related cataract is multifactorial and not completely understood.[2] The three main types of age-related cataracts are nuclear, cortical and posterior sub-capsular cataracts (PSCC). In many patients, components of more than one type are present. Population-based studies of lens opacity have suggested that the distribution of lens opacity types may differ between races, with persons of African descent being more likely to have cortical opacity than those of European descent[3,4], whereas brunescent cataract are more common in developing countries.[5] Epidemiologic studies have linked a high lifetime exposure to ultraviolet (UV) light due to their occupation with the formation of cortical cataract in humans.[6] Cataract is a major cause of visual disability in India. However, no population-based study has examined the distribution of cataract types using a standardized grading system. We report the prevalence of the different types of age-related cataract among adults in the western Indian state of Maharashtra. The population included in the study belonged to rural areas. Because it is known that different types of age-related cataract differ significantly in their tendency to cause visual disability and to require surgery, such differences in the distribution of lens opacity types may have significant implications for blindness prevention programs.[7] Moreover, incidence data help to find out possible causative factors and, when long-term follow-up is possible, to estimate the interval between exposure and the development of disease.

MATERIALS AND METHODS

This was a cross-sectional hospital-based survey carried out in the department of ophthalmology S.P. Medical College Bikaner over a period of six months after taking permission from the Institutional Ethics Committee. The inclusion criterion adopted was

patients who visited the department of Ophthalmology and were diagnosed with age-related cataract in either or both eyes. For this study, we have defined cataract as a specific lens lesion and not included visual acuity as a criterion. The exclusion criteria included eye surgery, trauma or any other systemic disease associated with cataract formation. Cataract was classified by senior ophthalmologists on examination of eyes with dilated pupils by comparing with standard photographs.[8] Demographic data included age, sex, occupation, dietary habits as to vegetarian or non-vegetarian, and tobacco use.

Table 1: Showing distribution of cataract morphology

Morphology	Number	%
Cortical cataract (CC)	60	30.3
Nuclear Sclerosis (NS)	90	45.5
NS+CC	6	3.0
Posterior subcapsular (PSCC)	17	8.6
NS+PSCC	22	11.1
Posterior Polar cataract (PPC)	3	1.5
Total	198	100

Table 2: Distribution of cataract wrt age group

Age group	CC (%)	NS (%)	PSCC (%)	NS + PSCC (%)	Total (%)
<65	26	28	7	22	83
	31.3	33.7	8.4	26.5	100.0
	43.3	31.1	100.0	64.7	43.5
≥65	34	62	0	12	108
	31.5	57.4	0.0	11.1	100.0
	56.7	68.9	0.0	35.3	56.5
Total	60	90	7	34	191
	31.4	47.1	3.7	17.8	100.0
	100.0	100.0	100.0	100.0	100.0

Table 3: Showing Distribution of cataract morphology with respect to diabetes status

Diabetes Status	Count	Category of cataract						Total (%)
		CC (%)	NS (%)	NS+CC(%)	NS+PSCC(%)	PPC(%)	PSCC(%)	
Present	**Count**	8	27	0	1	1	1	38
	%within diabetes	21.1	71.1	0.0	2.6	2.6	2.6	100.0
	%within category	13.3	30.0	0.0	4.5	33.3	5.9	19.2
Absent	**Count**	52	63	6	21	2	16	160
	%within diabetes	32.5	39.4	3.8	13.1	1.3	10.0	100.0
	%within category	86.7	70.0	100.0	95.5	66.7	94.1	80.8
Total	**Count**	60	90	6	22	3	17	198
	%within diabetes	30.3	45.5	3.0	11.1	1.5	8.6	100.0
	%within category	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 4: Type of occupation and category of cataract

Occupation	CC (%)	NS (%)	PSCC (%)	NS + PSCC (%)	Total
Farming	30	37	3	14	84
	35.7	44.0	3.6	16.7	100.0
	50.0	41.1	42.9	41.2	44.0
Housewife	18	31	0	12	61
	29.5	50.8	0.0	19.7	100.0
	30.0	34.4	0.0	35.3	31.9
Others	12	22	4	8	46
	26.1	47.8	8.7	17.4	100.0
	20.0	24.4	57.1	23.5	24.1
Total	60	90	7	34	191
	31.4	47.1	3.7	17.8	100.0
	100.0	100.0	100.0	100.0	100.0

RESULTS

A total of 198 patients were included in the present study of which 82 were males and 116 were females. The average age of presentation was 64.14 years, the youngest being 45 years old and the oldest being 86 years old. Nuclear sclerosis (NS) was present in 90 (45.5%), whereas NS grade IV was present in 53 (26.76%) patients. NS+cortical cataract (CC) was present in 6 (3%), NS+PSCC was present in 22 (11.1%),CC was present in 60 (30.3%), PSCC was present in 17(8.6%) and posterior polar cataract (PPC) was present in 3 (1.5%) patients [Table 1]. There was no difference in prevalence of CC cases in lower (<65 years) and higher (>65 years) age group. It was also observed that prevalence of NS was significantly higher (57.4%) in higher age group as compared to that in lower age group (33.7%) The difference was statistically significant ($Z = 2.4$, $P < 0.05$). On the other hand, prevalence of NS+PSCC cases was more than double (26.5%) in lower (< 65 years) age group as compared to that in higher (>65 years) age group (11.1%). The difference was statistically significant. Consequently prevalence of NS+PSCC cases was significantly more (64.7%) in lower (<65 years) age group as compared to the other two types ($Z = 2.05$, $P <0.05$) [Table 2]. Majority of the diabetic patients (71.1%) belonged to NS type, whereas prevalence of CC+NS type of patients was comparable with non-diabetic patients [Table 3].

The type of occupation was significantly associated with type of cataract ($\chi 2 = 11.64$, $P = 0.003$). Majority (50%) of the CCtype and NS+PSCC type (41.2%) were farmers, whereas 50.8% of NS type were housewives [Table 4]. Eighty-eight (44.4%) subjects of the study population consumed tobacco. The association between cataract morphology and tobacco consumption was found to be significant. Among the tobacco users, 50 (56.8%) had the nuclear sclerosis type of cataract. No association was seen between dietary habits (vegetarian or non-vegetarian) with cataract morphology.

DISCUSSION

In our study, the mean age of the patients was 64.14 years, which is comparable to another study conducted in India, which reported the mean age at presentation for cataract to be 63.13 ± 9.82 years.[9] An African study had reported a similar age at presentation at 66.5 years[10], whereas Conner-Spady et al had reported the mean age of patients in Canada to be 73.4 years.[11] In our study, the number of women (116) was more than that of men (82). A study from the USA also showed a higher prevalence of cataract among women among both blacks and whites.[12] Similar trend was observed in Africa.[13] In the present study the highest prevalence was that of NS, in its pure form or as mixed occurrence (45.5 + 3 +11.6 = 60.1%). Other studies have also established that nuclear cataract accounts for more than 60% of cataract surgeries in developing countries.[14] Similar findings have been reported from Africa also.[13] The study shows that the prevalence of NS was higher in the older age group, which was as expected since NS increases with age. The fact that the prevalence of NS+PSCC was found to be more than double in the younger age group as compared to the older age group highlights the greater visual disability caused by posteriorly located lens opacities leading to earlier presentation for treatment. Among farmers, cortical type of cataract was found to be more prevalent whereas among housewives, the nuclear type of cataract was more prevalent.

Epidemiologic studies have linked a high lifetime exposure to UV light due to their occupation with the formation of cortical cataract in humans.[6] Studies have also indicated that the fiber cells in the center of the lens, those directly exposed to light entering the eye through the pupil, are usually not damaged by the light.[6] The present study has found that most of the diabetic patients (71.1%) belonged to NS type. Other studies have also established that the morphology of cataract in adult diabetics resembles that seen in age-related cataract in the absence of diabetes.[15,16] The average age of the diabetics in the study group was 62.92 years, which is lower than the average age of the study group. Among the tobacco users, 50 (56.8%) had the NS cataract. The association between tobacco use and high rates of nuclear cataract has been shown in a study in a developing country in Asia.[17] This may be considered a short time study of morphology of cataract in the western part of India. A study of longer duration, including a wider population needs to be undertaken. In addition similar studies from other parts of the country may be carried out to study the trends.

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