PSEUDOEXFOLIATION SYNDROME IN KASHMIRI PATIENTS SCHEDULED FOR CATARACT SURGERY

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ABSTRACT: PURPOSE: To evaluate the prevalence of pseudo exfoliation syndrome among Kashmiri patients with age related cataract scheduled for surgery. In this study we also evaluated the prevalence of glaucoma and intraoperative complications associated with pseudo exfoliative syndrome. **METHOD:** The present prospective study was conducted in the Postgraduate Department of Ophthalmology, Sher-i-Kashmir Institute of Medical Sciences (SKIMS) Bemina from January 2005 to May 2007. The series included 1434 patients who were admitted for cataract surgery. Only patients with senile cataract were included in this study. All patients underwent a complete ophthalmological examination that included slit lamp evaluation with dilated pupil for pseudo exfoliative material, intra ocular pressure (IOP) measurements. All intraoperative complications were recorded. **RESULTS:** In our study the prevalence of pseudo exfoliation syndrome was found to be 22.52%. Pseudo exfoliation syndrome was bilateral in 78.83% of subjects and unilateral in 30.96%. Mean age of subjects with pseudo exfoliation was 71.9±8.3 years. Male to female ratio in pseudo exfoliation cases was 5.3:1. The most common type of cataract in pseudo exfoliative cases was nuclear cataract (52.4%) followed by mixed (20.7%), mature cataract (17.4%), cortical cataract (6.1%) and posterior sub capsular cataract (3.4%). Prevalence of glaucoma in the pseudo exfoliative group was 19.5% whereas in non-pseudo exfoliative group it was 3.9%, the difference being statistically significant (chi square = 89.35; p value < 0.001). Subluxation of the lens was seen in 5.26% of cases in pseudo exfoliative group where as in the non-pseudo exfoliative group it was only 0.27%, the difference being statistically significant (chi square = 41.808; p value < 0.001). Intraoperative complications were found more in the pseudoexfoliative group 11.4% as compared to non-pseudoexfoliative group (1.26%). The difference was again statistically significant (chi square = 75.831; p value < 0.001). **CONCLUSION:** The prevalence of pseudo exfoliation syndrome in Kashmiri population undergoing cataract surgery is on the higher side. Pseudoexfoliation syndrome was found to be significantly associated with glaucoma and increased intraoperative complications.

KEYWORDS: Pseudo exfoliation, Kashmiri, Cataract, Glaucoma.

INTRODUCTION: Pseudo exfoliation (PEX) syndrome is an age related disease characterized by the widespread deposition of an abnormal extra cellular fibrillar material on much ocular and extra ocular tissues.¹ This condition was first described by a Finnish ophthalmologist named John Lindberg in 1917 in his doctoral thesis. Pseudo exfoliative material was first seen with the advent of slit lamp, Lindberg defined the greyish flecks and changes on the lens and pupillary margin of the iris.² The cause of PEX material is unknown. However the use of immune electron microscopy has led to the theory that PEX is a type of elastosis with elastic microfibrils being abnormally secreted by local ocular cells.³ Other studies indicate that the PEX material may be a basement membrane proteoglycan.⁴ Pericellularly accumulating PEX material disrupts and destroys the normal basement

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membranes of the cells involved. An altered cell-matrix interaction might adversely affect the cells, causing cellular dysfunction and eventually leading to cell degeneration, hence the name degenerative fibrilopathy.

Pseudo exfoliation is present worldwide in every race and ethnic group with variable prevalences. The reported prevalence of PEX rates varies extensively from 0% to more than 40%.^{5,6} Prevalence of pseudo exfoliation are best obtained by population based studies, however useful information on the prevalence of pseudo exfoliation can be obtained from different sub groups of a population, such as patients with cataract and glaucoma.^{6,7}

Other studies⁸ done in Kashmir valley coupled with our clinical observation led us to believe that the prevalence of PEX among Kashmiri population is relatively high. Therefore in a prospective study we set out to study the prevalence of pseudo exfoliation among Kashmiri patients with age related cataract who were scheduled for cataract surgery.

MATERIAL AND METHODS: The present prospective study was conducted in the Postgraduate Department of Ophthalmology, Sher-i-Kashmir Institute of Medical Sciences Bemina Srinagar from January 2005 to May 2007. The eye department of SKIMS MC Bemina is a tertiary eye care Centre. The series include 1434 patients who were admitted for cataract surgery. Only patients with senile cataract were included in this study. Cataract cases secondary to trauma, previous surgery, intra ocular inflammation and diabetes mellitus were excluded.

After taking relevant details in medical and ocular history, all patients underwent a comprehensive eye examination. All eyes were examined with a slit lamp bio microscope before and after mydriasis.

The presence of PEX material was confirmed by looking for white, fluffy or granular material at the pupillary margin or on the anterior lens surface after dilating the pupil. Type of cataract was classified as mainly nuclear, cortical, posterior sub capsular (PSC), mature and mixed type based on slit lamp bio microscopy.

Intra ocular pressure (IOP) was measured using Goldmann Applanation Tonometry, an average of three IOP readings were obtained prior to pupillary dilatation. Gonioscopy was performed in patients who had suspicious glaucomatous findings. A diagnosis of glaucoma was recorded if the patient had raised IOP > 21mmHg along with optic nerve head cupping and corresponding visual field defects. In cases we could not evaluate the visual field or optic disc due to dense cataract an IOP reading of > 24mmHg and normal corneal thickness was considered glaucomatous.

During our study we also noted the intraoperative complications between the pseudo exfoliative group and non-pseudo exfoliative group during cataract surgery.

Data was analysed with the help of means, standard deviation and percentage statistics. For parametric data, students independent 't' test was applied and for non-parametric data chi-square test was used. Statistical package for social sciences (SPSS) version 16.0 was used to carry out the statistical analysis of data. P value of < 0.05 was considered statistically significant.

RESULTS: Out of 1434 subjects examined 22.52% (323) were found to have pseudo exfoliation. Thus the prevalence of pseudo exfoliation in a cataract population in our study was established as 22.52%. Pseudo exfoliation syndrome was bilateral in 78.83% (253) of subjects and unilateral in 30.96% (70) of the subjects. Pseudo exfoliative material was detected both at pupillary margin and on the anterior

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lens surface in 80% of the eyes, while it was detected on the anterior lens surface only after pupillary dilatation in 20% of the eyes.

The mean age of the subjects with pseudo exfoliation was 71.9±8.3 years while the mean age of subjects without pseudo exfoliation was 56.7±11.1 years (Fig. 1), the difference between the two was found to be statistically significant (t value = 22.823; p value < 0.001). Out of the 323 cases of pseudo exfoliation men constituted 272 cases and women 51 cases. Thus men outnumbered women in the ratio of 5.3:1. The difference was statistically significant (p value < 0.001) (Fig. 2).

The distribution of morphological types of cataract in the pseudo exfoliative group is illustrated in Fig. 3. The most common presentation was nuclear cataract 52.4% (169), followed by mixed 20.7% (67), mature cataract 17.4% (56), cortical cataract 6.1% (20) and posterior sub capsular 3.4% (11). In eyes with unilateral pseudo exfoliation degree of lens opacities was significantly more advanced in eyes with pseudo exfoliation. Subluxation of the lens was seen in 5.26% (17) of cases in pseudo exfoliative groups as only 0.27% (3) of the cases in non-pseudo exfoliative group had subluxated lens. The difference between the two groups was statistically significant (chi-square statistic (with Yates correction) = 41.808; p value < 0.001).

Glaucoma was found in 19.5% (63) of cases in the pseudo exfoliative group, whereas in the non-pseudo exfoliative group it was found in 3.9% (43) of the cases. The difference between the two groups was statistically significant (chi-square statistic = 89.35; p value < 0.001).

Intraoperative complications were found more in the pseudo exfoliative group 11.4% (37) as compared to the non-pseudo exfoliative group in which only 1.26% (14) developed intraoperative complications. The difference between the two groups was statistically significant (chi-square statistic = 75.831; p value < 0.001) (Table 1 and Fig. 4). Out of the 37 cases in pseudo exfoliative group 30 cases had whole capsular bag extraction followed by iris injury in 6 cases and nuclear drop in one case as shown in Fig. 5.

DISCUSSION: The reported prevalence rate of pseudo exfoliation syndrome in different populations shows extensive variations. Extensive variations in prevalence of pseudo exfoliation syndrome are seen from one region to other in the same country. For a long time pseudo exfoliation was regarded as a Scandinavian phenomenon, but it has since been recognized all over the world.⁶

Prevalence rates as low as 0% in Eskimos⁵ and as high as 38% in Novajo Indians⁹ have been reported.

In our study we found a prevalence rate of pseudo exfoliation to be 22.52% among 1434 cases scheduled for cataract surgery. When compared to previous reports from other parts of the world or even from other parts of our country,^{10,11} these prevalence rates are on higher side. In a review Forsius reported the frequency of pseudo exfoliation in patients with cataract vary from 0.3% in Poland, 3.5% in France, 18% in Nosuay to 33% in Finland. The corresponding figures from Ethiopia describing a similar group of patients was 39.3%,¹² which is higher than reported in our study. One report from Africa¹³ cited a prevalence rate of 26% among South African patients who were admitted for cataract surgery, which is comparable to our study.

In studies done in south India the prevalence of pseudo exfoliation was found to be 8%¹⁰ and 6%¹¹ which is significantly less than our study.

These differences in prevalence rates could reflect true variations arising from racial, genetic or environmental factors. These differences could also be attributed to differences in study design

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(Prospective versus retrospective) sampling methods (Population based versus hospital based), population size, differences in techniques of assessment of pseudo exfoliation.

In our study there was a selection bias. We studied pseudo exfoliation syndrome in a cataract population. So our observations may not reflect the real distribution of pseudo exfoliation in the general population of the area. Various studies have shown higher prevalence of pseudo exfoliation in cataract patients.^{6,14} Thus our study may represent the late manifestation of the syndrome and not the pre-clinical early stages.

In our study we found that the mean age of patients with pseudo exfoliation was 71.9 ± 8.3 years whereas the mean age of patients without pseudo exfoliation was 56.7 ± 11.1 years. The difference between the two groups was statistically significant (p value <0.001). This is in agreement with the result of other workers who found the mean age of cataract patients with pseudo exfoliation higher than those without pseudoexfoliation.^{15,16} Higher prevalence of pseudo exfoliation in eyes scheduled for cataract surgery and of cataract in eyes with pseudo exfoliation has been found, and the incidence of both conditions increases with age.^{15,17}

Sex distribution in our study showed a male preponderance. Out of the total 323 cases of pseudo exfoliation, 272 were males and 51 were females. Male to female ratio was 5.3:1. The difference in the prevalence of two sexes was statistically significant (p value <0.001). Male preponderance has also been reported elsewhere.^{6,18} Many studies have found no sex/rediliction.¹⁹ While in other studies females have predominated.²⁰ However since our study was a hospital based study, any true sex prediction can only be predicted by population based studies.

In our study we found that nuclear sclerosis (52.4%) was the single most common morphological type of cataract followed by mixed type (20.7%). The results are similar to findings reported in the Beaver Dam eye study²¹ and Framingham Eye study.²² However in a study in African population cortical opacities were the most common type.²³

In our study we also found that eyes with pseudo exfoliation had more significant cataract than clinically uninvolved fellow eyes. The exact etiological relationship between cataract and pseudo exfoliation is not clear. Ocular ischemia has been suggested as the most common underlying factor for the occurrence of cataract and pseudo exfoliation in the same eye.⁷ One more finding that can explain the relationship between pseudo exfoliation and cataract is that Ascorbic acid (Vitamin C) is significantly reduced in the aqueous of cataract patients with pseudoexfoliation.²⁴ One may therefore consider the possible association between oxidative stress and UV exposure in pseudo exfoliation syndrome and hence the reason for the association between the two.

A strong relationship between glaucoma and pseudo exfoliation is well known.^{25,26} In our study we found that 19.5% of those with pseudo exfoliation had glaucoma, whereas in the non-pseudo exfoliative group only 3.9% were found to have glaucoma. The difference between the two groups is statistically significant (chi square statistic = 89.35; p value < 0.001). Thus we can conclude that pseudo exfoliation is associated with an increased risk of glaucoma.

The deposits of pseud oexfoliative material and melanin pigment throughout the trabeculum and the degenerative changes of the juxta-canalicular tissue are the major mechanisms of pseudo exfoliative glaucoma.²⁷ Apart from the obstruction to the trabecular outflow, increased aqueous protein levels, an impaired ocular and retrobulbar perfusion and disorder of elastic tissue of lamina cribrosa have also been proposed as the mechanism of glaucoma in pseudo exfoliative patients.²⁸

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Spontaneous subluxation of the lens was more common in the pseudo exfoliative group (5.26%) as compared to the non-pseudo exfoliative group (0.27%). The difference between the two groups was statistically significant (chi square statistics with Yates correction = 41.808; p value of < 0.001). This could be attributed to zonular weakness secondary to deposition of pseudoexfoliative material on the zonular fibres resulting in a proteolytic disintegration of the zonules.²⁹

In our study we also found that the intraoperative complications were significantly more in the pseudo exfoliative group (11.4%) as compared to non-pseudo exfoliative group (1.26%), (chi-square statistic 75.831; p value <0.001). Cataract surgery on eyes with pseudo exfoliation has higher incidence of operative complications like posterior capsular rupture, zonular dialysis and vitreous loss.³⁰ These findings could be attributed to two important risk factors associated with pseudo exfoliation i.e. poor pupillary dilatation and zonular fragility.³¹

CONCLUSION: The prevalence of pseudo exfoliation syndrome in Kashmiri population undergoing cataract surgery is on the higher side as compared to other parts of the country. Moreover its association with glaucoma and increased intraoperative complications as compared to the non-pseudo exfoliation group is a cause of concern. All patients with pseudo exfoliative syndrome should be on regular follow up to detect glaucoma at an early stage. Patients with pseudo exfoliation are at increased risk of developing complications intra operatively, early diagnosis, detailed examination, knowledge of the complications and ability to manage these complications is key to success. Moreover since ours was a hospital based study more population based studies should be done to evaluate the prevalence of pseudo exfoliation in the general Kashmiri population and its association with cataract and glaucoma.

Fig. 1: Showing mean age of the studied subjects

Fig. 2: Pie chart showing sex distribution in the pseudo exfoliative group

Fig. 3: Pie chart showing morphological types of cataract in the pseudo exfoliative group

Fig. 4: showing comparison of Glaucoma, subluxation of lens and intraoperative complications between pseudo exfoliation and non-pseudo exfoliation group.

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Fig. 5: Showing intraoperative complications in pseudo exfoliative group

	Pseudo exfoliation	Non-Pseudo exfoliation	P value
Glaucoma	19.5%	3.9%	< 0.001
Subluxation	5.26	0.27	
Intraoperative complications	11.4%	1.26	

Table. 1: Comparison of Glaucoma, subluxation of lens and intraoperative complications between pseudo exfoliation and non-pseudo exfoliation group.

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