



## Corneal changes in pseudoexfoliative eyes

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### ABSTRACT

#### Aim

Corneal changes in Pseudoexfoliative eyes and its outcome.

#### Methods

This study was carried out on 100 consecutive patients with Pseudoexfoliation. Complete ocular evaluation was done and corneal changes were noted. Central corneal thickness was measured using ultrasound pachymetry.

#### Results

Pseudoexfoliation was predominantly seen in males with male to female ratio of 3:2. Mean Central corneal thickness in Pseudoexfoliation with glaucoma eyes was  $521.7 \pm 17.23 \mu$  which was lower when compared with mean central corneal thickness in Pseudoexfoliation without glaucoma eyes ( $512.4 \pm 33.52 \mu$ ). The resulted when statistically analyzed were found to be significant.

#### Conclusion

Evaluation of central corneal thickness should be done in all patients with Pseudoexfoliative glaucoma due to thinner cornea and the risk of underestimation of intra ocular pressure.

**Keywords:** Central Corneal Thickness, Pachymetry, Pseudoexfoliation with Glaucoma, Pseudoexfoliation without Glaucoma

### INTRODUCTION

Pseudoexfoliation (PEX) syndrome is an age related disease characterized by the widespread deposition of an abnormal extra cellular fibrillar material on many ocular and extra ocular tissues.<sup>1</sup> This condition was first described by a Finnish ophthalmologist named John Lindberg in 1917 in his doctoral thesis. Pseudoexfoliative 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.<sup>2</sup>

Pseudoexfoliation is present worldwide in every race and ethnic group with variable prevalence's.<sup>3,4</sup> The

reported prevalence of PEX rates varies extensively from 0% to more than 40%.<sup>5,6</sup> Prevalence of pseudoexfoliation are best obtained by population based studies, however useful information on the prevalence of pseudoexfoliation can be obtained from different sub groups of a population, such as patients with cataract and glaucoma.<sup>6,7</sup>

Other studies<sup>8</sup> 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 pseudoexfoliation among Kashmiri patients with age related cataract who were scheduled for cataract surgery.

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## MATERIAL AND METHODS

The present study was conducted in the Postgraduate Department of Ophthalmology, Govt. Medical College, Srinagar. The diagnosis of Pseudoexfoliation was made based on, deposition of Pseudoexfoliation material on the pupillary margin or on the anterior capsule of lens.

Patients were then subjected to following Ophthalmic evaluation:

- 1) Recording of visual acuity for distance using Snellen's chart.
- 2) Measurement of Tear film Break up time
- 3) Conjunctiva was examined for the presence of pterygium. Cornea was examined for the presence of climatic droplet keratopathy and guttae. The endothelium was examined to look for the presence of Pseudoexfoliative material.
- 4) Stereoscopic evaluation of the fundus and optic disc with indirect ophthalmoscope and 90-D lens was done depending upon the media clarity.

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.

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

A total of 150 eyes with evidence of Pseudoexfoliation were enrolled in the study which included 24 eyes with glaucomatous changes and 76 eyes without glaucoma.

**Table 1 Age and Gender Distribution**

Age (Years)	Male		Female		Total	
	N	%	N	%	N	%
40-50	3	3.4	5	8.2	8	5.3
51-60	31	34.8	24	39.3	55	36.7
61-70	42	47.2	27	44.3	69	46.0
> 70	13	14.6	5	8.2	18	12.0
Mean±SD	65.3±9.87		59.2±6.75		62.8±8.56	

The mean age of the subjects in the study was 65.3 years. There was a linear increase in the number of Pseudoexfoliation patients with age upto the age of 70 years. Most of the patients were seen in the 61-70 years age group. There were more males with Pseudoexfoliation than

females in the study (57 Males vs. 43 Females). The average age at which Pseudoexfoliation was seen was higher in females than in males i.e., females developed the disease at later age than males and this was statistically significant ( $p < 0.05$ ).

**Table 2 Climatically Induced Corneal and Conjunctival Alterations**

Pterygium	Number	Percentage
Present	32	21.3
Absent	118	78.7
Total	150	100

Twenty patients with Pseudoexfoliation had pterygium in one or both eyes. This was more

commonly seen in males (13 patients) and the incidence increased with the age.

Table 3 Tear Film Break Up Time (TBUT) in Patients with Pseudoexfoliation

TBUT (Seconds)	Number	Percentage
≤10	42	28.0
11-15	68	45.3
>15	40	26.7
Total	150	100

Thirty eyes had abnormal tear film break up time of ≤ 10 seconds and in the rest of eyes (70) it was

normal. The mean tear film break up time was 13.85 seconds.

Table 4 Showing Corneal Alterations in Pseudoexfoliation

Corneal Alterations	No. of Eyes	Percentage
Climatic Droplet Keratopathy	31	20.7
Guttae	8	5.3
Pseudoexfoliative Material on Cornea	7	4.7

Most common associated condition noticed in cornea was climatic droplet keratopathy which was seen in 18 eyes, followed by guttae and pseudoexfoliative material on cornea in 5 patients each.

Mean CCT in Pseudoexfoliative eyes ( $521.7 \pm 17.23 \mu$ ) as compared with CCT in age age matched normal population ( $512.4 \pm 33.52 \mu$ ) [Vijaya L et al., Central

Corneal Thickness in Adult South Indians] [5] was almost similar (P-value=0.207).

However, Mean CCT in Pseudoexfoliation with glaucoma eyes ( $509.6 \pm 13.73 \mu$ ) was found to be lower when compared with Mean CCT in Pseudoexfoliation without glaucoma eyes ( $523.45 \pm 17.15 \mu$ ) and this was found to be statistically significant (P-value <0.001).

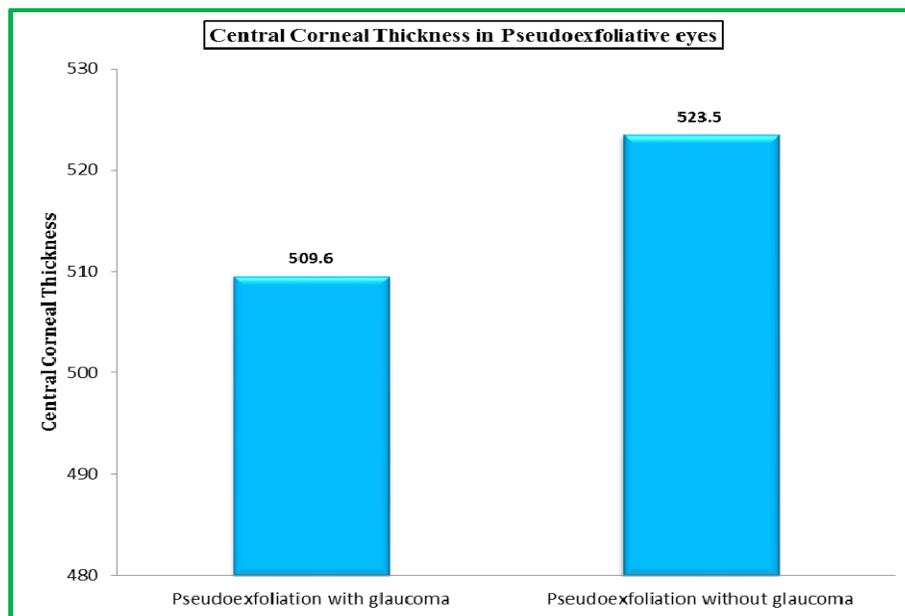


Fig 1 Central Corneal Thickness in Pseudoexfoliative Eyes

## DISCUSSION

In our study, we found that the incidence of pterygium and Pseudoexfoliation syndrome both peaked at 61-70 years of age and more males had pterygia and Pseudoexfoliation than females. This could point to a common etiology probably exposure to ultra violet radiation in the pathogenesis of both the conditions. Forsius H, Forsman E et al,<sup>7</sup> however noted in their study that there was rapid increase in the incidence of Pseudoexfoliation with age, especially after 50 years. Whereas pterygium, climatic droplet keratopathy or pronounced pingecula reached its highest incidence after 60 years. They also found a higher incidence of pterygia, climatic droplet keratopathy and pingecula in males but did not find a corresponding higher incidence of Pseudoexfoliation syndrome in males in their study population. Resnikoff S, Filliard G<sup>8</sup> found six times as many cases of exfoliation syndrome in persons with climatic keratopathy than in people without.

Although we found climatic droplet keratopathy in 18 eyes, there was no comparison available because we did not have the control group.

Our study had only a small proportion of patients with tear film break up time of  $\leq 10$  secs. 70 patients had TBUT  $>10$  seconds. The mean TBUT was 13.85 seconds. Kozobolis VP, Detorakis et al<sup>9</sup> found that the tear film break up times were significantly lower in Pseudoexfoliation syndrome. The average being 6.91 seconds, which was considerably lesser than that found in our study group. Probably the incidence of dry eye is more common in that region which could affect the test so significantly. Mean CCT in Pseudoexfoliative eyes ( $514.28 \pm 20.8 \mu$ ) as compared with CCT in age matched normal population ( $511.4 \pm 33.5 \mu$ ) [Vijaya L et al,<sup>10</sup> Central Corneal Thickness in Adult South Indians] was almost similar. However, Mean CCT in Pseudoexfoliation with glaucoma eyes ( $502.7 \pm 12.82 \mu$ ) was found to be lower when compared with mean CCT in Pseudoexfoliation without glaucoma eyes ( $518.36 \pm 13.21 \mu$ ). Georgios et al<sup>11</sup> in their study found CCT in Pseudoexfoliation with glaucoma eyes ( $526 \mu$ ) was significantly thinner compared to eyes with Pseudoexfoliation without glaucoma ( $547.3 \mu$ ).

## CONCLUSION

All patients with pseudoexfoliative syndrome should be on regular follow up to detect glaucoma at an early stage. Patients with pseudoexfoliation are at increased risk of developing complications intraoperatively, early diagnosis, detailed examination, knowledge of the complications and ability to manage these complications is key to success.

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