

TO DETERMINE THE ASSOCIATION OF GLAUCOMA IN PSEUDOEXFOLIATIONUmamaheshwari Sundaresan¹, Kavitha Kandasamy²¹Assistant Professor, Department of Ophthalmology, Government Mohan Kumaramangalam Medical College and Hospital, Salem, Tamil Nadu.²Assistant Professor, Department of Ophthalmology, Government Mohan Kumaramangalam Medical College and Hospital, Salem, Tamil Nadu.**ABSTRACT****BACKGROUND**

Pseudoexfoliation syndrome is an age-related systemic syndrome. Open angle glaucoma is more common in pseudoexfoliation syndrome. The disease may be bilateral and asymmetric. The clinically uninvolved eye of unilateral cases has a risk of developing glaucoma. About 7.67% of patients with pseudoexfoliation syndrome are ultimately diagnosed to have glaucoma. Glaucomatous optic nerve head changes and visual field damage also tend to be greater in patients with pseudoexfoliation glaucoma than in patients with primary open angle. Glaucoma, suggesting an intrinsic vulnerability of the optic nerve head in pseudoexfoliation syndrome.

MATERIALS AND METHODS

Ours was a non-randomized cross-sectional observational study conducted over a period of one year in 200 eyes of 100 patients. Diagnostic criteria include presence of pseudoexfoliation material on the pupillary border and /or the lens.

RESULTS

Out of 100 patients with pseudoexfoliation, 55 were males and 45 were females. In both unilateral and bilateral pseudoexfoliation groups, there was a mild male preponderance and most of the patients were agricultural workers. Of these 100 patients, 53 had bilateral pseudoexfoliation and 47 had unilateral PXF. Thus, totally 153 eyes of 100 patients had pseudoexfoliation. Among them 4 patients were detected to have glaucoma, 1 had bilateral and 3 patients had unilateral glaucoma.

CONCLUSION

Bilateral pseudoexfoliation was more common than unilateral pseudoexfoliation. PES, though a disease of the elderly, can also occur in < 50 years' age group. There is a risk of developing glaucoma in pseudoexfoliation patients. Open angle glaucoma is more common in pseudoexfoliation syndrome. The clinically uninvolved eye of unilateral cases has a risk of developing glaucoma.

KEYWORDS

Intra Ocular Pressure, Pseudoexfoliation, Pseudoexfoliation Syndrome.

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BACKGROUND

Pseudoexfoliation (PXF) is the most common identifiable precursor of open-angle glaucoma worldwide.¹ It is also referred to "capsular glaucoma" or "glaucoma capsulare."² Pseudoexfoliation manifests clinically as characteristic fibrillary protein deposits in the anterior segment of the eye.^{3,4} This material is associated with elastic microfibrillar-associated glycoproteins, including fibrillin, amyloid P, elastin, and tropoelastin.⁵ Electron microscopy demonstrates

amyloid like material consisting of cross- banded fibrils and filamentous subunits with an amorphous ground substance.⁶ The disease may be bilateral and asymmetric. The clinically uninvolved eye of unilateral cases has a risk of developing glaucoma. About 20-85% of patients with pseudoexfoliation syndrome are diagnosed to have glaucoma. 5% of patients develop elevated I.O.P after 5 years and 15% develop elevated I.O.P. after 10 years. Glaucoma in pseudoexfoliation is usually higher than in those without pseudoexfoliation. Glaucomatous optic nerve head changes and visual field damage also tend to be greater in patients with pseudoexfoliation glaucoma than in primary open angle and glaucoma, suggesting an intrinsic vulnerability of the optic nerve head in pseudoexfoliation syndrome.

Mechanism of Glaucoma

Glaucoma in pseudoexfoliation is classically associated with an open angle. The most likely mechanism is blockage of the filtering meshwork by a combination of pseudoexfoliation material and pigment and their accumulation in

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juxtacanalicular region and destruction of Schlemm's canal. Angle closure glaucoma is rare, usually due to pupillary block caused by a combination of posterior synechiae, increased iris rigidity or thickness and anterior lens movement resulting from zonular weakness.

Pseudoexfoliation Glaucoma and POAG

Current thinking is that glaucoma due to pseudoexfoliation is a secondary open angle glaucoma due to the deposition of pseudoexfoliation material in the trabecular mesh work. Clinical differences between glaucoma due to pseudoexfoliation and POAG, are frequent asymmetry or unilaterality, potential for rapid escalation of I.O.P. and refractoriness to anti glaucoma therapy, more favourable early response to argon laser trabeculoplasty. POAG is almost always bilateral but may be asymmetrical. It is not associated with excessive pigmentation of trabecular meshwork.

Prevalence

An extensive body of literature has documented marked geographic variations in the population distribution of PXF.⁷⁻¹¹ Pseudo exfoliation syndrome is common in late 50 years but becomes increasingly common in late 60s and 70s. PXF is more common in females than male and glaucoma has a greater predilection for men.

Clinical Features

Clinically in pseudoexfoliation syndrome cornea shows Scattered flakes of PXF material may be observed on endothelium. PXF. Following mydriasis, pigment dispersion is often seen. Anterior chamber angle open in 83% of patients with PXF glaucoma. Increased trabecular pigmentation is a prominent sign of PXF. Pigment characteristically deposited on the Schwalbe's line and sometimes as a wavy line or anterior to Schwalbe's line (Sampaolesi line). PXF material is most prominent at the pupillary border. Pigment loss from the iris sphincter region is a hall mark of pseudoexfoliation which is reflected in iris sphincter region as moth eaten pattern on trans illumination, defect near the pupillary border. PXF material may be detected earliest on the ciliary process and zonules. Zonular pseudoexfoliation may cause the peripheral granular zone and may appear as subtle striations of pseudoexfoliation material (or) pigment on the surface of the lens. Pseudoexfoliation material in the form of granular whitish deposition over the anterior lens surface is the most commonly recognized and is granular in the periphery and frosty white centrally. Eyes with pseudoexfoliation a greater incidence of visual field defects than eyes with POAG and higher degree of optic nerve damage. Poor mydriasis is well known in pseudoexfoliation syndrome.

Source of Pseudoexfoliation Material

In the eye, exfoliative material is produced by the lens, iris, and ciliary epithelia and is also found in the conjunctiva.⁴ Recent studies, however, have disclosed the typical exfoliative material has now been found widely distributed

in the body, including heart, lung, liver, gallbladder, kidney, and meninges, and in skin a form of elastosis⁴ suggesting aberrant connective-tissue metabolism.^{5,12} Indeed, site-specific elastosis of the lamina cribrosa of the optic nerve has now been demonstrated in patients with PXF and glaucoma.

Aims and Objectives

To determine the association of glaucoma in patients with pseudoexfoliation syndrome with respect to Incidence and type of glaucoma in pseudoexfoliation.

MATERIALS AND METHODS

Source of Data

100 patients with pseudoexfoliation syndrome who attended the Department of Ophthalmology, Government Mohan Kumaramangalam Medical College Hospital, Salem.

Method of Collection of Data

Ours was a non-randomized cross-sectional observational study conducted over a period of one year from 2016 to 2017 among 100 patients with pseudoexfoliation syndrome who attended the Department Of Ophthalmology, Government Mohan Kumaramangalam Medical College Hospital, Salem. Both male and female patients with the presence of pseudoexfoliation material on the pupillary border and /or the lens were included in this study pattern. Patients without pseudoexfoliation and patients who did not give consent for the study were excluded from our analysis. Data collection was done using a case study proforma by principal investigator. After obtaining informed consent from all patients, a detailed evaluation including ocular history, detailed slit lamp examination and the clinical signs were specifically looked for Conjunctiva-congestion, Cornea-oedema, pigmentation, pseudoexfoliation material, Anterior chamber-depth, flare, cells, pseudoexfoliation material, pigment dispersion, Iris-pattern, trans illumination defects, Pupil-size, reaction to light, pseudoexfoliation material, dilation with mydriatics, Lens-Pseudoexfoliation material, cataractous or not. Pupil was dilated as a routine in most of the cases to note the three zones of pseudoexfoliation material on the lens capsule. Glaucoma workup was done for all patients which included visual acuity, tonometer with applanation tonometer, perimetry with Bjerrum screen and gonioscopy with gold Mann three mirror lens. During gonioscopy the angle status was assessed and the presence of pseudoexfoliation material and increased pigmentation on the angle were noted.

Inclusion Criteria

Adults (aged over 18 years), both males and females.

Exclusion Criteria

Patients aged below 18 years and patients who did not give consent for the study were excluded from our analysis.

RESULTS**Person Related Parameters**

Laterality	No. of Cases with Pseudoexfoliation	No. of Eyes with Pseudoexfoliation
Unilateral	47 (47%)	47 (47%)
Bilateral	53 (53%)	106 (106%)
Total	100 (100%)	153 (153%)

Table 1. Laterality of PXF

Baseline Parameters	Summary
Age Group	
< 50 years	7 (7%)
51 to 60 years	33 (33%)
61 to 70 years	52 (52%)
71 and above	8 (8%)
Gender Distribution	
Male	55 (55%)
Female	45 (45%)
Mean Age (in years)	
Pseudoexfoliation pts.	63.47
Unilateral PXF	62.82
Bilateral PXF	62.88
Unilateral Cases	
Right eye	24 (51.06%)
Left eye	23 (48.04%)

Table 2. Summary of Baseline Characteristic Parameters

Among the study population, 7 (7%) participants were aged up to 50 years, 33 (33%) were aged between 51 to 60 years, 52 (52%) were between aged 61 to 70 years, and 8 (8%) were 71 years and above aged. Among the study population male participants were 55 (55%) remaining 45 (45%) were female participants. Among the study population, the mean age of Pseudo exfoliation patients' group was 63.47 years, Unilateral PXF group was 62.82 years and Bilateral PXF group was 62.88 years. Among the unilateral cases, 24 (51.06%) were affected in right eye and 23 (48.04%) were affected in left eye.

	Laterality of PXF		P Value
	Unilateral (N=47)	Bilateral (N=53)	
Age Group			
< 50 years	4 (8.51%)	3 (5.66%)	0.285
51 to 60 years	19 (40.42%)	14 (26.41%)	
61 to 70 years	22 (46.81%)	30 (56.60%)	
71 and above	2 (4.26%)	6 (11.32%)	
Gender			
Males	25 (53.20%)	30 (56.60%)	0.732
Females	22 (46.80%)	23 (43.40%)	
Table 3. Comparison of Baseline Characteristics between Study Group (Laterality of PXF)			

Table 3. Comparison of Baseline Characteristic between Study Group (Laterality of PXF)

In unilateral group, 4 (8.51%) were in up to 50 years, 19 (40.42%) were in 51 to 60 years, 22 (46.81%) were in 61 to 70 years and 2 (4.26%) were in 71 years and above the age group. In bilateral group, 3 (5.66%) were in up to 50 years, 30 (56.60%) were in 51 to 60 years, 30 (56.60%) were in 61 to 70 years and 6 (11.32%) were in 71 years and above the age group. The difference in the proportion of age group between Laterality of PXF was statistically not significant (P value 0.285). In unilateral group, 25 (53.20%) were male and 22 (46.80%) were female. In bilateral group, 30 (56.60%) were male and 23 (43.40%) were female. The difference in the proportion of gender between Laterality of PXF was statistically not significant (P value 0.732). (Table 3)

	Features	Patients Number
Conjunctiva	Pterygium	16
Cornea	Sph Degeneration	28
Pupil	Non-Dilation/PXF	26

Table 4. Associated Clinical Features

16 Patients had pterygium and 8 patients had spheroidal degeneration. 26 patients with pseudo exfoliation did not respond to mydriatics. This no dilatation of pupil is a well- recognized entity in pseudo exfoliation syndrome. This could be attributed to the intrinsic degenerative changes occurring in the sphincter pupillae of pseudo exfoliation eyes. Pseudo exfoliation material was seen in the pupillary margin in all patients. The three classic zones of pseudo exfoliation material deposition on the lens were noted in 53 patients.

Parameters	Summary
No. of Eyes with Pseudoexfoliation (%)	
No. of eyes with glaucoma	4 (7.67%)
No. of eyes without glaucoma	75 (92.33%)
Unilateral and Bilateral Glaucoma	
pts with unilateral glaucoma	3
pts with bilateral glaucoma	1

Table 5. EYE Related Parameters

7.67% of pseudo exfoliation patients had with glaucoma while 92.33% had no evidence of glaucoma. Out of 4 patients with glaucoma, all patients had open angle glaucoma. Thus, open angle glaucoma is more common in pseudo exfoliation syndrome. Out of 100 pseudo exfoliation patients with open angle glaucoma, 3 had unilateral glaucoma and 1 had bilateral glaucoma. Patients with unilateral open angle glaucoma, have a high risk of developing glaucoma in the other eye and hence were advised a periodical review. 23 patients with bilateral open angle glaucoma had pseudo exfoliation in both eyes.

DISCUSSION

53% of patients had bilateral pseudoexfoliation and 47% had unilateral pseudoexfoliation. Thus, bilateral pseudoexfoliation is more common and this could be due to the possibility that the unilateral cases invariably become

bilateral at a later date. In unilateral patients RE was involved in 52% and LE in 48%.⁷⁻¹¹ The most common age group in both unilateral and bilateral cases was 61-70 years. The mean age was 63.47 years and only 10% of patients were less than 50 years. Hence pseudoexfoliation syndrome is a disease of aged. Mean age in unilateral cases 62.88 years. The absence of much of difference in the mean ages of the 2 groups can be explained by the possibility that the onset of pseudoexfoliation was bilateral in some cases and unilateral in others. The youngest patient was 50 years old and the oldest patient was 94 years old. 55% of pseudoexfoliation patients were males and 45% were females. As ultraviolet light is a possible factor related to pseudoexfoliation syndrome, the definite male preponderance could have explained partly by the fact that males are more involved with outdoor activities than females. 7.67% of pseudoexfoliation patients had glaucoma¹ while 92.33% had no evidence of glaucoma. Out of 4 patients with glaucoma, all patients had open angle glaucoma. Thus,⁶ open angle glaucoma is more common in pseudoexfoliation syndrome. Out of 100 pseudoexfoliation patients with open angle glaucoma, 3 had unilateral glaucoma and 1 had bilateral glaucoma. Patients with unilateral open angle glaucoma, have a high risk of developing glaucoma in the other eye and hence were advised a periodical review. 1 patient with bilateral open angle glaucoma had pseudoexfoliation in both eyes. In 26 patients, pupil did not respond to mydriasis probably due to intrinsic degenerative changes occurring in the sphincter pupillae in pseudoexfoliation syndrome.

CONCLUSION

Bilateral pseudoexfoliation was more common than unilateral pseudoexfoliation. Pseudoexfoliation syndrome, though a disease of the elderly, can also occur in <50 years age group. The youngest patient reported in this study was 50 years old and the oldest patient was 94 years old. Males predominated in all groups of pseudoexfoliation patients, unilateral and bilateral, and with or without glaucoma. There is a risk of developing glaucoma in pseudoexfoliation patients. Open angle glaucoma is more common in pseudoexfoliation syndrome. The clinically uninvolved eye of unilateral cases has a risk of developing glaucoma.

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