

A Hospital Based Observational Assessment of the Comprehensive Examination of Glaucoma and Cataract in Pseudo Exfoliation

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Abstract

Aim: A comprehensive examination of Glaucoma and Cataract in Pseudo exfoliation.

Material and Methods: This study was conducted in the Department of Ophthalmology, PMCH, Patna, Bihar, India for one year. 137 Patients with pseudo exfoliation were included into the study and evaluated. After obtaining informed consent history and demographic data was collected and detailed ocular examination including Best corrected visual acuity, Slit lamp examination for presence of pseudo exfoliative material, Applanation tonometry, Gonioscopy, Visual fields analysis, Dilated fundus examination and examination of lens was performed. Diagnosis of pseudo exfoliation glaucoma was made based on the presence of: If IOP is > 21 mm Hg in either eye, Vertical cup disc ratio is >0.7:1 (or) Cup disc asymmetry >0.2 between the two eyes (or) Focal thinning, notching of neuroretina rim and Presence of glaucomatous visual field defects.

Results: Total number of patients included in the study was 137. Total number of eyes included in the study was 220. Following were the observations made in our study. Out of total 2750 cases screened 137 Patients (220 Eyes) had pseudo exfoliation. Out of 137 patients, 79 (57.6%) were Males and 58(42.4%) were Females. Male: Female ratio was 1.36:1. Out of 137 patients 54 (39.4%) were having unilateral pseudo exfoliation, 83 patients (60.6%) were having bilateral pseudo exfoliation. Out of 220 eyes, 204 eyes (92.72%) had open angle of Grade III – IV. Out of 220 eyes, 154 eyes (69.55%) had intraocular pressure <21 mm Hg, 66 eyes (30.00%) had intraocular pressure > 21mm Hg. 143 (65.00%) eyes had normal visual fields and optic disc cupping of <0.7:1CDR, 77 eyes (35.00%) had abnormal visual fields and glaucomatous cupping of >0.7:1CDR. Out of 220 eyes, 132 (60.00%) had nuclear cataract, 73 (33.18%) had senile immature cataract, 14 (6.37%) had senile mature cataract and one patient had hyper mature cataract.

Conclusion: Pseudo exfoliation is a degenerative disease of basement membrane, which increases with the age, hence more commonly seen in older age group. Pseudo exfoliation initially starts as unilateral disease and progresses to other eye as the age advances.

Key Words: Pseudo exfoliation, Glaucoma, Nuclear cataract, Intra Ocular Pressure, visual field, Optic disc

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Introduction

Pseudo exfoliation syndrome (PXF) is a common age-related systemic disorder characterized by the production and accumulation of fibrillar extracellular material in various ocular tissues. It is most notably associated with an increased risk of developing glaucoma and cataracts, leading to significant visual impairment if left untreated. The comprehensive examination of glaucoma and cataracts in the context of PXF is crucial for effective management and improved patient

outcomes. [1-3] Glaucoma is a leading cause of irreversible blindness worldwide, and pseudo exfoliation glaucoma (PXG) is one of the most aggressive forms of secondary open-angle glaucoma. Patients with PXF are at a significantly higher risk of developing glaucoma compared to the general population. The fibrillar material characteristic of PXF can obstruct the trabecular meshwork, impeding aqueous humour outflow and leading to elevated intraocular pressure (IOP). [4-6]

Elevated IOP is a primary risk factor for glaucomatous optic neuropathy, characterized by optic nerve head damage and corresponding visual field loss. Cataracts, the leading cause of blindness worldwide, are also more prevalent and severe in patients with PXF. The deposition of pseudo exfoliative material on the lens capsule can lead to increased lens opacity and faster cataract progression. This often results in earlier onset and more frequent need for cataract surgery compared to individuals without PXF. Cataract surgery in PXF patients presents unique challenges. The fragility of the zonular fibers in these patients increases the risk of intraoperative complications such as zonular dehiscence and capsular rupture. The coexistence of glaucoma and cataracts in PXF patients complicates the management approach. Combined cataract and glaucoma surgery, such as phacoemulsification with trabeculectomy or minimally invasive glaucoma surgeries (MIGS), can be considered to address both conditions simultaneously. [7-10]

Material and Methods

This study was conducted in the Department of Ophthalmology, PMCH, Patna, Bihar, India for one year. Patients screened and found to have Pseudo exfoliation unilaterally or bilaterally were included in the study. 137 Patients with pseudoexfoliation were included into the study and evaluated. After obtaining informed consent history and demographic data was collected and detailed ocular examination including Best corrected visual acuity, slit lamp examination for presence of pseudo exfoliative material, Applanation tonometry, Gonioscopy, Visual fields analysis, Dilated fundus examination and examination of lens was performed. Presence of pseudo exfoliative material on lens was looked for after pupillary dilatation. Findings were recorded and analysis of the data done. Intra ocular pressure measurement was recorded by Goldmann Applanation Tonometry Gonioscopy was performed with Goldmann four mirror contact gonioscope, Visual field analysis was done by using Humphrey Auto Field Analyzer.

Stereoscopic evaluation of fundus was done with indirect ophthalmoscope using 20D lens and slit lamp fundoscopic examination using 90D lens and Optic Disc was assessed for cup disc ratio, characteristic glaucomatous excavation of the neuroretina rim and typical wedge shaped nerve fiber layer defects. Pseudoexfoliation was diagnosed clinically by the presence of typical pseudoexfoliation material at the pupillary border on undilated slit lamp examination (or) anterior lens capsule on dilated examination (or) the trabecular meshwork on gonioscopy. Diagnosis of pseudoexfoliation glaucoma was made based on the presence of: If IOP is > 21 mm Hg in either eye,

Vertical cup disc ratio is >0.7:1 (or) Cup disc asymmetry >0.2 between the two eyes (or) Focal thinning, notching of neuroretina rim and Presence of glaucomatous visual field defects. Statistical Analysis was done by Statistical Package for Social Sciences (SPSS), Version 19.

Results

Total number of patients included in the study was 137. Total number of eyes included in the study was 220. Following were the observations made in our study. Out of total 2750 cases screened 137 Patients (220 Eyes) had pseudo exfoliation. Out of 137 patients, 79 (57.6%) were Males and 58(42.4%) were Females. Male: Female ratio was 1.36:1. Out of 137 patients 54 (39.4%) were having unilateral pseudoexfoliation, 83 patients (60.6%) were having bilateral pseudo exfoliation. Out of 220 eyes, 204 eyes (92.72%) had open angle of Grade III – IV. Out of 220 eyes, 154 eyes (66.82%) had intraocular pressure <21 mm Hg, 66 eyes (33.18 %) had intraocular pressure > 21mm Hg. 143 (65.00%) eyes had normal visual fields and optic disc cupping of <0.7:1CDR, 77 eyes (35.00%) had abnormal visual fields and glaucomatous cupping of >0.7:1CDR. Out of 220 eyes, 132 (60.00%) had nuclear cataract, 73 (33.18%) had senile immature cataract, 14 (6.37%) had senile mature cataract and one patient had hyper mature cataract.

TABLE 1: Age distribution in pseudoexfoliation: (N=137)

Age (Years)	No. of Patients (n)	Percentage (%)
< 30	1	0.7
31 -40	3	2.1
41 -50	20	14.5
51-60	26	18.97
61-70	38	27.7
>70	49	35.7
Total	137	100

Table 2: Gender distribution In pseudoexfoliation: (N=50)

Sex	No. of Patients (n)	Percentage (%)
Male	79	57.6
Female	58	42.4
Total	137	100

Table 3: Laterality Distribution In Pseudoexfoliation: (N= 137)

Laterality	No. of Patients (No. of Eyes)	Percentage (%)
Unilateral	54 (54 Eyes)	39.4
Bilateral	83 (166 Eyes)	60.6
Total	137 (220 Eyes)	100

Table 4: Distribution of Pseudo exfoliative Material

Distribution of Pseudo Exfoliative Material	No. of Eyes (n)	Percentage (%)
Pupillary Margins	212	96.36
Anterior Lens Capsule	189	85.90
Angle of Anterior Chamber	151	68.63

TABLE 5: Gonioscopy Grading Angle of Anterior Chamber (N=220 Eyes)

Angle of Anterior Chamber	No. of Eyes (n)	Percentage (%)
Grade III-IV	204	92.72
Grade II-III	14	6.36
Grade < II	2	0.90
Total	220	100

Table 6: Intraocular Pressure and Visual Field Assessment

Parameter	Number of Eyes (n=220)	Percentage (%)
Intraocular Pressure (IOP)		
IOP < 21 mm Hg	154	66.82
IOP > 21 mm Hg	66	33.18
Visual Field and Optic Disc Cupping		
Normal Visual Fields and Cupping < 0.7:1 CDR	143	65.00
Abnormal Visual Fields and Cupping > 0.7:1 CDR	77	35.00

Table 7: Types of Cataract

Type of Cataract	Number of Eyes (n=220)	Percentage (%)
Nuclear Cataract	132	60.00
Senile Immature Cataract	73	33.18
Senile Mature Cataract	14	6.37
Hypermature Cataract	1	0.45

Discussion

This was a prospective study conducted on 137 patients (220 eyes) with pseudo exfoliation.

Age incidence of pseudo exfoliation on lens: Pseudo exfoliation of lens rarely occurs below 50 years of age. The study literature shows the highest incidence of the condition to occur between 60 -80 years. Arvind H et al [9], Shazly et al, [8] S learner et al [9] reported that the mean age of subjects with pseudo exfoliation was 64.7, 68.15 and 72.94 years respectively. Wani Fouzia R et al [10], Yeshigeta G. et al, [11] found that 64.7% and 67.8% of patients belong to age group > 60 years respectively. In the present study, the mean age of pseudo exfoliation

was 68.04 years. 65.4 % of patients were in the age group of age group of 51-60 and above, which is comparable with previous studies. This indicates that pseudoexfoliation is a disease of old age with highest incidence after 60 years of age. Gender distribution: Though pseudoexfoliation is generally found to occur some years earlier in males than females there is no appreciable sex preference. Yeshigeta G. et al [11], found 68.75% male incidence against 31.25% female incidence, with M:F – 2.2:1. Rashad Qamar Rao et al [12], Shazly et al [8], Arvind H Paul⁷ found no statistically significant difference in sex distribution among pseudoexfoliation patients. In present study, Out of 137 patients, 79 (57.6%) were Males and 58(42.3%)

were Females. Male : Female ratio was 1.36:1 which showed no statistically significant sex predilection. Male predominance in studies by Yeshigeta et al [11], can be attributed to racial difference. Laterality: Most researchers have found that bilateral incidence of pseudoexfoliation. Kozobolis et al [13], reported 27.2% of unilateral PXF and 72.8% of bilateral PXF, Yeshigeta et al [11], Tliksew et al [14], Shazly et al [8] found unilateral pseudoexfoliation in 33.3%, 37.8%, 17.8% and bilateral pseudo exfoliation in 66.7%, 62.2%, 82.2% cases respectively. In present study Out of 137 patients 54 (39.4%) were having unilateral pseudoexfoliation, 83 patients (60.6%) were having bilateral pseudoexfoliation, which is comparable with previous studies. This suggested that unilateral PXF is in fact a bilateral but asymmetric condition. Percentage of unilateral disease decreased with a corresponding increase in bilateral disease with increasing age. Distribution of pseudo exfoliative material: Pseudo exfoliation material appears as deposits of granular material likened to coarse white powder occurring on the anterior lens capsule, pupil margin, zonules, ciliary body, iris crypts, in the anterior chamber angle and floating freely in aqueous. [15] Qamar Rao et al [12], Yeshigeta et al, [11] and Wani Fouzia et al, [10] noted Flakes at pupillary margin in 81.7%, 95.2% and 76.5% cases respectively. Alan P Rotchford et al¹⁶ showed that exfoliative material was present at pupillary border in majority of patients. Present study showed presence of pseudo exfoliative material in 96.36% indicating that it is a common site where exfoliative material gets deposited, could be due to rubbing of exfoliated material from anterior surface of lens capsule due to pupillary movement. The pseudoexfoliation material on anterior lens capsule is initially continuous and movement of iris rubs off the material immediately under its border, resulting in formation of lacunae between the central and peripheral zones. Exfoliative material was seen on anterior lens capsule in 22.6% by Wani Fouzia R¹⁰ but Rashad Qamar Rao, et al [12] reported presence of pseudo exfoliative material on lens capsule in 98.3% of cases. Present study shows the presence of pseudo exfoliative material on anterior lens capsule (peripheral band) in 85.90%. Pseudo exfoliative material was found in angle of anterior chamber in 56.7% cases by Rashad Qamar Rao et al¹². Present study shows flakes of pseudo exfoliative material in the angle of anterior chamber in 68.63%, which is comparable with the previous studies. Intraocular pressure: There is significant association between high intraocular pressure and pseudoexfoliation. Wani Fouzia et al [10], Rashad Qamar Rao et al¹², Yeshigeta et al [11], reported raised intraocular pressure in 25%, 40%, 28.5% of patients respectively. In present study 33.18 % had an intraocular pressure more than 21 mm Hg, which is comparable with the previous studies. Glaucoma in

pseudo exfoliation: A significantly higher prevalence of ocular hypertension and glaucoma is observed in PXF eyes when compared with normal eyes. Shazly et al⁸, Wani Fouzia et al¹⁰, Yeshigeta et al¹¹, reported pseudoexfoliation glaucoma in 30.31%, 38.3%, 28.5% respectively. In the present study pseudoexfoliation glaucoma was found in 35% of patients with pseudoexfoliation, which is comparable with the previous studies. Type of cataract in pseudo exfoliation: Pseudo exfoliation is associated with increased incidence of nuclear sclerosis. H. Arvind et al⁷, reported nuclear sclerosis in 67.1%, Yeshigeta et al¹¹ reported nuclear sclerosis in 41%. In the present study nuclear cataract is seen in 60%, which is comparable with previous studies.

Conclusion

Pseudoexfoliation is a degenerative disease of basement membrane, which increases with the age, hence more commonly seen in older age group. Pseudoexfoliation initially starts as unilateral disease and progresses to other eye as the age advances. In the eye, the fibrillar pseudo exfoliative material is commonly seen at pupillary margins, anterior lens capsule and angle of anterior chamber. Pseudoexfoliation is associated with open angles and flakes of pseudo exfoliative material are seen in angle of anterior chamber on gonioscopy. Most common type of cataract associated with pseudoexfoliation is nuclear cataract. From this study we infer that all patients with pseudoexfoliation should be evaluated for glaucoma.

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