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Original Research Article

Pseudoexfoliation Syndrome: A Clinical Study of Glaucoma

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Abstract

Background: The most often recognized cause of secondary glaucoma is pseudoexfoliation syndrome (PXS), which has varying degrees of frequency among different ethnic groups (PXF). The disease known as pseudoexfoliation is inherited genetically. As people age, pseudoexfoliation becomes more common. It is a prevalent ailment among the elderly. The most common ocular sign of a systemic illness and the primary cause of secondary open-angle glaucoma is pseudoexfoliation syndrome (PXS). Due to the subtle and uneven progression of this illness, PXS glaucoma frequently manifests at a much-advanced stage at the time of diagnosis. This syndrome is characterized by a markedly increased intraocular pressure (IOP), most typically with an open angle. While not every PXS patient will experience glaucoma, it is impossible to accurately anticipate which PXS syndrome individuals will experience optic nerve injury and eventual visual loss.

Aim: The aim of this study was to describe the clinical characteristics of glaucomatous in treated patients with pseudoexfoliative glaucoma.

Material and Method: This is observational research that the ophthalmology department has been conducting. The study comprised 100 individuals who visited the Department of Ophthalmology and had pseudoexfoliation syndrome. The presence of pseudoexfoliation material on the pupillary border and/or lens was the criterion used to select the patient for the investigation. In the majority of instances, the pupil was dilated as usual in order to observe the three zones of pseudoexfoliation material on the lens capsule. All patients underwent a comprehensive glaucoma workup that included measurements of visual acuity, tonography, perimetry using a Bjerrum screen, tonometer with Schiotz tonometer, and gonioscopy using Goldmann three-mirror lens. Every patient received a thorough evaluation that included a gonioscopy, intraocular pressure monitoring, slit lamp biomicroscope, ophthalmic and general history, and comprehensive eye examination.

Results: The mean age was 68.47±9.37 years. Among the study population, 3 (3%) were aged up to 50 years, 15 (15%) were aged between 51 to 60 years, 33 (33%) were aged between 61 to 70 years, 43 (43 %) were aged between 71 to 80 years and remaining 6 (6 %) were aged 81 years and above. Among the study population, 65 (65%) participants were male and the remaining 35 (35%) were female. Among the study, population 20 (20%) eyes had a gonioscopy PXF angle. Among the study population, 70 (70%) eyes had gonioscopy pigments. Among the study population, 45 (45%) eyes had gonioscopy Sampaolesi's line. Among the study population, 59 (59%) eyes had GONIOSCOPY Shaffer's Grade IV, 22 (22%) eyes had Grade III, 11 (11%) had Grade II and the remaining 8 (8%) eyes had GONIOSCOPY Shaffer's grade I.

Conclusion: The current study contributes to the understanding of pseudoexfoliation's prevalence and associated problems. Pseudoexfoliation is becoming more common in the population, as are its repercussions. Because it is more common in the elderly, there is a greater need to be mindful of pseudoexfoliation. Many comorbidities result from delaying obtaining medical attention. One prevalent age-related disease is pseudoexfoliation. Pseudoexfoliation can occur in a variety of populations, but it is most common in the elderly.

Keywords: Pseudoexfoliation Syndrome, Complications, Glaucoma, Iris pigmentation, Pupil and Pseudoexfoliative Glaucoma.

Introduction

First reported by Lindberg in 1917, pseudoexfoliation syndrome (PXS) is typified by the deposition of characteristic fibrillar extracellular material in the anterior portion of the eye. [1] It is often linked to pseudoexfoliation glaucoma, a type of pen angle glaucoma. Pseudoexfoliation syndrome can result in corneal epitheliopathy, zonular weakness, inadequate mydriasis, elevated intraocular pressure, and a high

rate of vitreous loss following cataract surgery. The most serious co-morbidity linked to pseudoexfoliation syndrome is glaucoma. Pseudoexfoliation material deposition, endothelial pigmentation, pupillary ruff loss, and iris Date of receipt of manuscript: August 20, 2019 Review date: August 30, 2019 Updated by the author on September 8, 2019 Date of Acceptance for Publication: September 13, 2019 The clinical manifestation of pseudoexfoliation syndrome includes pigment accumulation in the trabecular meshwork, sampaolesis line, and sphincter transillumination abnormalities. [2] The misdiagnosis of pseudoexfoliation syndrome can be attributed to the examiner's low index of suspicion, failure to dilate the pupil, or failure to inspect the lens with a slit lamp following dilation. [2]

It was in 1971 when John Lindberg, a Finnish ophthalmologist, first documented the symptoms of pseudoexfoliation syndrome (XFS). [3] Between 0.3% and 30% of individuals 60 years of age or older are affected, out of an estimated 60 to 70 million persons globally. [4,5] Extracellular fibrillar material (XFS) is produced and deposited in several ocular and extraocular tissues, and it is an age-related systemic illness. [6] XFS is a thin, "dandruff-like" substance that is normally found on the anterior lens capsule of the eye. However, it can also deposit on the corneal endothelium, pupillary margin, lens zonules, trabecular meshwork, and the face of the ciliary body. [7] The prevalence of some intraocular disorders, such as glaucoma, cataract, lens subluxation, iris atrophy, or keratopathy resembling Fuchs keratopathy, is impacted by the presence of exfoliation material in the eye. [8]

Most cases of pseudoexfoliation syndrome are asymptomatic, and the rise in intraocular pressure is typically painless. For the majority of patients, it causes a delay in the diagnosis of pseudoexfoliation syndrome. Pseudoexfoliation syndrome risk may rise with a delayed diagnosis. Between 10 and 20 percent of those over 60 have pseudoexfoliation syndrome, depending on the region. [9] In India, it ranges from 1.8% to 7.4% over the age of 45 years. [10] The condition known as pseudoexfoliation syndrome is more common in women. About 25% of cases of open-angle glaucoma are brought on by pseudoexfoliation syndrome. Pseudoexfoliation syndrome is not the same in any age group, gender, race, ethnicity, or population. [11]

About 25% of XFS eyes experience elevated intraocular pressure, either with or without glaucomatous neuropathy. [12] Secondary open-angle glaucoma most commonly manifests as pseudoexfoliative glaucoma (XFG). [13] It has been established that XFS poses a substantial risk for developing glaucoma; in eyes with pseudoexfoliation syndrome, glaucoma is six to ten times more common than in eyes without the condition. [14] The exact cause of the pathogenesis of glaucoma during XFS is still unknown, although several theories have been proposed, including the mechanical obstruction of the trabecular meshwork (TM) brought on by exfoliation material and ischemic or molecular insults that result in irreversible tissue damage. [15]

Publications about the epidemiology of XFS abound, but epidemiological information about pseudoexfoliative glaucoma is hard to come by. The goal of the current investigation is to identify the clinical characteristics and different consequences linked to pseudoexfoliation syndrome. to compile information on the frequency of ocular clinical profile of pattern and complications in patients using pseudo-exfoliative substance who visit the hospital's general ophthalmology outpatient department.

Material and Methods

This is an observational research that the ophthalmology department has been conducting. The study comprised 100 individuals who visited the Department of Ophthalmology and had pseudoexfoliation syndrome. The presence of pseudoexfoliation material on the pupillary border and/or lens was the criterion used to select the patient for the investigation. In the majority of instances, the pupil was dilated as usual in order to observe the three zones of pseudoexfoliation material on the lens capsule. Every patient received a comprehensive glaucoma workup that included measurements of visual acuity, a tonometer using a Schiotz tonometer, tonography, perimetry using a Bjerrum screen, and gonioscopy using a Goldmann three-mirror lens. The angle's condition was evaluated using gonioscopy, and it was observed that the angle had more pigmentation and pseudoexfoliation material. A questionnaire was used to gather information about the duration, family history, and history of chronic general illnesses as well as glaucoma.

Inclusion Criteria

- Age more than 45years
- All eyes with pseudoexfoliative material were included

Exclusion Criteria

- Previous intraocular surgery.
- History of trauma, uveitis.
- Significant corneal opacities obscure the anterior segment structures.
- Any ocular pathology that could have led to secondary glaucoma.
- Those patients who refuse to give consent

Examination and Investigations: A comprehensive clinical history was obtained, covering the primary complaint, the length of the

illness, and any additional pertinent past events. Both local and general examinations are part of a comprehensive clinical evaluation. This comprises the following: a general assessment, vital signs, anemia, icterus, cyanosis, clubbing, pedal edema, lymphadenopathy, and an examination of the respiratory and cardiovascular systems.

Ocular Examination: Both eyes' visual acuity was measured using a pinhole and without assistance. A slit lamp examination was performed on each patient following phenylephrine mydriasis. The development of greyish white flaky deposits that resembled dandruff on the iris's papillary margin, the anterior capsule of the lens in the papillary, the retro-iridal section, the zona (where visible), and the anterior face of the vitreous led to the diagnosis of exfoliation of the eye. Transillumination deficiencies are caused by the dispersion of pigment from the iris, particularly in the atrophic regions. Deposits of pigment cover the anterior capsule of the lens and the posterior surface of the cornea. After that, a gonioscopy examination was performed in a dark room using a short, narrow slit-beam gonioscope in order to prevent constriction of the pupil and artificial opening of the angle. In order to anesthetize this cornea, 0.5% proparacaine eye drops were injected into the conjunctival sac. An analysis was conducted on the anterior chamber angle. Optical Coherence Tomography was used to assess the retinal nerve fiber layer.

All patients underwent intraocular pressure measurement using a Goldman applanation tonometer following corneal anesthesia with 0.5% proparacaine eye drops in the conjunctival sac. Every time it was feasible, an ophthalmoscopic examination was conducted. Ocular hypertension was defined as eyes with intraocular pressure greater than 21 mm Hg but normal visual fields and optic discs. Glaucoma was defined as eyes with intraocular pressure greater than 21 mm Hg, glaucomatous cupping, and visual field loss.

Statistical Analysis: Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency, and proportion for categorical variables. The association between explanatory variables and categorical outcomes was assessed by cross-tabulation and comparison of percentages.

Result:

A total of 100 subjects were included in the final analysis.

Table 1: Descriptive analysis of age, and gender in the study population (N=100)

Parameter	Summary
Age Mean ± SD	62.44±7.33
Age group	
Up to 50 years	3 (3%)
51 to 60	15 (15%)
61 to 70	33 (33%)
71 to 80	43 (43%)
81 years and above	6 (6%)
Gender	
Male	65 (65%)
Female	35 (35%)

The mean age was 68.47±9.37 years. Among the study population, 3 were aged up to 50 years, 15 were aged between 51 to 60 years, 33 were aged between 61 to 70 years, 43 were aged between 71 to 80 years and remaining 6 were aged 81 years and above. Among the study population, 65 participants were male and the remaining 35 were female.

Table 2: Summary of Gonioscope Findings

Gonioscopy PXF in angle	
Present	20 (20%)
Absent	80 (80%)
Gonioscopy Pigments	
Present	70 (70%)
Absent	30 (30%)
Gonioscopy Sampaolesi's line	
Present	45 (45%)
Absent	55 (55%)
Gonioscopy Shaffer's Grade	
Grade IV	59 (59%)
Grade III	22 (22%)
Grade II	11 (11%)
Grade I	8 (8%)

Among the study, population 20 eyes had a gonioscopy PXF angle. Among the study population, 70 eyes had gonioscopy pigments. Among the study population, 45 eyes had gonioscopy Sampaolesi's line. Among the study population, 59 eyes had GONIOSCOPY Shaffer's Grade IV, 22 eyes had Grade III, 11 had Grade II and the remaining 8 eyes had GONIOSCOPY Shaffer's grade I.

Table 3: Visual status in pseudo-exfoliative glaucoma subjects

Visual Acuity	No. of Eyes	Percentage
No PL	2	9.52%
PL-3/60	13	61.90%
4/60-6/36	4	19.04%
6/24-6/6	2	9.52%
Total	**21**	**100%**

Among the study population 2 (9.52%) had no PL, 13 (61.90%) had PL – 3/60, 4 (21.74%) had visual activity 4/ 60-6/36, 4 (19.04%) had visual activity 6/24-6/6.

Discussion

The most common cause of both open- and closed-angle glaucoma globally is pseudoexfoliation. It is linked to delayed dislocation of the intraocular and crystalline lenses as well as zonular weakening. The geography and study design may have an impact on the prevalence of pseudoexfoliation. The prevalence in the majority of the research is between 0.69 and 23%. It ranged from 0.69 to 3.8% in the Indian population. [16] When pseudoexfoliation is present, cataract surgical problems may arise more frequently. The prevalence and complications of pseudo-exfoliation were ascertained in the current investigation.

Arnarsson et al. 2007 [17] found that the prevalence of XFS increases significantly with age: 2.5% of people aged 50–59 years had XFS; whereas 40.6% of those aged 80 years or more were affected. Numerous studies confirm greater rates of prevalence with increasing age [18] but when adjusting for age and gender, the life span was not statistically different in persons with and without XFS. [19]

It resembles Sathish, G. et al. 2018 [20], a study conducted in a population of 22 pseudoexfoliation patients in which 53%was belonged to the age group of 71-80 years 53% followed by the age group of 61- 70 years 27%. The prevalence and mean age of pseudoexfoliation may vary based on age, race, and geographic location.

Joshi, R., et al. 2019 [16], conducted a study in which out of 226 pseudoexfoliation cases, 119 patients were males (52.7%) and 107 were females (47.3%). In most of the studies, the predominance of males was more as compared to females. In a study performed by Hemalatha, B.C. et al 2016 [21], out of 50 cases, 32 were male patients, and 18 were female patients. High ultraviolet exposure may be one of the reasons for male predominance in the Indian population.

Sharma, P. et al. 2013 [22], conducted a study in a population of 93pseudo exfoliation patients in which 49.4% showed pigments on the corneal endothelium and 8.23% have phacodonesis. The presence of the corneal endothelium pigments and phacodonesis helps to identify patients with pseudoexfoliation. Sharma, P. et al 2011 [22], a study in which 84.7% of patients were identified with the pseudoexfoliation material on the pupillary margin. Among the study population, 65.13% of eyes had anterior lens capsule PXF in the pupil. In Sharma, P. et al 2011 [22], the study performed in a population of 93 patients 91.7% showed pseudoexfoliation material on the anterior capsule of the lens.

In Sharma, P. et al. 2011 [22], study intraocular pressure was normal in 79.4% of pseudoexfoliation patients. Glaucoma and ocular hypertension were found in 1.8% and 18.8% of subjects, respectively. When compared to glaucoma sufferers, ocular hypertension is more common. Patients with ocular hypertension may develop glaucoma if pseudo exfoliation is not diagnosed in a timely manner.

A decline in ocular activity is correlated with an increase in pseudoexfoliation prevalence. Damage to the optic nerve and visual field may result from elevated intraocular pressure and patients' inadequate response to treatment. Poor vision may eventually result from it.

Stein et al.2011 [23] reported an increased PXS frequency with an increase in the annual number of sunny days. Sufi et al.2014 [24] showed an increased prevalence of PXS in people exposed to outdoor activity. Since agriculture is the primary source of income for most people in rural Kashmir, they are likely to be exposed to outdoor activities. This corroborates the relationship between environmental factors (potential UV exposure, solar radiation) and PXS reported by other studies. In general, the agricultural lifestyle of the Arabic and Kurdish populations may account for the higher incidence of PXS among them; however, we were unable to investigate this theory because we did not gather comprehensive data on sun exposure. [25]

Patients who have had pseudoexfoliation react better to combination medications than to single medications, and they respond better to surgical therapy than to medicinal therapy. Pseudoexfoliation patients are more likely to experience posterior capsular tears, and vitreous loss after cataract surgery can be minimized by planning beforehand. There are several restrictions on our investigation. It speaks about patients who receive care in a glaucoma specialty clinic, which may only treat those with the most advanced stages and forms of the condition. Furthermore, since the illness is asymptomatic, referral bias may have arisen; one potential complicating factor is the lower frequency with which females in the community seek out eye examinations.

Conclusion:

The current study contributes to the understanding of pseudoexfoliation's prevalence and associated problems. Pseudoexfoliation is becoming more common in the population, as are its repercussions. Because it is more common in the elderly, there is a greater need to be mindful of pseudoexfoliation. Many comorbidities result from delaying obtaining medical attention. One prevalent age-related disease is pseudoexfoliation. Pseudoexfoliation can occur in a variety of populations, but it is most common in the elderly. It raises the risks associated with cataract surgery. Prompt identification and efficient handling might lessen the side effects linked to pseudoexfoliation. In order to understand the distinct epidemiology of PXS in our local population, we suggest doing a more extensive prospective study that examines the prevalence of PXS in the neighborhood. PXS is a significant risk factor for glaucoma; individuals with PXS syndrome should be aware of this and have an annual examination because the risk may always exist.

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