Clinical Survey of Pseudoexfoliation Syndrome

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Abstract

Objective: Assess the prevalence of PEX and identify the associated glaucoma and cataract.

Study Design and Methodology: A sample of 6,650 patients (age ≥40 years) that attended the single ophthalmic private clinic for different complaints, for five years (January 2013 until January 2018), those diagnosed with PEX enrolled in this study, with a total number of 296 patients.

Results: 14 (4.7%) patients with age from 40-49 years, 54(18.2%) from 50-59 years, 102 (34.5%) from 60-69 years, and 126(42.6%) equal or older than 70 years. Close sex frequencies were observed, with 153(51.7%) males, and 143(48.3%) females. In the current study, the prevalence of PEX was 4.45% (95% confidence interval (CI), 3.98-4.97). There was a statistically insignificant relationship between PEG or advanced glaucoma with age or sex, but cataract was significantly associated with older age and male sex.

Conclusion: The prevalence of Pseudoexfoliation syndrome was 4.45%, with a sharp increase after the age of 50 years. Although the prevalence of PEG and advanced glaucoma increased with age, it was neither statistically associated with it, nor with sex. Cataract prevalence was associated with increased age and male sex.

Keywords: pseudoexfoliation, glaucoma, cataract, age, gender

1. Introduction

Pseudoexfoliation (PEX) syndrome is defined as an age-related disorder of the extracellular matrix with characteristic production with an accumulation of a fibrillary material progressively in different intraocular and extraocular tissues (Anastasopoulos, Founti, & Topouzis, 2015). PEX is strongly associated with developing glaucoma (Ritch & Schlotzer-Schrehardt, 2001). Pseudoexfoliative glaucoma (PEG) regarded as the commonest type of secondary open-angle glaucoma (Ritch, 2001), and usually with higher intraocular pressure, more clinically serious course and worse prognosis compared to primary open-angle glaucoma (POAG) (Heijl, Bengtsson, Hyman, & Leske, 2009; Hyman, Heijl, Leske, Bengtsson, & Yang, 2010; Leske et al., 2007).

Some population-based studies have shown a cross-sectional association of cataract with PEX, this could be due to alterations in the vasculature of iris and blood-aqueous barrier, and this affects the aqueous composition and subsequently could affect the lens metabolism, resulting in the formation of cataract (Kanthan, Mitchell, Burlutsky, Rochtchina, & Wang, 2013). In the current study, the aim was to assess the prevalence of Pseudoexfoliation syndrome and to identify its associated complications; namely glaucoma and cataract.

2. Method

2.1 Study Design and Setting

The total sample of patients was 6,650 patients who attended a private ophthalmic center, for a period of 5 years, from January 2013 until January 2018, all undergone full ocular examination with slit-lamp biomicroscopy examination before and after full pupillary dilatation and then there were 296 patients diagnosed with ocular Pseudoexfoliation, which were enrolled in this study.

2.2 Eye Examination

Further ocular examination included; applanation tonometry, standard visual field perimetry, and optical coherence tomography for assessment of functional and structural changes. The presence of cataract, glaucoma (Pseudoexfoliation and advanced), history of diabetes, hypertension, or ischemic heart disease were all

documented.

Advanced glaucoma defined as optic nerve near total cupping with/without severe loss of visual field within 10° of point of fixation, indicating a scotoma encroaching on fixation or splitting it (Gessesse & Damji, 2013).

2.3 Ethical Clearance

All of the participants provided their written consent to participate in this research after they were fully educated about the nature of the study. This study was approved by the scientific, ethical committee of the Fayha General Hospital. The study and all its procedure were done in accordance with the Helsinki Declaration of 1975, as revised in 2000.

2.4 Statistical Analysis

The data was handled and analyzed by IBM© SPSS© (Statistical Package for the Social Sciences) Statistics Version 22. Chi-square (with 95% Confidence Interval) was the test used for categorical data, and *P-values* less than 0.05 were considered statistically significant throughout this study.

3. Results

In the current study, the prevalence of Pseudoexfoliation syndrome was 4.45% (95% confidence interval (CI), 3.98-4.97). The most common age group was ≥70 years which is slightly higher than 60-69 years, similar distribution of gender observed, in this sample of patients DM, hypertension and IHD frequency was low as illustrated in Table 1.

Table 1. Demographic and clinical characteristic

Variables		Number	%
Age groups	40-49	14	4.7
	50-59	54	18.2
	60-69	102	34.5
	≥70	126	42.6
Sex	Male	153	51.7
	Female	143	48.3
Diabetes mellitus		22	7.4
Hypertension		35	11.8
Ischemic heart diseases		3	1.0

There was no significant association between Pseudoexfoliative glaucoma (PEG) and advanced glaucoma with age, while cataract show statistically significant association with age in which advanced age group association with higher frequency of cataract, as illustrated in Table 2.

Table 2. Association between age groups with Pseudoexfoliative glaucoma, advanced glaucoma, and Cataract

Age groups	40-49	50-59	60-69	≥70	p-value
Pseudoexfoliative glaucoma, n (%)					
Present (110)	5 (35.7)	18 (33.3)	42 (41.2)	45 (35.7)	0.761
Absent (186)	9 (64.3)	36 (66.7)	60 (58.8)	81 (64.3)	
Advanced glaucoma, n (%)					
Present (84)	4 (28.6)	12 (22.2)	34 (33.3)	34 (27.0)	0.501
Absent (212)	10 (71.4)	42 (77.8)	68 (66.7)	92 (73.0)	
Cataract, n (%)					
Present (127)	0 (0.0)	12 (22.2)	48 (47.1)	67 (53.2)	<0.001
Absent (169)	14 (100.0)	42 (77.8)	54 (52.9)	59 (46.8)	

There was no significant association between Pseudoexfoliative glaucoma (PEG) and advanced glaucoma with gender, while cataract show statistically significant association with gender in which male show higher association with cataract, as illustrated in Table 3.

Table 3. Association between gender with Pseudoexfoliative glaucoma, advanced glaucoma, and Cataract

Gender	Male	Female	p-value
Pseudoexfoliative glaucoma, n (%)			
Present (110)	60 (54.5)	50 (45.5)	0.450
Absent (186)	93 (50.0%)	93 (50.0)	
Advanced glaucoma, n (%)			
Present (84)	48 (57.1)	36 (42.9)	0.237
Absent (212)	105 (49.5)	107 (50.5)	
Cataract, n (%)			
Present (127)	120 (94.5)	33 (19.5)	<0.001
Absent (169)	7 (5.5)	136 (80.5)	

4. Discussion

In the current study the prevalence of Pseudoexfoliation syndrome was 4.45% (95% confidence interval (CI), 3.98-4.97), this prevalence was comparable to results reported by Vijaya et al. (2015) (Vijaya et al., 2015) who examined 7774 subjects in south India, then followed them for six years, and found the prevalence of Pseudoexfoliation syndrome among that population to be 3.73% (95% CI, 3.73-4.2), also in another study done by Jasna Pavičić-Astaloš, et al. (2016) in north-west Croatia (Pavičić-Astaloš et al., 2016), which included 5349 subjects and found the prevalence of Pseudoexfoliation syndrome among them to be 3.6%, it's well known that the prevalence differs with age, sex, and more importantly with the geographic location of a population and ethnicity, also genetic predisposition like LOLX1 variants (Anastasopoulos, Founti & Topouzis, 2015).

In the current study the prevalence of Pseudoexfoliation syndrome clearly increased with age, and this was compared to results of Jonas et al. (2013) (Jonas et al., 2013) in central India, who enrolled 4646 subjects and detected PES in 87 patients, and found that the prevalence was significantly related to age, although it's proven from the definition of the disease itself that it is age-related, but consistency of this proved that there was no shift of the disease to involve a lower age population.

In the current study, sex distribution of PEX was very similar with males forming 51.7% compared to 48.3% females, similar results were reported by Vijaya et al. (2015), with 44.7% male and 55.4% female, but Raşit Kılıç (2014) in Turkey (Kılıç et al., 2014) reported more male predominance with 66.04% male compared to 33.96% females, in their study which identified PEX in 212 (10.1%) of the total 2103 participant, but another earlier Turkish study done by Cumurcu et al. (2010) (Cumurcu, Kilic, & Yologlu, 2010) reported no sex difference in PEX prevalence.

The prevalence of diabetes mellitus, hypertension, and IHD was relatively low in the current study, and these findings supported the results of Thessaloniki Eye Study, done by Anastasopoulos, et al. (2011) (Anastasopoulos et al., 2011) who found no relationship between these diseases and PEX, but in a review done by Andrikopoulos, et al. (2014) (Andrikopoulos, Alexopoulos, & Gartaganis, 2014) they mentioned that PEX could by a risk factor for developing cardiovascular disease or they are different manifestations of the same pathologic condition.

In the current study the prevalence of PEG was 110(37.2%), and the prevalence of advanced glaucoma cases from them was 84(28.4%), and although showed statistically insignificant relationship with age and with sex, there was an increase in prevalence of PEG and advanced glaucoma with increasing age and slightly more in males, this result was comparable to results of Jasna Pavičić-Astaloš, et al. (Pavičić-Astaloš et al., 2016) who showed the prevalence of PEG to be 23.6% with no sex difference, also the result of Seng Lee (2015) in Singapore (Lee, Wong, & Ho, 2015) showed that the mean age for PEX patients with or without PEG had no statistically significant difference, and there were statistically significant more males having PEG than females, on the other hand, Jonas, et al., (Jonas et al., 2013) reported that after age adjustment for a multivariate analysis; PEX was not related to open-angle glaucoma. Another study was done by Tanushree and Gowda, (2014) in India, they examined 100

patients diagnosed with PEX and screened them for glaucoma, 17.0% of them had PEG, 10 (58.8%) was male and 7(41.2%) were females, who also reported that, although the prevalence of PEX was higher in females, PEG was more in male. In contrast to this, a large cohort study in the USA done by Kang et al. (2012) (Kang, Loomis, Wiggs, Stein, & Pasquale, 2012) showed that male was 68% less likely to develop PEG than women, this varying reports about sex and PEG indicates that there are still undiscovered confounder factors that bias the results of each study toward a certain sex.

The prevalence of cataract among patients with PEX in the current study was 42.9%, which was comparable to the results of Yildirim, et al. (2017) (Yildirim, Yasar, Gursoy, & Colak, 2017) in Turkey, who reported that 55.0% of the 100 patients with PEX suffered cataract compared to 35.0% of the 1909 other subjects without PEX. The current study showed that there was a statistically significant association between older age groups and male sex with cataract. It known that cataract prevalence increases with age in patients with PEX or without it (Plateroti, Plateroti, Abdolrahimzadeh, & Scuderi, 2015). In the current study males with cataract were the majority 120(94.5%) compared to females 7(5.5%), a less than this male predominance was reported by Gelaw et al. (2012) in south-east Ethiopia (Gelaw & Tibebu, 2012) with 68.7% male compared to 31.3% of females suffering from cataract and Pseudoexfoliation, this higher male ratio might be explained as male are usually independent and can have access to medical care easier than female in such societies.

5. Conclusion

The prevalence of Pseudoexfoliation syndrome was 4.45% (95% confidence interval (CI), 3.98-4.97), with a sharp increase after the age of 50 years. Although the prevalence of PEG and advanced glaucoma increased with age, it was neither statistically associated with it, nor with sex. Cataract prevalence was associated with increased age and male sex.

Acknowledgments

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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