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Research Article

Pseudoexfoliative Syndrome with Age-Related Cataracts in Residents of the South of Russia

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Abstract

Introduction: The problem of age-related cataract is a major world medical and social problem, inevitably accompanying an increase in life expectancy, because cataract is the main cause of reversible blindness in the world. Pseudoexfoliation syndrome (PEX) - system dystrophic process clinically reflecting the eyeball. Known for high frequency combination PEX age cataract and its prevalence in the Nordic countries. Dystrophic changes in PEX increases the risk of complications during surgical removal of cataracts in five, increasing to 49.4%.

Aim: The aim of the study is to study the clinical features of the ocular manifestations of Age-related cataracts in pseudoexfoliative syndrome in residents of the southern territories of Russia.

Materials and Methods: A total of 179 patients were surveyed with age-related cataracts (277 eyes). Of these, 75 patients have identified PEX and age-related cataracts (41.9%, 114 eyes), the rest of the 104 patients with age-related cataracts had no PEX (58.1%, 163 eyes).

Results: The comparative analysis of the data of patients with age-related cataracts on the background of PEX and without him, received a comprehensive survey of traditional and special eye techniques.

Conclusion: Received information about the features of age-related cataract, emerging against the backdrop of PEX syndrome in the inhabitants of the southern territories of Russia.

Keywords: *Age-Related Cataracts; Pseudoexfoliation Syndrome (PEX); Regional and Clinical Features; Southern Regions of the Russia*

Introduction

Age-related cataracts are currently considered as the most important world medical and social problem, inevitably accompanying an increase in life expectancy [1-4]. The most common cause of curable blindness in the world is clouding of the lens, the proportion of which is 47% of the total number of eye diseases [4]. By the age of 80, cataracts are found in most of the population [5]. In the U.S., cataracts account for about 50% of all visual impairment in adults over the age of 40 [6]. The tendency to increase the frequency and "rejuvenation" of Age-related cataracts is observed in all regions of the Russian Federation. According to E.S. Libman (2011), the prevalence of Age-

related cataracts in Russia in terms of circulation was 1201.5 per 100 thousand population, in absolute figures - 1,742,250 people, or 6.8% in the general structure of eye diseases [4]. The incidence of Age-related cataracts in the Amur Region for the period 1990-2012 in the structure of general ophthalmopathology increased by 11.5% [7]. In Russia, there was an increase in the frequency of cataracts among people of working age [8]. In hot countries, cataracts differ significantly from cataracts in other places, which is due to climatic and geographical features (early development, predominance in men, rapid progression, large size and brown color of the lens nucleus) [9]. Further study of the regional features of age-related cataracts in different places of the planet is needed to prevent complications and increase the effectiveness of surgical treatment [9]. It is known that natural trigger factors of hot countries (increased insolation) lead to the appearance and progression of cloudiness in the lens [10]. According to [11], in the Southern, North Caucasian and Crimean Federal Districts in 2015, a total of more than 335,180 patients with cataracts were registered. In the Krasnodar region in 2015, there were 82,568 patients with cataracts, while the frequency was 1514.1 per 100 thousand people, which exceeds the figures given [4]. All of the above facts have determined the interest in studying the regional features of Age-related cataracts in the southern regions of Russia, especially in cases where cataracts are accompanied by ocular pseudoexfoliative syndrome (PEX). The development of PEX almost always leads to the appearance and progression of cataracts, the frequency of their companionship is 24 - 70%. According to most researchers, PEX is considered as a systemic dystrophic process [12]. Pseudoexfoliative material is found, in addition to the eyeball, in the endothelium of blood vessels, skin, liver, heart, kidneys, brain membranes [13,14]. It is known that the risk of PEX is determined by geographical and hereditary components, with an increase in frequency from southern to northern countries [14-16]. A key role in the occurrence of PEX is assigned to ultraviolet radiation, as it induces free radical oxidation and destruction of cell bio membranes [17-20]. It is known that among persons over 60 years of age, PEX is found in more than 1/3 [21-23]. Dystrophic changes that occur in PEX increase the risk of intra- and postoperative complications and reduce the effectiveness of cataract surgical treatment [16-21,24]. Thus, the problem of studying Age-related cataracts occurring against the background of pseudo-exfoliative syndrome is relevant for the southern territories of our country, where the combination of a hot climate with increased insolation are natural trigger factors for the occurrence and progression of these clinical conditions.

Purpose of the Study

The purpose of the study is to study the clinical features of the ocular manifestations of Age-related cataracts in pseudoexfoliative syndrome in residents of the southern territories of Russia.

Materials and Methods

A total of 179 patients were surveyed with Age-related cataracts (277 eyes). Of these, 75 patients have identified PEX and age-related cataracts (41.9%, 114 eyes), the rest of the 104 patients with age-related cataracts had no PEX (58.1%, 163 eyes). A comprehensive examination was carried out using traditional (visometry, autokeratorefractometry, ophthalmobiomycroscopy, pneumotonometry, perimetry, ophthalmoscopy) and special methods (ultrasonic biometrics, threshold of electrical sensitivity of the optic nerve, critical frequency of flicker fusion).

The criteria for inclusion in the study group: patients 50 years and older than both sexes, with a verified diagnosis of all stages of age-related cataracts with and without PEX, living in the south of Russia. Exclusion criteria: all types of cataracts, with the exception of age; all forms of glaucoma and the consequences of injuries and inflammatory eye diseases; other eye pathology that can affect the "purity" of the study; uncompensated general somatic diseases. Statistical processing of the results of the study was carried out using Statistica 7.0 (StatSoft, Inc., USA) with the calculation of average values and their error (M ± m), (δ) and the Student's criterion, with the calculation of the level of confidence (P). The differences corresponding to ($P \leq 0.05$) were statistically significant, and the differences at $P \geq 0.05$ were unreliable.

Results and their Discussion

In total, 179 patients with age-related cataracts (277 eyes) were examined, of which: men - 83 (46.4%), women - 96 (53.6%). Pseudoexfoliative syndrome was detected in 75 patients with age-related cataracts (41.9%, 114 eyes); the gender distribution in this group was as follows: men - 32 (42.7%), women - 43 (57.3%). Patients with Age-related cataracts with PEX made up the I clinical group. In the remaining 104 patients (58.1%, 163 eyes), there was no PEX, the gender distribution was approximately the same: men - 51 (49.0%), women - 53 (51.0%). These patients were included in the II clinical group. According to the age-gender distribution, the groups were representative ($P \geq 0.05$). The age of patients of group I (Age-related cataracts in combination with PEX) averaged 73.21 ± 0.76 ($\delta = 8.0$), patients of group II (Age-related cataracts without PEX) - 70.19 ± 0.67 ($\delta = 8.6$), thus, the average age of patients with PEX was statistically significantly greater than in patients without PEX ($P \leq 0.05$).

Among 51 - 60-year-old and 61 - 70-year-old patients with Age-related cataracts, there were more people without PEX. In the next age decade (71 - 80 years), the proportion of patients with PEX is almost 2 times greater (44.3%) than without the syndrome (25.1%). In the age range of 81 - 90 years, the frequency of PEX is almost the same. In total, in patients with Age-related cataracts of the period 50 - 70 years, PEX occurs in 38.0%, in patients with Age-related cataracts, older than 70 years - in 62.0%. Most often, patients complained of a decrease in visual acuity: patients with Age-related cataracts with PEX - in 95.6%, patients with Age-related cataracts without PEX - in 98.2%. The lack of objective vision was reported by 4.4% of patients PEX- syndrome. The average value of visual acuity without correction in patients with Age-related cataracts with PEX was 0.15 ± 0.02 ($\delta = 0.18$), in patients with Age-related cataracts without PEX was 0.19 ± 0.01 ($\delta = 0.19$), the difference is statistically significant ($P \leq 0.05$). Without correction, visual acuity ranged from 0.01 to 0.8 in the presence of PEX, and from 0.01 to 0.75 in Age-related cataracts without PEX. Optical correction contributed to a significant increased visual acuity - the average values changed in patients with PEX to 0.63 ± 0.05 ($\delta = 0.22$), in patients without PEX - up to 0.61 ± 0.03 ($\delta = 0.25$), the difference is not statistically significant ($P \geq 0.05$). Most patients with Age-related cataracts and PEX did not correct or need any optical correction of visual acuity (79.6%), as did patients without PEX (65.6%). The average value of the strength of myopic correction in Age-related cataracts with PEX was 1.50 ± 0.21 Dptr ($\delta = 0.84$), in Age-related cataracts without PEX - 1.61 ± 0.14 Dptr ($\delta = 0.78$), the difference was statistically significant ($P \leq 0.05$). The average value of the strength of hypermetropic correction in Age-related cataracts with PEX was 1.18 ± 0.26 Dptr ($\delta = 0.69$), in Age-related cataracts without PEX - 1.38 ± 0.13 Dptr ($\delta = 0.69$), the difference was unreliable ($P \leq 0.05$). Violations of the hydrodynamics of the eyes in the examined patients were not revealed. The mean level of true intraocular pressure (P^0) in the presence of PEX was 15.64 ± 0.27 ($\delta = 2.89$) mm Hg. art., without PEX - 15.55 ± 0.21 ($\delta = 2.62$) mm Hg. art. ($P \geq 0,05$).

Particular attention was paid to the condition of the stroma and pupillary pigment border of the iris, the presence of pigment on its surface. The iris was not changed in 21.3% of cases in patients with PEX and in 49.1% of cases in patients without the syndrome, which is 2.3 times less often. The rate of atrophy of grade 1 stroma was about the same in both clinical groups. In contrast, grade 2 stroma atrophy was 2.4 times more common in patients with PEX than in patients without it. Thus, in total, with cataracts against the background of PEX, atrophy of the iris stroma was detected in 74.5% of cases, against 49.7% with cataracts without PEX. The pupillary pigment border was unchanged in cataract patients with PEX only in 21.9% versus 47.9% in cataract patients without PEX, which is 2.2 times more common ($P \leq 0.05$). Thinning of pupillary pigment border was detected with approximately the same frequency - 31.6% and 33.7%, respectively. Partially destroyed pupillary pigment border was with PEX 2.5 times more often than in patients without PEX ($P \leq 0.05$). There was no completely destroyed pupillary pigment border, as this is not typical for Age-related cataracts, more consistent with the manifestations of primary open-angle glaucoma. A mound of pigment on the iris with PEX was present in 60.5% of cases, which is 2.2 times more common than in eyes without PEX (27.0%) ($P \leq 0.05$). In patients with PEX, pigment on the iris was absent in 39.5% of cases, and in patients without the syndrome - in most cases, in 73.0%.

In patients of group I (Age-related cataracts in combination with PEX), iridodonesis was noted 13 times more often than in patients of group II (Age-related cataracts without PEX) ($P \leq 0.05$). The frequency of iridodonesis in patients with Age-related cataracts with

PEX indicates damage to the ligamentous apparatus of the lens. The weakness of the cinn ligaments in PEX causes the presence of lens subluxations, the frequency of which in patients of group I (14.9%) exceeded that in patients of group II (1.8%) by more than 8 times ($P \leq 0.05$). The color of the optic disc in patients with Age-related cataracts of both groups was normal, the average size of the excavation of optic nerve (E/D) was almost the same - 0.22 ± 0.01 ($\delta = 0.05$) and 0.22 ± 0.004 ($\delta = 0.05$) ($P \geq 0.05$). The data obtained correspond to the high average values of lability (conductivity) of the optic nerve, which in both groups were also within the normal range (36.14 ± 0.57 ($\delta = 5.96$) - in patients with PEX and 35.69 ± 0.41 ($\delta = 5.16$) - in patients without PEX) ($P \geq 0.05$). The density of the lens nucleus was estimated by Buratto. A dense nucleus and a very dense nucleus were more than 1/3 of the cases in patients of group I with Age-related cataracts us with a background of PEX.

Conclusion

The population of the southern regions of the Russian Federation is exposed to natural trigger factors (hot climate, increased insolation) that contribute to the development of ocular manifestations of pseudo-exfoliative syndrome and the occurrence of age-related cataracts. A comparative analysis of the results of examinations of two groups of patients with age-related cataracts was carried out: against the background of the ocular PEX and without it. Patients with PEX were statistically significantly "older", in the age category over 70 years, PEX was 1.6 times more common than in the category of persons 50 - 70 years old. The initial visual acuity in patients with Age-related cataracts and PEX was statistically significantly lower than in patients without the syndrome. Most of the subjects did not need optical correction or did not correct (79.6% of patients of group I and 65.6% of patients of group II). The rest of the patients had a fairly high visual acuity with correction - an average of about 0.6. At the same time, with PEX, pronounced trophic changes in the anterior part of the eyes were observed - atrophy of the iris stroma of the 2nd degree was 2.4 times more often than in patients without PEX and atrophy of all degrees was noted 1.5 times more often than in patients without PEX. The pupillary pigment border was 2.2 times more likely to be altered with Age-related cataracts with PEX. In patients with PEX, it was 2.5 times more likely to be partially destroyed by pupillary pigment border ($P \leq 0.05$). With PEX, there was 2.2 times more likely to have a mound of pigment on the iris, as opposed to Age-related cataracts without PEX (60.5% and 27.0%, respectively) ($P \leq 0.05$). There was no pigment rash on the iris at PEX of 39.5%, which is 1.8 times less common than in the absence of PEX (73.0%). Iridodonesis in patients with Age-related cataracts and PEX was noted 13 times more often than in patients without PEX ($P \leq 0.05$) and lens subluxation was 8 times more common than in patients without PES (14.9% vs. 1.8%) ($P \leq 0.05$). When assessing the density of the lens nucleus according to Buratto, patients with Age-related cataracts with PEX in more than 1/3 of cases had a dense and very dense nucleus. The medium, dense and very dense core of the lens was 59.4% in patients without PEX and in 75.4% in patients with PEX, which is 1.3 times less common.

Thus, a comparative analysis of the clinical manifestations of age-related cataracts with pseudoexfoliative syndrome and without it in residents of the southern regions of Russia indicates significant pathological disorders caused by the presence of PEX. With the combination of Age-related cataracts with PEX, statistically significant ones were revealed: older age, pronounced dystrophic changes in the anterior part of the eyeball, leading to frequent subluxations of the lens, a high specific gravity of the dense and very dense lens nucleus. All of the above creates technical difficulties during the operation, increases the risk of intra- and postoperative complications, which must be taken into account when removing age-related cataracts in patients with age-related cataracts and PEX.

Disclosure

There is no conflict of interest. There is no financial interest in the submissions or methods.

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