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Cataract surgery in patients with ocular pseudoexpholiation



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Mirjana Janicijevic-Petrovic*, Tatjana Sarenac-Vulovic*, Dejan Vulovic**, Katarina Janicijevic**, Marko Petrovic**, Dragan Vujic***

*Clinic of ophthalmology, Clinical Centre Kragujevac, in Kragujevac, Serbia **Faculty of Medical Sciences, University in Kragujevac, Serbia ***State University of Novi Pazar, Serbia

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MATERIAL AND METHODS: Retrospective 5-year study based on general and ophthalmic history records, and including 268 eyes (174 patients), aged 50 years and over. Ophthalmological examination involved visual acuity, measuring of intraocular pressure, slit lamp examination and indirect ophthalmoscopy. Type of surgical treatment was tailored for each patient (extra capsular cataract extraction, phaco-emulsiphication).

RESULTS: Preoperative slit lamp examination showed phacodonesis in 17.91% (47), iridodonesis in 2.98% (8), pigment dispersion in 6.72% (18), lens subluxation in 4.85% (13) on the total. Extra capsular cataract extraction was performed in 36.94% (99) and phaco-emulsiphication in the others. Analysis of intra operative complications showed: posterior capsular rupture 17.91% (48), zonular dialysis or break 5.97% (16), lens subluxation 1.86% (5), intraocular bleeding 2.98% (8), vitreous loss 13.80% (37). Postoperative complications include: anterior chamber reaction 45.90% (123), intraocular lens tilt 15.67% (42), endothelial decompensation 21.64% (58), subluxation/luxation IOL 3.73% (10), secondary cataract 21.46% (58), pigment dispersion 37.68% (101), increased IOP 13.80% (37), residual lens matter 13.80% (37), hyphema 3.73% (10), posterior synechiae 6.72% (18), iris prolapsus 2.73% (8). CONCLUSION: Cataract surgery in PES will frequently encounter small pupils, shallow anterior chambers, posterior adhe-

sions, weak zonular support, partial subluxation or complete dislocation of lens. Authors presented the best possible approach on PES and surgical methods for patients with cataract with special accent of possible surgical complications.

KEY WORDS: Cataract, Pseudoexfoliative syndrome, Surgical complications

Introduction

Pseudoexfoliative syndrome (PES) is an age related disease (after 50 years, predominantly females) characterized by production and progressive accumulation of fibril extracellular material in all tissues of anterior segment of eye as well as extra ocular tissues (muscles, heart, lungs, liver, central nervous system, kidneys). It can be genetically inherited. The origin of the pseudoexfoliation is not yet known. In the eye it can be diagnosed remarking fibro granular white material deposited on anterior lens capsular and at pupil margin. PES can be detected on lens epithelium, iris stromal and blood vessels, corneal endothelium, anterior hyaloid membrane, zonular fibres, trabecular meshwork and subconjunctival tissues.

Slit lamp examination of eye with PES shows pupil margin atrophy (transillumination), increased pigment dispersion and depositions throughout the anterior segment, endothelial precipitates, iridodonesis, phacodonesis and spontaneous lens subluxation.

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Ĉorrespondence to: Mirjana A. Janicijevic-Petrovic. Clinic of ophtalmology, Clinical Centre Kragujevac, Zmaj Jovina 69, 34000 Kragujevac, Serbia (E-mail: mira.andreja@yahoo.com)

Cataract surgery of patients with PES has an higher incidence of complications like posterior capsular rupture, zonular dialysis or breaks, lens subluxation, subluxation of intraocular lens, intraocular bleeding, vitreous loss, anterior chamber reaction, formation of posterior synechiae and corneal endothelial decompensation, and moreover pseudoexfoliative material after cataract surgery can be found. The contraction of anterior lens capsular and intraocular lens tilt can be notified. The increased incidence of secondary cataract is recorded in these patients. Cataract surgery should be performed when reduced visual function impairs enough the quality of life to warrant the risk of surgery. Cataract surgery in PES is exposed to potential and extensive complications, due to the inherent structural weakness.

We present the best possible approach on PES and surgical methods for patients with cataract with special accent on surgical complications. Our purpose was to show that patients who were operated in the early stages of the disease had much better results.

Methods

This study was carried out from 1st January 2007 to 30th December 2011 at Clinic of Ophthalmology in Clinical Centre Kragujevac, Serbia. A total of 268 eyes on 174 patients aged 50 years and over were included in study. PES patients with complicated and traumatic cataract, high myopia, earlier uvetis episodes and developmental cataract were excluded.

A complete general and ophthalmic history was taken for patients. Ophthalmological examination involved visual acuity, measuring of intraocular pressure (Goldman's aplanation tonometry), slit lamp examination of anterior segment and indirect ophthalmoscopy (fundus examination). The diameter of pupil of each patient was measured preoperatively. The pupil size was graded as poor (2-4 mm), fair (5-6 mm) and satisfactory (7-9 mm).

Cataract surgery was performed for every patient. Type of surgical treatment was tailored for patient (extra capsular cataract extraction and phacoemulsiphication).

The patients were discharged on the first postoperative day. The operative and postoperative complications were recorded. The results were entered and analyzed by SPSS program, versus 19.00, (chi-square test, p-values include the exact value less than 0.01).

Results

In our study 73.56% (128) were female, and 26.44% (46) were male with the high statistical significant difference between the sex ($\chi^2 = 38.644$, p<0.01)(Table I) All patients were divided in five groups according to age. The first group was from 50 to 59 years - 14 patients,

TABLE I - Pseudoexfoliative syndrome. Cataract Epidemiology (sex, age groups) in number of patients (174).

Female	Male Age groups (years)					
73.56% 128	26.44% 46	50-59 8.04% 14	60-69 37.93% 66	70-79 43.67% 76	80-89 9.77% 1	90-99 0.57% 1

TABLE II - Preoperative Slit lamp Examination (number of eyes 268)

Phacodonesis	Iridodonesis	Pigment	dispersion Lens subluxation
17.91%	2.98%	6.72%	4.85%
47	8	18	13

second from 60 to 69 years - 66 patients, third from 70 to 79 years - 76, forth from 80 to 89 years - 17, and last one from 90 to 99 years, only 1 patient.

The mean age of the patients was 71.2 ± 4.7 years. The more recurrent age was in the third group from 70 to 79 years (76), with high statistical significant difference by age ($\chi^2 = 135.138$, p<0.01)

Distribution of frequency of right or left eye overtaken shows, that 20.68% (55) were right, 25.29% (68) were left and at 54.02% (145), were bilateral, as the more frequency of bilateral eyes and statistical significant (χ^2 =52.987, p<0.01).

Preoperative slit lamp examination showed phacodonesis in 17.91% (47), iridodonesis in 2.98% (8), pigment dispersion in 6.72% (18), lens subluxation in 4.85% (13) of all patients, with the more frequency of phacodonesis as statistical significant (χ^2 =42.651, p<0.01), table 2. Intra operative pupil diameter measurements in mm indicated for poor pupil dilatation (2-4 mm) in 32.84% (88), fair pupil dilatation (5-6 mm) in 38.06% (101) and satisfactory pupil dilatation (7-9 mm) in 28.73% (77) eyes (two eyes without reaction), with the more frequency of fair pupil reaction as statistical significant (χ^2 =3.256, p=0.196 (Table III).

Preoperative intraocular pressure range was from 11 to 28 mm Hg, with mean of 14± 4.35 mm Hg.

Different surgical technics were performed. Extra capsular cataract extraction was performed in 36.94% (99) and phaco-emulsiphication in others. Posterior chamber intraocular lens was implanted in 81.72% (219), anterior chamber intraocular lens was implanted in 13.80 % (37) of eyes, with the more frequency in posterior chamber lens as statistical significant ($\chi^2 = 129.391$, p<0.01). Only twelve eyes of total was not applications intra ocular lens.

Distribution of intra operative complications showed: posterior capsular rupture in 17.91% (48), zonular dial-

Poor pupil	Fair pupil	Satisfactory pupil	
dilatation	dilatation	dilatation	
(2-4 mm)	(5-6 mm)	(7-9 mm)	
32.84%	38.06%	28.73%	
88	101	77	

TABLE III - Pupil diameters in mm (number of eyes 268)

TABLE III - Intraoperative and post operative complications (number of eyes 268)

Intra operative complications			
posterior capsular rupture	17.91% (48)		
zonular dialysis of break	5.97% (16)		
lens subluxation	1.86% (5)		
intra ocular bleeding	2.98% (8)		
vitreous loss	13.80% (37)		
Postoperative complications			
anterior chamber reaction	45.90% (123)		
intraocular lens tilt	15.67% (42)		
endothelial decompensation	21.64% (58)		
subluxation/luxation IOL	3.73% (10)		
secondary cataract	21.46% (58)		
pigment dispersion	37.68% (101)		
incresed IOP	13.80% (37)		
residual lens matter	13.80% (37)		
hyphema	3.73% (10)		
posterior synechiae	6.72% (18)		
iris prolapsus	2.73% (8)		
Enophthalmitis	0%(0)		
Re-surgery	1.86%(5)		

ysis or breaks in 5.97% (16), lens subluxation 1.86% (5), intraocular bleeding 2.98% (8), vitreous loss 13.80% (37), with the more frequency was posterior capsular rupture (χ^2 =62.228, p<0.01), as high statistical significant of difference (Table IV)

Post operative complications (502) include: anterior chamber reaction 45.90% (123), intraocular lens tilt 15.67% (42), endothelial decompensation 21.64% (58), subluxation/luxation IOL 3.73% (10), secondary cataract is recorded in 21.46% (58) after 8 weeks, pigment dispersion 37.68% (101), increased IOP 13.80% (37), residual lens matter 13.80% (37), hyphema 3.73% (10), posterior synechiae 6.72% (18), iris prolapsus 2.73% (8), with the more frequency was anterior chamber reaction (χ^2 =312.00, p<0.01), as high statistical significant of difference, Table IV.

There were no patients with postoperative endophthalmitis. Reoperations were required for 13.40% (5) patients. Three patients needed lens matter wash form one to three days after cataract surgery. One of them needed reposition of prolapsed uveal tissue. Secondary implantation of artificial intraocular lens was needed for one patient one month after surgery. Cataract surgery in PES will frequently encounter small pupils, shallow anterior chambers, posterior adhesions, weak zonular support, partial subluxation or complete dislocation of lens.

Analysis of our study shows that patients with PES and cataract were more among the female population, aged 60-79 years. Cataract surgery in our clinic is the bilateral more commonly performed, which is consistent with global data. Preoperative slit-lamp detection established a phacodonesis as the more common clinical sign, and fair pupil response slit (5-6 mm) as the more frequently pupil reaction to light. In our patients more often cast in the PC IOL in posterior chamber as optimal localization, and with a new appropriate surgical technique.

Common intra operative complication was posterior capsule rupture, while the more frequent postoperative complications were anterior chamber reaction, which is consistent with the global trends, too. The number and type of complications depended on the surgical technique of choice, operator experience, but also from individual clinical state of patients with PES, and early surgical intervention, which is confirmed by the numerous references to the world, which will be stated. The authors are obliged to continue research into the preventive diagnostic and therapeutic modules for PES and cataract.

Authors concluded that anterior chamber hypoxia due to iris vasculopathy (blood vessels damage is caused by anti oxidative stress) may represent a complication of PES and cataract surgery. The involvement of local and systemic oxidative stress in intraocular pressure elevation and optic nerve damage has been hypothesized in pathogenesis of glaucoma (systemic levels of pro oxidants and anti oxidants by analyzing the blood biochemistry in patients with glaucoma)¹.

Author's poorer postoperative results was in PES associated cataract as compared to those obtained in open angle glaucoma and senile cataract, and with high incidence of pre and postoperative complications (fibrous exudation in humor aqueous, ruptured posterior capsule and vitreous loss respectively).

PES is a risk factor in the evolution and treatment of PES and cataract. To assess whether the pseudoexfoliation syndrome is associated with the long-term incidence of cataract or cataract surgery, long-term follow-up data from this population-based older cohort suggest that the presence of PES is associated with an increased risk of a nuclear cataract and cataract surgery ².

Spontaneous dislocation of posterior chamber intraocular lens in patients with PES several years after cataract surgery may liberate lens cortical material, causing lens particle glaucoma, is declares by many Authors, as we did ³.

A relationship between width of the pupil, time factor, hardness of cornea and incidence of inflammatory reaction, has been demonstrated from many authors in 24.10%. PES itself is the source of more severe complications in operation on cataract. In our opinion and clinical experience these patients should be in day hospital care and operated on in time by an experience surgeon 4 .

PES patients presenting the association cataract and secondary open angle glaucoma, that have been operated by phaco-emulsiphication + PC IOL and IOP decrease from the pre-operatory values; in glaucomatous disease of PES patients the pressure continue to progress probably because of other specific risk factors, as is our conclusion too ⁵.

Other authors reported some cases of PES in which pseudoexfoliative material appeared on intraocular lens surface and glaucoma developed more than 8 years after cataract surgery. This report suggests that careful followup is essential to monitor the development of glaucoma in patients with PES, particularly when an intraocular lens is implanted in sulcus, whose opinion we also share ⁶.

Cataract surgery in PES is difficult. Pseudoexfoliative glaucoma is aggressive, with great pressure differences between the two eyes, also with important circadian variations of intraocular pressure and has reserved prognostic, as we experienced with our patients ⁷. Moreover placement of implant may be adversely affected by inadvertent stress exerted upon zonular structures during surgery, resulting in subluxated or dislocated lens implants. This may become apparent during intra, postoperative, or even in long term postoperative period.

Pseudoexfoliation was bilateral in 65.7% of cases. It was significantly associated with cataract, glaucoma and phacodenesis. Of the eyes with PES, 92.10% had cataract, 33.10% had glaucoma and 7.90% had phacodenesis.

Although this study was not population-based, its findings increase our knowledge of PES in a Middle Eastern country, which can be helpful to prevent clinical surgery complications ⁸.

The prevalence of glaucoma in subjects with PES was 19.60%. After controls for age and sex, glaucoma and cataract surgery, rose-bengal staining and diabetes were associated with PES, but only glaucoma and rose bengal staining associations remained significant in a multivariate model, as we will do in other research ⁹.

Pseudoexfoliation is the more common identifiable cause of secondary glaucoma and pseudoexfoliation patients have higher rates of intra and postoperative complications of cataract surgery compared to those without the condition. The objective of this study was to assess the clinical characteristics of pseudoexfoliation syndrome among cataract patients examined at Jimma University Specialized Hospital, Southwest Ethiopia, like in our clinical surgery experience ¹⁰.

Pseudoexfoliation is recognized risk factor for developing cataract, glaucoma and lens dislocation. PES is also associated with increased risk of complications during cataract surgery due to poor midriasis and zonulae weakness. The aim of this study is to report the prevalence of pseudoexfoliation among Upper Egyptians attending

the ophthalmology clinic of Assiut University Hospital, something we experienced during our surgeries ¹¹.

Conclusion

By utilizing a precision early microsurgical approach, these complications can be significantly reduced, yielding consistently better postoperative results. Cataract surgery in PES will frequently encounter small pupils, shallow anterior chambers, posterior adhesions, weak zonular support, partial subluxation or complete dislocation of crystalline lens.

We present the best possible approach on PES and surgical methods for patients with cataract with special accent of surgical complications. Operations should be done in optimal time, and by surgical expert.

Riassunto

SCOPO: La sindrome da pseudo-esfoliazione è un'anomalia sistemica che principalmente colpisce gli occhi. Noi presentiamo il miglior approccio possibile alla sindrome da pseudo-esfoliazione e i metodi chirurgici per i pazienti con la cataratta, ponendo l'accento alle complicanze chirurgiche. Il nostro scopo era quello di dimostrare che i pazienti che sono stati operati nelle fasi iniziali della malattia hanno avuto risultati molto migliori.

MATERIALI E METODI: La ricerca retrospettiva, durata 5 anni, basata sulla documentazione che riguarda la generale storia della malattia e quella oftalmica riguarda 268 occhi (totale di 174 pazienti), dell'età pari o superiore ai 50 anni. L'esame oftalmologico comprende l'acutezza visiva, la misurazione della pressione intraoculare, l'esame con la lampada a fessura e l'oftalmoscopia indiretta. Il tipo del trattamento chirurgico è stato adattato per ogni paziente (estrazione extracapsulare di cataratta, facoemulsificazione).

RISULTATI: L'esame preoperatorio con la lampada a fessura ha dimostrato facodonesi nel 17.91% (47), iridodonesi nel 2.98% (8), dispersione del pigmento nel 6.72% (18), sublussazione della lente nel 4.85% (13) di tutti i pazienti. L'estrazione extracapsulare di cataratta è stata eseguita nel 36.94% (99) e la facoemulsificazione in tutti gli altri casi. La distribuzione delle complicanze intraoperatorie ha dimostrato: rottura della capsula posteriore 17.91% (48), dialisi zonulare o rottura 5.97% (16), sublussazione della lente 1.86% (5), sanguinamento intraoculare 2.98% (8), perdita di vitreo 13.80% (37). DISCUSSIONE: Le complicanze post-operatorie sono: reazione in camera anteriore 45.90% (123), tilting intraoculare della lente 15.67% (42), decompensazione endoteliale 21.64% (58), sublussazione/lussazione IOL 3.73% (10), cataratta secondaria 21.46% (58), dispersione del pigmento 37.68% (101), aumentato IOP 13.80% (37), sostanza residua della lente 13.80% (37), hyphema 3.73% (10), synechiae posteriori 6.72% (18), prolasso dell'iride 2.73% (8).

CONCLUSIONE: L'intervento chirurgico di cataratta nella sindrome la sindrome da pseudo-esfoliazione troverà frequentemente le pupille piccole, camere anteriori poco profonde, adesioni posteriori, debole supporto zonulare, sublussazione parziale o dislocazione totale della lente. Gli autori presentano il miglior approccio possibile nella sindrome da pseudo-esfoliazione e i metodi chirurgici per i pazienti con cataratta, ponendo l'accento alle complicanze chirurgiche.

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