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ОРИГИНАЛЬНОЕ ИССЛЕДОВАНИЕ
ORIGINAL RESEARCH

Effect of mydriasis degree on intraoperative complications in patients with complicated cataract associated with pseudoexfoliative syndrome

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Abstract. Relevance. Cataract is one of the causes of blindness and low vision among the pathology of the organ of vision. Medication to cure cataracts is extremely ineffective. According to statistics, over the past year, there are about a million patients diagnosed with cataracts. The main method of surgical treatment of cataracts is phacoemulsification. The main cause of a narrow pupil with lens opacities is pseudoexfoliative syndrome, which affects the development of the disease, both in the intraoperative and postoperative periods. The aim of this study is to evaluate the effect of mydriasis on intraoperative complications in patients with complicated cataract in PES. **Materials and Methods.** The study involved 176 patients of varying severity of PES and a control group without signs of PES. Patients underwent ophthalmological diagnostics (visometry, biomicroscopy, ophthalmoscopy, CCFM, ruler for measuring pupil diameter, pneumotonometry, IOP according to A.N. Maklakov, 10g weight, OST of the anterior segment). In addition to ophthalmological examinations, all patients underwent anamnesis and laboratory tests before surgery according to generally accepted methods. Preoperative preparation of the patient included both drug therapy and a psychological aspect. Particular importance was attached to premedication. All patients in all study groups were prescribed a sedative (*per os*) 1 hour before surgery. In all observation groups, in order to achieve the cycloplegia required during the operation, instillations of mydriatics were performed according to the scheme. **Results and Discussion.** Evaluation of the results revealed that the degree of mydriasis is a statistically significant risk factor for the development of all complications except "conjunctiva". For the

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conjunctiva, no statistically significant risk factors were found among the selected parameters. AUC for ROC curves are in the range of 0.7–0.9 for all complications, which indicates a good and satisfactory choice of model parameters. In the “photophobia” regression, the risk of developing complications is 6 higher with mydriasis up to 5 mm in the postoperative period, and 26 times higher to get a complication with mydriasis less than 4 mm. In the regression of “chamber moisture” — the moisture of the anterior and posterior chambers, the risk of developing turbid fluid is 353 times higher with mydriasis less than 4 mm, and 27 times higher with mydriasis up to 5 mm. *Conclusion.* The characteristic signs of pseudoexfoliation syndrome undoubtedly complicate the surgeon’s work: rigid narrow pupil, ciliary muscle weakness, iridodonesis, phacodonesis. When planning cataract surgery, special attention should be paid to diagnosis, history taking in terms of general somatic features, and the choice of mydriatics. This work showed how much the degree of mydriasis can influence complications in the intraoperative period.

Keywords: complicated cataract, pseudoexfoliation syndrome, mydriatics, cycloplegia, rigid pupil, complications

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Introduction

More than 300 thousand cataract surgeries are performed annually in the Russian Federation. The leading position in cataract surgery is occupied by phacoemulsification [1]. The main cause of narrow pupil in case of lens opacities is pseudoexfoliative syndrome (PES), which is directly related to the development of the disease, both in intraoperative and postoperative periods. PES is an age-related systemic dystrophic disease with a characteristic lesion of the visual organ, mainly of the anterior segment of the eye [2]. The pupil in PES is stiffer than in the fellow eye and doesn’t respond well to medication cycloplegia.

Spraying on the anterior capsule of the lens, in the iris stroma — on the anterior segment of the eye, causes atrophy of the iris sphincter and iris dilator; this is the cause of pupil stiffness, this condition leads to mechanical obstruction preventing the achievement of cycloplegia [3]. Non-medicamentous mydriasis of the pupil can be caused by heterogeneous condensed bodies at their molecular contact of exfoliative material to the iris pigment epithelium and the anterior capsule of the lens [4].

The authors noted that after medication cycloplegia, intraocular pressure rises, which may cause an abundant pigment release from the posterior chamber into the anterior chamber, which positively correlates with the

intensity of pigment dispersion [5]. Scientists have noted localization of exfoliative material, according to different sources, at the pupil margin, within 33–95% of patients, but there is also data on the detection of characteristic dustings at the pupil margin even with complete preservation of the iris pigment border [6]. WuDunn D. on the basis of his observations and work with clinical material considers the weakness of cinnamon ligaments and possible complications in the form of lens subluxation as a result of friction of iris and lens capsule covered with exfoliations [7].

The ways to achieve mydriasis are not only mechanical, and also medication too. Authors attempt to use antioxidants, vasoactive drugs, disaggregants, antihypoxants in the prevention of complications of this syndrome, but the effectiveness of actions needs further clarification [8]. Currently, to achieve a wide pupil in preparation of the patient for surgery, there is a choice of mydriatics, both in combination and in monotherapy. The most frequently used groups of drugs are adrenomimetics — phenylephrine, and M-cholinoreceptor blockers — cyclopentolate and tropicamide. Authors in various observations have repeatedly noted a pronounced enhancing effect of the use of mydriatics with such non-steroidal anti-inflammatory drugs as diclofenac sodium, flurbiprofen, ketorolac trometamol [9]. Dube P. (1990) in his works compared instillation of mydriatics according to the conventional method in combination with 1% indomethacin and 1% prednisolone. The results of the study showed that the strongest synergy, when comparing the two drugs, was observed in 1% indomethacin [10]. Other authors Guzinska M. and Dimitrakos S.A. conducted similar work, using diclofenac sodium with indomethacin. The results showed, more pronounced effect in diclofenac [11, 12]. Au M.K. and Singh P. noted the relationship between the use of mydriatics and antiprostoglandin piroxicam, but there is no information about the effectiveness of these drugs [13]. Allaire C. et al. found no significant difference when comparing 0.1% indomethacin and 0.03% flurbiprofen [14]. Psilas K. et al. noted opposite findings of a pronounced weak synergism in prolonged cycloplegia of 0.1% diclofenac compared to 1% indomethacin and 0.03% flurbiprofen

[15]. Using non-steroidal anti-inflammatory drugs of choice, the author Solomon K.D. showed persistent mydriasis with 0.05% ketorolac, noting a pronounced effect than with 0.03% flurbiprofen, while the interval and frequency of instillation are important [16]. The authors Chaudhary K.P., Sofat B K. and Stewart R. suggested using 1 drop of instillation with an interval of 30 minutes 2 hours before the planned operation. Other authors suggested 60 minutes before the planned surgery with a 15 minute interval [17]. The third authors suggested instillation of 5-fold mydriatics every 30 minutes [11]. In the available sources there are data on the use of intracameral injection of adrenaline (epinephrine) to additionally achieve cycloplegia. Authors Corbett M.C. and Liou S.W. used epinephrine in irrigation solution at a concentration of 1:1.000.00. No data on the condition of patients with hypertension were noted [18]. Chen C.C. observed the possibility of restoring intraoperative cycloplegia by injecting 0.1 ml of adrenaline into the anterior segment of the eye, namely into the anterior chamber, but no data on systemic side effects were found [19]. Another scientist, when comparing alpha-adrenostimulant and adrenaline injected into the anterior chamber, noted less toxic effect on the body and adequate cycloplegia predominantly in alpha-adrenostimulant [20]. The author Schlichtenbrede F.C. compared instillations of alpha-adrenomimetics 5% and 10% phenylephrine, with concomitant pathologies of CHD, however, systemic cardiovascular effects were not found, but cycloplegia was achieved mainly with 10% instillation [21]. Kumar Vinod et al proposed the following regimen: 3-fold instillation 1 hour before the planned surgery with a 5-minute interval of M-choline blocker (tropicamide 1%) and 2-fold alpha-adrenomimetic (10% phenylephrine) [22]. Another author suggested another instillation scheme for persistent mydriasis: combination of mydriatics with NSAIDs by 3-fold injection into the conjunctival cavity of a solution of tropicamide, diclofenac sodium and phenylephrine in the ratio of 1%-0.1%-10% with simultaneous injection of a mixture of 0.1 ml of atropine and mesaton (in the ratio of 0.1%-1%) [23]. Authors Postupayeva N.V. and colleagues proposed an interesting scheme to achieve

mydriasis, a prepared drug mixture of 0.05 ml, which includes arenalin, mesaton, lidocaine (1% — 1% — 2% respectively), to inject localized at 12, 4 and 8 o'clock into the limbus region at the border of opaque and transparent parts of the cornea, using a 27G injection needle (ratio of solutions 0.02:0.02:0.01 respectively) [24].

The aim of this work was to determine the influence of the degree of mydriasis on intraoperative complications in patients with complicated cataract on the background of pseudoexfoliative syndrome.

Materials and methods

This scientific work was carried out at the Department of Eye Diseases of RUDN University, namely at the clinical base of the ophthalmologic department of the V.M. Buyanov State Clinical Hospital, and short-stay hospital unit. Patients (176 subjects) were divided into 3 groups according to severity and a control group without clinical manifestations of PES.

Group 1 $n=40$ (40 eyes) — the median age was 74.53 (IQR: 56–89 years), 75% were female, and 25% were male. Group 2 $n=44$ (45 eyes) — the median age was 74.25 (IQR: 59–91 years), 63.6% were female, and 36.4% were male.

Group 3 $n=47$ (49 eyes) — the median age was 73.62 (IQR: 49–93 years), 61.7% were female, 38.3% were male. Control group $n=45$ (45 eyes) the median age was 70.93 (IQR: 54–82 years), 68.9% were female, 31.1% were male in Table 1.

The patients underwent ophthalmologic diagnostics (visometry, biomicroscopy, ophthalmoscopy, critical frequency of merge of flickers, ruler for pupil diameter measurement, pneumotonometer, intraocular pressure (IOP) according to A.N. Maklakov — 10g weight, OCT of the anterior segment). In addition to ophthalmologic examinations, anamnesis collection and laboratory tests were performed before the operation according to the generally accepted methodology. Preoperative preparation of the patient included both drug therapy and psychological aspect.

Special importance was given to premedication. 1 hour before surgery all patients in all studied groups were given a sedative drug (*per os*).

Inclusion criteria were:

- Presence of cataract in one eye (visual acuity not more than 0.4, with visual acuity of the other eye not less than 0.8).

- compensated IOP

Exclusion criteria were:

- Infectious — inflammatory diseases of the eye, oncologic diseases of the eyeball, appendicular apparatus of the eye, decompensated glaucoma, lack of light perception, decompensated somatic diseases.

Voluntary written consent was obtained from the patients for the investigation and publication of relevant medical information according to WMA Declaration of Helsinki — Ethical Principles for Medical Research Involving Human Subjects, 2013.

Statistical processing of the data was performed in the development environment of R-4.1.3. When analyzing quantitative parameters, each parameter was pre-tested for normality of distribution using the Shapiro-Wilk test. In case of normal distribution the parameter is presented as $M \pm SD$, in case of deviation from normal distribution the parameter is presented as $Me (Q1; Q3)$. Four-group analysis of variance (ANOVA) was used when comparing groups for continuous parameters. Comparisons of conjugation tables for categorical parameters were performed using Fisher's exact test.

Graphical representation of the results was performed using span diagrams.

Regression analysis for generalized linear models (GLM) was used to analyze the relationships between the parameters. To analyze the probability of complications and factors that influence this probability, a multivariate logistic regression (MLR) model was used, for which ROC analysis was performed. The quality of the model was assessed by the AUC value for the ROC-curve.

Results and discussion

The comparison of the groups by age and gender showed that the studied groups had no statistically significant differences ($p=0.152$ and $p=0.564$, respectively) in Table 1.

Preoperative vision in the groups had no statistically significant difference ($p=0.37$) in Table 2.

Table 1

Demography					
Parameter	Control	1- Group	2- Group	3- Group	P- value
Age (years)	70.93±7.45	74.53±8.16	74.25±7.51	73.62±9.42	0.152
GenderFemale	31 (68.9%)	30 (75%)	28 (63.6%)	29 (61.7%)	0.564
Male	14 (31,1%)	10 (25%)	16 (36.4%)	18 (38.3%)	

Table 2

Visual functions					
Parameter	Control	1-Group	2-Group	3-Group	P-value
Vision before surgery	0.03(0.01;0.05)	0.03(0.02;0.052)	0.05(0.02;0.1)	0.02 (0;0.08)	0.37

In all observation groups, to achieve mydriasis required during surgery, mydriatic instillations were performed. M-cholinoblocker instillations (tropicamide 1%, 0.5% and cyclopentolate 1%) were used in 65%, 54.5% and 44.7% of groups 1, 2 and 3, respectively. Group 1 used cyclopentolate 1% once 40 min before the planned surgery, group 2 used cyclopentolate 1% instillations 30 and 15 min before surgery, and group 3 used 1% tropicamide solution 30, 20, and 10 min before surgery. Combined-action midriatics (tropicamide+phenylephrine) in 20%, 20.5% and 19.1%, respectively. Alpha-adrenomimetics (phenylephrine hydrochloride 2.5%) in 20%, 25% and 38.3%, respectively. In group 1 30 min before surgery, in group 2 30, 15 min, in group

3 1 hour, 30 min, 15 min. In all the observation groups, in addition to mydriatics, in the preoperative period, predominantly diclofenac sodium 100 mg, followed by nimesulide and indomethacin 1% were used.

From the preoperative instillation it is worth noting a statistically significant difference in the frequencies of M-choline blockers ($p=0.006$).

According to the results of mydriatic instillation we obtained the following data in Table 3. There were statistically significant differences between the groups ($p < 0.05$). In group 1, 67.5% of medial mydriasis was up to 6.5 mm, in group 2, 72.7% up to 5.5 mm., and in group 3 of observations, 70.2% of medial mydriasis was less than 4 mm.

Table 3

Degrees of medication-induced mydriasis					
Parameter	Control	1-Group	2-Group	3-Group	P-value
Up to 8 mm	45(100%)	0(0%)	0(0%)	0 (0%)	0
Up to 6.5 mm	0 (0%)	27 (67.5%)	3 (6.8%)	0(0%)	0
Up to 5.0 mm	0 (0%)	13 (32.5%)	32 (72.7%)	14 (29.8%)	0
Less than 4.0 mm	0 (0%)	0 (0%)	9 (20.5%)	33 (70.2%)	0

To achieve our aim, we additionally studied the patients' general medical pathologies.

Statistical analysis of the history of concomitant comorbid pathologies showed that the groups had statistically significant differences in the frequencies of cardiologic, pulmonologic, and neurologic pathologies in Table 4. There was no statistically significant differ-

ence in the frequencies of endocrinologic pathologies between the groups ($p=0.243$). As follows from the results, all mentioned pathologies have a negative statistically significant effect on mydriasis. The associated pathologies worsen the process of mydriasis. The statistical significance of the remaining parameters has not been established.

Table 4

		Associated pathologies				
Parameter		Control	1-Group	2-Group	3-Group	P-value
Cardiology	No	30 (66.7%)	25(62.5%)	20(45.5%)	18 (38.3%)	0.02
	Yes	15 (33.3%)	15(37.5%)	24(54.5%)	29 (61.7%)	
Endocrinology	No	26 (57.8%)	24 (60%)	24(54.5%)	19 (40.4%)	0.243
	Yes	19 (42.2%)	16 (40%)	20(45.5%)	28 (59.6%)	
Pulmonology	No	36 (80%)	27(67.5%)	21(47.7%)	13 (27.7%)	00
	Yes	9 (20%)	13(32.5%)	23(52.3%)	34 (72.3%)	
Neurology	No	20 (44.4%)	13(32.5%)	20(45.5%)	2 (4.3%)	00
	Yes	25 (55.6%)	27(67.5%)	24(54.5%)	45 (95.7%)	

In the OLM for MIDRIAZ *Demography*, *Vision before surgery*, *Presence of associated pathologies* and use of preoperative instillations were selected as independent factors. The result estimation of OLM

parameter estimation and their statistical significance are summarized in Table 5. As it follows from the results, all mentioned pathologies have a negative statistically significant effect on mydriasis.

Table 5

Group comparison			
Parameter	Coefficient estimated	Standard error	P-value
Visual acuity on admission	0.542	1.158	0.64
Age	-0.001	0.011	0.963
Gender (m)	0.18	0.157	0.254
Cardiology	0.397	0.177	0.026
Endocrinology	0.319	0.148	0.033
Pulmonology	0.78	0.153	0
Neurology	0.612	0.163	0
Comb Mydriat	-0.089	0.515	0.863
M-cholinoblok	0.188	0.506	0.711
A-Adrenomim	-0.067	0.501	0.894

For the complications “conjunctiva”, “photophobia”, “anterior chamber fluid” MLR models were built, for which the following factors were selected: degree of mydriasis, gender, age, type of surgery and IOL model. The evaluation results of the estimated MLR models are summarized in Tables 6–8.

Evaluation of the results revealed that the degree of mydriasis is a statistically significant risk factor for the development of all complications except “conjunctiva”. For conjunctiva, no statistically significant risk factors were found among the selected parameters (Table 6).

Table 6**Logistic regression – conjunctiva**

Parameter	Estimation of LR coefficient	Standard error	P-value	Odds ratio	2.5% limit 95% DI	97.5% limit 95% DI
Mydriasis up to 6.5 mm	-1.036	0.509	0.042	0.355	0.128	0.947
Up to 5.0 mm	0.336	0.466	0.47	1.4	0.562	3.52
Less than 4.0 mm	1.071	0.687	0.119	2.918	0.794	12.001
Gender (m)	0.073	0.376	0.846	1.076	0.517	2.276
Ages	-0.01	0.023	0.665	0.99	0.945	1.036
Phaco+IOL+ periph. irid.	0.837	0.657	0.203	2.308	0.681	9.419
Phaco+IOL+ basal coloboma	-0.226	0.633	0.721	0.798	0.233	2.877
ECCE+IOL	-0.399	0.398	0.316	0.671	0.306	1.465
AFY	-0.28	0.463	0.546	0.756	0.303	1.877
HQ Acrylic IOL	-0.21	0.632	0.739	0.81	0.233	2.855
RPR, T-19, Miol	-0.129	0.732	0.86	0.879	0.215	3.999
Acryfold	0.564	0.483	0.246	1.758	0.69	4.646

Note: AFY- American type of intraocular lens; HQ Acrylic intraocular lens- German lens type; RPR, T-19, Miol- Russian lens type; Acryfold- Indian lens type. Abbreviations: Phaco+IOL+periph. irid.: Phacoemulsification+intraocular lens+peripheral iridectomy; ECCE+IOL: Extracapsular cataract extraction+ intraocular lens.

In the regression of “photophobia” the risk of complications is 6 times higher with mydriasis up to 5 mm, in the postoperative period, and 26 times higher to get a complication with mydriasis less than 4 mm (Table 7).

Table 7**Logistic regression – photophobia**

Parameter	Estimation of LR coefficient	Standard error	P-value	Odds ratio	2.5% limit 95% DI	97.5% limit 95% DI
Mydriasis up to 6.5 mm	0.044	0.604	0.942	1.045	0.311	3.405
Up to 5.0 mm	1.855	0.534	0.001	6.393	2.333	19.203
Less than 4.0 mm	3.25	0.793	0	25.789	5.991	138.823
Gender (m)	-0.505	0.429	0.239	0.604	0.255	1.386
Ages	-0.042	0.028	0.136	0.959	0.907	1.012
Phaco+IOL+ periph. irid.	1.009	0.678	0.137	2.744	0.77	11.593
Phaco+IOL+ basal. coloboma	1.24	0.805	0.123	3.457	0.789	19.893
ECCE+IOL	-0.409	0.454	0.369	0.665	0.267	1.601
AFY	-0.089	0.526	0.866	0.915	0.324	2.575
HQ Acrylic IOL	-0.721	0.707	0.308	2.056	0.526	8.722
RPR, T-19, Miol	0.634	0.842	0.451	1.885	0.377	11.077
Acryfold	0.815	0.529	0.124	2.258	0.813	6.572

Note: AFY- American type of intraocular lens; HQ Acrylic intraocular lens- German lens type; RPR, T-19, Miol- Russian lens type; Acryfold- Indian lens type. Abbreviations: Phaco+IOL+periph. irid.: Phacoemulsification+intraocular lens+peripheral iridectomy; ECCE+IOL: Extracapsular cataract extraction+ intraocular lens.

In the regression of “anterior chamber fluid” — anterior and posterior chamber moisture, the risk of developing turbid fluid is 353 times higher with mydri-

asis less than 4 mm, and 27 times higher with mydriasis up to 5 mm (Table 8).

Table 8

Logistic regression- anterior chamber fluid

Parameter	Estimation of LR coefficient	Standard error	P-value	Odds ratio	2.5% limit 95% DI	97.5% limit 95% DI
Mydriasis up to 6.5 mm	1.77	0.667	0.008	5.871	1.683	24.243
Up to 5.0 mm	3.31	0.657	0.	27.379	8.285	113.521
Less than 4.0 mm	5.869	1.243	0	353.731	43.94	8176.802
Gender (m)	-0.272	0.479	0.57	0.762	0.295	1.953
Ages	-0.003	0.031	0.927	0.997	0.938	1.06
Phaco+IOL+ periph. irid.	0.199	0.687	0.773	1.22	0.32	4.943
Phaco+IOL+ basal. coloboma	0.664	0.826	0.422	1.942	0.409	11.305
ECCE+IOL	0.574	0.521	0.27	1.776	0.643	5.052
AFY	0.401	0.576	0.486	1.493	0.485	4.721
HQ Acrylic IOL	0.822	0.807	0.308	2.275	0.499	12.761
RPR, T-19, Miol	0.888	1.091	0.416	2.43	0.339	28.526
Acryfold	0.775	0.581	0.182	2.17	0.708	7.044

Note: AFY- American type of intraocular lens; HQ Acrylic intraocular lens- German lens type; RPR, T-19, Miol- Russian lens type; Acryfold- Indian lens type. Abbreviations: Phaco+IOL+perif. irid.: Phacoemulsification+intraocular lens+peripheral iridectomy; ECCE+IOL: Extracapsular cataract extraction+ intraocular lens.

AUC for ROC curves lie in the range of 0.7–0.9 for all complications, which indicates a good and

satisfactory choice of model parameters shown in Figures 1, 2, 3.

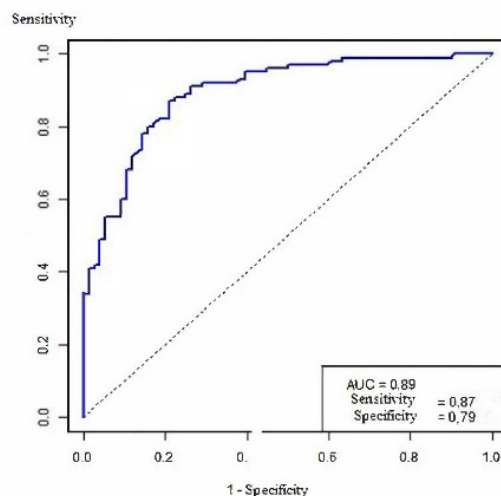


Fig 1. AUC: area under the ROC curve "anterior chamber fluid"

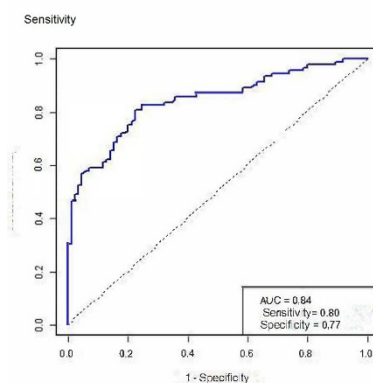


Fig 2. AUC: area under the ROC curve "photophobia"

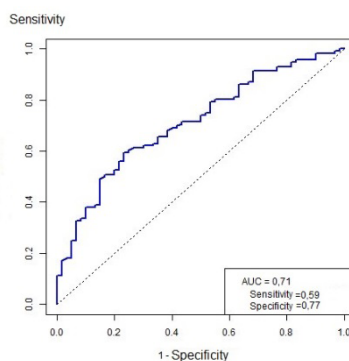


Fig 3. AUC area under the ROC curve "conjunctiva"

Conclusion

Undoubtedly, a narrow, rigid pupil causes complications in the intraoperative period, and negatively affects the postoperative period in the distant period, with the risk of complications, including IOP elevation. When planning cataract surgery, special attention should be paid to diagnosis, history taking in terms of general medical features, and most importantly, the choice of mydriatics. As the literature review shows there is no consensus on the choice, dosage, time intervals of mydriatic instillation to achieve persistent mydriasis, but to enhance the action of mydriatics, the authors undertake the prescription of drugs both NSAIDs and hormonal therapy intravenously and per os. Proceeding from the purpose of our work, we have shown what are the risks of complications in the intraoperative period in patients based on the development of our mydriatic instillation patterns.

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Влияние степени мидриаза на интраоперационные осложнения у пациентов с осложненной катарактой на фоне псевдоэксфолиативного синдрома

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Аннотация. *Актуальность.* Одна из причин слепоты и слабовидения среди патологии органа зрения является катаракта. Медикаментозно вылечить катаракту крайне малоэффективно. По данным статистики, за последний год больных с диагнозом «катаракта» составляет около миллиона. Основной способ хирургического лечения катаракты является

факоэмульсификация. Основные причины узкого зрачка при помутнений хрусталика является псевдоэксфолиативный синдром, который влияет на развитие заболевания как в интраоперационном, так и в послеоперационном периодах. Цель настоящего исследования – оценить влияние степени мидриаза на интраоперационные осложнения у пациентов с осложненной катарактой на фоне ПЭС. Материалы и методы. В исследовании принимали участие 176 пациентов различной степени тяжести ПЭС и контрольная группа без признаков ПЭС. Пациентам проводили офтальмологическую диагностику (визометрия, биомикроскопия, офтальмоскопия, КЧСМ, линейка для измерения диаметра зрачка, пневмотонометрию, ВГД по А.Н. Маклакову, грузом 10 г, ОСТ переднего отрезка). Всем пациентам помимо офтальмологических исследований, перед операцией проводили сбор анамнеза, лабораторные исследования по общепринятой методике. Предоперационная подготовка пациента включала в себя как медикаментозную терапию, так и психологический аспект. Особое значение придавалось премедикации. За 1 час до операции всем пациентам во всех исследуемых группах назначали седативный препарат (*per os*). Во всех группах наблюдения, для достижения необходимого в ходе операции циклоплегии, проводили инстилляцию мидриатиков по схеме. *Результаты и обсуждение.* Оценка результатов выявила, что степень мидриаза является статистически значимым фактором риска для развития всех осложнений кроме «конъюнктивита». Для конъюнктивита статистически значимых факторов риска среди выбранных параметров не обнаружено. AUC для ROC-кривых лежат в диапазоне 0,7–0,9 по всем осложнениям, что говорит о хорошем и удовлетворительном выборе параметров модели. В регрессии «светобоязни» риск развития осложнений в 6 раз выше при мидриазе до 5 мм, в послеоперационном периоде, и в 26 раз выше шанс получить осложнение при мидриазе менее 4 мм. В регрессии «камерной влаги» — влага передней и задней камеры — риск развития мутной жидкости в 353 раза выше при мидриазе менее 4 мм, и в 27 раз выше при мидриазе до 5 мм. *Выводы.* Характерные признаки псевдоэксфолиативного синдрома, несомненно, усложняют работу хирурга: ригидный узкий зрачок, слабость цилиарной мышцы, ириодонез, факодонез. Особое внимание при планировании хирургии катаракты следует уделять диагностике, сбору анамнеза в плане общесоматических особенностей и выбору мидриатиков. В данной работе показано, насколько сильно может повлиять степень мидриаза на осложнения в интраоперационном периоде.

Ключевые слова: осложненная катаракта, псевдоксфолиативный синдром, мидриатики, циклоплегия, ригидный зрачок, осложнения

Информация о финансировании — неприменимо

Вклад авторов: Б.Б. Бекмирова — сбор и обработка материалов, анализ полученных данных, написание текста, М.А. Фролов — концепция и дизайн исследования, редактирование рукописи. Все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией.

Информация о конфликте интересов. Авторы заявляют об отсутствии конфликтов интересов.

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