

## STATE OF THE CENTRAL RETINAL ARTERY WHEN USE OF VARIOUS LOKAL ANESTHETICS DURING OPHTHALMOLOGICAL OPERATIONS

Norbuvi Tuhtaevna Bektemirova

PhD, Senior Lecturer, Department of Anesthesiology and Intensive Care,  
Tashkent Medical Academy, Uzbekistan, Tashkent

### ABSTRACT

The article provides for the problem of choosing the optimal anesthesia option for acquired cataracts in the elderly and senile age with one or more somatic concomitant diseases, which requires a special approach to these patients in terms of preparation for surgery, choice of anesthesia and postoperative management. The main causes of disability in 15-20% of cases are visual disorders. Anesthetic aid in ophthalmology is an actual problem of modern medicine, which is due to the specifics of intraocular operations.

**Keywords:** cataract, retrobulbar blockade, bupivacaine hydrochloride, lidocaine hydrochloride.

### RELEVANCE

Anesthetic in ophthalmology is an actual problem of modern medicine, which is due to the specifics of intraocular operations.

The relevance of anesthesia in ophthalmology increases and due to the fact that more than half of patients who performed surgery patients are elderly [2, 5] having one or more somatic comorbidities, which requires a special approach to these patients in preparation for the operation, the choice of anesthesia and postoperative management.

Hemodynamic disorders are one of the most important links in the pathogenesis of diseases of the eye. By providing anesthetic in surgical ophthalmology, it is crucial to incorporate a IOP, which is in direct proportion to the eye hemodynamics. The works of many authors [1, 4] indicate that the vascular factor is one of the most important links in the mechanism of change in intraocular pressure (IOP).

### OBJECTIVE

To study the influence of the most commonly used anesthetics during retrobulbar blockade on microcirculation of eyes when ophthalmological operations.

### MATERIAL AND METHODS

The studies were performed in 115 patients operated with a diagnosis of cataracts (acquired). Patients performed the operation extracapsular cataract extraction, extracapsular cataract extraction with intraocular lens implantation (IOL EEC) and aphakia.

The age of patients in the study groups ranged from 50 to 86 years. More than half (84 patients - 79.2%) of them were between 60 to 80 years. The median age was 69.6 + 5.3 years. The allocation of the patients on the floor of the 115 female patients were 70 (61%) and male patients - 44 (39%).

## RESULTS AND DISCUSSION

We studied 115 patients, 90 patients had comorbidities. It should be noted that the majority (81 patients) stated on 2 or more concomitant diseases. The incidence of coronary heart disease (CHD) and essential hypertension (EH) prevailed over the rest of the co-morbidities (chronic pyelonephritis, chronic bronchitis, peptic ulcer, chronic hepatitis, diabetes, effects of acute stroke. All patients before admission to the hospital were subjected to clinical examination. Patients depending on the applied local anesthetic for retrobulbar blockade were divided into three groups. Group I consisted of patients who as a local anesthetic is used 2-4% procaine, in group II using 2-4% lidocaine, and in group III for conduction anesthesia used 0.5% bupivacaine solution.

For the purpose of comparability of comparable groups, we consciously formed the group so that all the parameters were representation.

To study the ocular hemodynamics using Doppler ultrasound (Doppler ultrasound), which carried them. Doppler ultrasound was performed on the ultrasonic «Kransbuhler» company DOPPLEROGRAPHY at a radiation frequency of 4 MHz and 8 in a continuous mode.

The technique used to visualize blood flow in the central retinal artery (CRA). The following hemodynamic parameters were evaluated in a quantitative analysis:

1. Vs – maximum systolic blood flow velocity, cm / sec;
2. Vd - a finite diastolic velocity, it reflects resiliently-elastic properties of the arteries, cm / sec;
3. Ri - the index of circulatory resistance or resistance index (index Purcell), reflecting the increase in blood flow resistance in the blood vessels.

All patients 30 minutes before surgery intramuscular premedication (diphenhydramine 0.1 mg / kg, diazepam 0.25 mg / kg or droperidol 0,125mg / kg and non-narcotic analgesics) was carried out.

Regional blockade in all the studied groups was performed according to the method proposed by J. Morgan, Michael C.(1998) (3). The volume of solution and concentration dependent on the anatomical features of the eyeball and performed surgery. Thus in patients with endophthalmitis for the "elimination" of the eyeball, creating favorable conditions for the surgeon entered for retrobulbar anesthesia was in the range of 5 to 10 ml. And for patients with protrusion of the eyeball and the orbit of the smaller volume - from 3 to 5 ml. The average volume of the solution was  $7.2 \pm 0.4$  mL. Facial nerve blockade we conducted by Lintu baths. We used 25G gauge needle with a blunt tip. Vkoloy did in the lower eyelid between the middle and lateral thirds of the orbit (typically 0.5 cm medial to the lateral canthus). The patient is asked to look up above the tip of the nose, the needle is propelled by 3.5 cm towards the top of the muscle cone. Eliminating intravascular location using aspiration needle samples, the local anesthetic was injected, then the needle was removed. Retrobulbar block provides anesthesia, akinesis (immobility of the eyeball), and eliminated oculocephalic reflex. In the implementation of sedation, we are aware of the fact that it does not matter what kind of drug used and the dose as well as a deep sedation is contraindicated in ophthalmic interventions, because it increases the risk of apnea and involuntary movements of the patient during surgery. On the other hand, superficial sedation does not prevent discomfort when performing retrobulbar blockade. For sedation, we used all cases propofol. Depending on age and comorbidity using this drug in the dose  $0.8 + 0.3$  mg / kg to outside vibrations from 0.3 to 1.2 mg / kg, which is administered

intravenously in a bolus over 1-5 minutes. Further adjustment of the desired depth of sedation carried drip intravenous administration of the drug in doses of from 1.5 to 4.5 mg / kg / hr (average of  $2.9 \pm 0.2$  mg / kg / h). For rapid deepening of sedation with an additional bolus of 10-20 mg of propofol.

Regardless of the method of sedation was conducted constant monitoring of respiration and oxygenation (pulse oximetry), control of blood pressure (BP) and heart rate (HR). And in patients with concomitant diseases of the cardiovascular system (CVS) - ECG monitoring.

Qualitative and quantitative assessment of anesthetic eye under the action of local anesthetics were carried out on the change of intraocular hemodynamics. The activity of local anesthetics during regional anesthesia of the eyeball was evaluated by the presence of ptosis and lack of movement of the eyeball in all directions.

Condition of the central retinal artery Doppler ultrasound in the studied patients.

Many authors have noted the relationship of hemodynamics in the ophthalmic artery to the IOP and hydrodynamics. In connection with this present in this chapter an analysis of the results of regional hemodynamics in the studied groups of patients, as detailed study of hemodynamics of the eye is one of the objective parameters of the microvasculature.

For the purpose of the comparative study of the effect of individual local anesthetics on hemodynamic parameters CAC, we compared the data studied in groups. If systolic blood flow in Group I before and after the anesthetic novocaine increased by 3.5%; then in groups II and III, where the anesthetic lidocaine and implemented by bupivacaine the figure is 13.8% and 15.4%. The increase in end-diastolic velocity in the CACs, if compared in groups, before and after the blockade on the research stages, respectively, was 7.9%; 10.2% and 60.9%. When comparing the circulatory resistance index changes in the studied group notes the following: in group I decrease the tone of resistive vessels after anesthesia was 25% in groups II and III - 37.5% and 55.5%, respectively.

#### Hemodynamic CAC studied groups

The studied group		Hemodynamic		
		Vmax, cm/c	Vmin, cm/c	Ri
I Group (n=35)	before anesthesia	11,3±0,5	3,8±0,2	0,80±0,01
	after anesthesia	11,7±0,5	4,1±0,3	0,62±0,01*
II Group (n=30)	before anesthesia	10,9±0,4	3,9±0,2	0,80±0,02
	after anesthesia	12,4±0,3*	4,3±0,4	0,50±0,03*
III Group (n=50)	before anesthesia	11,0±0,3	4,1±0,3	0,90±0,01
	after anesthesia	12,7±0,3*	6,6±0,2*	0,51±0,03*
Norm		14,0±1,6	4,1±0,4	0,7

Note: where \* P<0,05.

From the table above clearly visible unidirectional hemodynamic changes CAC caused by local anesthetics used by us, but the severity of these changes and the point of application of several different



When comparing the initial values  $V_{max}$ ,  $V_{min}$  and  $R_i$  patients in all three groups with the normal values of these parameters, they are all statistically significant ( $P < 0.05$ ) were lower than what we have explained the age characteristics and the presence of ophthalmic pathologies.

However, the actions of each of the local anesthetics used in the hemodynamic parameters studied CAC noted for their severity. So, if the systolic and diastolic blood flow velocity in patients of Group I after novocaine blockade a tendency to increase ( $P > 0.05$ ), the tone of resistance vessels microcirculation significantly decreased ( $P < 0.05$ ) by 29%. Lidocaine resulted in slightly more pronounced changes in hemodynamic parameters studied CAC regarding novocaine.  $V_{max}$  and  $V_{min}$  in patients of Group II having increased after blockade by 13.8 and 10.2%, respectively, exceeded the same indicators in the I group of patients by 10.3% ( $P < 0.05$ ) and 2.3% ( $P > 0.05$ ). Statistically significant ( $P < 0.05$ ) greater lidocaine reduced the tone of resistance vessels of the retina eyes than novocaine.

The most improved blood flow velocity and  $V_{max}$  and  $V_{min}$  during retrobulbar blockade with bupivacaine, which is 11.9% ( $P < 0.05$ ) and 53% ( $P < 0.02$ ) exceeded the same indicators of the patients in group I, respectively, and at 1, 6% ( $P < 0.05$ ) and 50.7% ( $P < 0.05$ ) in group II patients. Regarding the state of the tone of resistance vessels of the retina, the bupivacaine, reducing it to 55.5% compared to the initial values, has a stronger effect in comparison with the groups I and II by 33% ( $P < 0.05$ ) and 18% ( $P < 0.05$ ), respectively

### CONCLUSIONS

Thus, in its capacity, we studied anesthetics can be distributed in the following order: procaine - lidocaine - bupivacaine. It is known that the capacity of anesthetic depends on the solubility in fats: the higher the solubility of the anesthetic in the fats, the pronounced effect. In this case, if the solubility of novocaine in fats  $< 1$ , then for lidocaine and bupivacaine, the figure is 4 and 28. In the most blood flow is improved by retrobulbar blockade with bupivacaine, with respect to the use of novocaine and lidocaine.

During the surgery, requiring a long-term deep anesthesia may be used 0.5% bupivacaine - a drug with strong anesthetic properties. Also it should be noted that the most improved blood flow during retrobulbar blockade with bupivacaine, which exceeded the same indicators in patients with Group I and II that proved Ultrasonic Doppler CAC.

### BIBLIOGRAPHY

1. Alekseev V.V., Strakhov V.V., Korchagin N.V. Plethysmographic and pathological parallels reduce intraocular volumetric blood flow in primary open-angle glaucoma // *Clinical Ophthalmology* - 2010. - №4. - C. 120-123.
2. Gorbunov A.V, Osokina Yu. Yu. Modern Tactics of treatment of degenerative diseases of the retina in patients older age group. - *The success of Gerontology*. - 2010. - №4. - C. 636-643.
3. J. Edward Morgan-ml., S. Michael Magid. *Clinical Physiology / Trans. with Eng.* - L.: Bean, 430.
4. Abdullaeva, B. P. (2022). Use of Team Sports in Physical Education Activities in Preschool Educational Organizations in Our Country and Abroad. *Periodica Journal of Modern Philosophy, Social Sciences and Humanities*, 12, 116-120.

5. Abdullaeva, B. P. (2022). Analysis of the Level of Proficiency in the Elements of Playing Football by Children of Senior Preschool Age. *International Journal of Multicultural and Multireligious Understanding*, 9(4), 110-115.
6. Abdullayeva, B. P. (2022). Physical Education of Preschool Children Cultivate Qualities. *International Journal of Innovative Research in Science Engineering and Technology*, 11(3), 2212-2214.
7. Abdullaeva, B. P. (2021). Football as a means of Physical Education. *Current Research Journal of Pedagogics*, 2(08), 72-76.
8. Abdullaeva, B. P. (2021). Teaching a Child to Play Football from a Youth. *The American Journal of Interdisciplinary Innovations Research*, 3(04), 147-151.
9. Абдуллаева, Б. П. (2021). Футбол в дошкольном возрасте: проблемы и решения. *Экономика и социум*, (8), 336-340.
10. Abdullayeva, B. P. (2021). Boshlang'ich futbol elementlari shartlari va vazifalarini klaster asosida o'rgatish. *Academic research in educational sciences*, 2(CSPI conference 1), 18-22.
11. Abdullayeva, B. P. (2021). The Main Criteria Used in Teaching the Elements of Football in Preschool Education. *Экономика и социум*, (4-2), 854-859.
12. Turdaliyevich, A. F., & Pulatovna, A. B. (2020). Organization of Swimming Lessons in Preschool Institutions. *The American Journal of Social Science and Education Innovations*, 2(07), 322-330.
13. Turdaliyevich, A. F. (2020). Center For Scientific And Methodological Support, Retraining And Advanced Training Of Specialists In Physical Culture And Sport Under The Ministry Of Physical Culture And Sports Of The Republic Of Uzbekistan. *Journal of Social Science and Education Innovations*, 2(2), 322-330.
14. Abdullaev, F. T. (2022). Theoretical and Practical Basis of Determining Fitness for Sports. *Periodica Journal of Modern Philosophy, Social Sciences and Humanities*, 12, 121-128.
15. Farhod, A. (2022). Boksda mashg'ulotning tashkil etilishi va metodikasi asoslari: Abdullayev Farhod, O'zbekiston Respublikasi Jismoniy tarbiya va sport vazirligi huzuridagi jismoniy tarbiya va sport bo'yicha mutaxassislarni ilmiy-metodik ta'minlash, qayta tayyorlash va malakasini oshirish instituti. *Образование и инновационные исследования международный научно-методический журнал*, (3), 142-146.
16. Turdalievich, A. F. (2022). Youth Sports Development. *Galaxy International Interdisciplinary Research Journal*, 10(5), 781-785.
17. Abdullayev, F. T. (2022). Olimpiya va paralimpiya o'yinlariga zamonaviy sport tayyorgarligining dolzarb muammolari. 2021 yilda o'tkazilgan XXXII yozgi Olimpiya va XVI Paralimpiya o'yinlari, 1(5), 4-6.
18. Abdullayev, F. T. (2022). Yosh bokschilarning musobaqa va mashg'ulot faoliyati xususiyatlarini hisobga olgan holda ularning texnik taktik tayyorgarligi. *Monografiya*, 1(1), 100-155.
19. Абдуллаев, Ф.Т., Жуманов, О.С. (2020). Машғул� жангларида ва мусобақаларда ҳаракатларнинг қўлланилиш кўрсаткичларининг индивидуаллашувига таъсир қилувчи омиллар. 2020 йилда ўтказиладиган XXXII ёзги олимпия ва хvi паралимпия ўйинларига спортчиларни тайёрлашнинг долзарб муаммолари, 1(2), 171-173.

20. Абдуллаев, Ф.Т., Пардаев, Б.П. (2020). Ёш боксчиларда машғулот жанглари ва мусобақалардаги тайёргарлик ҳаракатларини такомиллаштириш. 2020 йилда ўтказиладиган XXXII ёзги олимпия ва XVI паралимпия ўйинларига спортчиларни тайёрлашнинг долзарб муаммолари, 1(1), 8-10.
21. Turdalievich, A. F., & Turdalievich, P. B. (2020). The Role of Public Sports and Health Measures in Strengthening Children's Bodies. Academic Research in Educational Sciences, (4), 9-14.