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*Sample Availability:*Samples of (2*E*,4*E*,7*Z*)-deca-2,4,7-trienoate-2-*O*- β -D-glucopyranosyl- β -D-glucopyranoside (**1**) and amyl-1-*O*- β -D-apiofuranosyl-1,6-*O*- β -D-glucopyranoside (**2**) are available from the authors.

About efficiency of complex therapy of refractive amblyopia

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Abstracts: The results of complex treatment refractive ambliopia in patients with high myopia, includes eximer laser refractive surgery (Epi-LASIK) in combined with using the drug Ceraxon and electrical stimulation of retina and optic nerve, was studied. Complex treatment refractive amblyopia in patient with high myopia leads to increasing vision acuity after treatment in average by 25%, in fact improve hemodynamics of ophthalmic artery, central retinal artery, and short posterior ciliary arteries, decrease period of revitalizing of visual function and made postoperative period of rehabilitation faster.

Key words: high myopia, refractive amblyopia, hemodynamics, Ceraxon (citikolin), electrical stimulation of retina and optic nerve, Epi -LASIK.

Refractive anomalies are the most widespread pathology of the visual analyzer at present. Actual direction is the development of correction methods in patients with amblyopia, which developed on the base of refractive anomaly. Recently, a number of foreign and domestic scholars have noted improvement in visual acuity in patients with refractive and anisometric amblyopia after the excimer laser refractive operation. In recent years, there are reports in the literature about the using pharmacological drugs: piracetam, nootropil, instenon, vizobalans, mildronate, pikamilon, fezam, in complex treatment of amblyopia in children. Results of complex treatment was evaluated positively, suggesting that the use of pharmacological drugs that contribute to successful treatment of amblyopia - one of today's promising. Citikolin (Ceraxon by firm «Nycomed») is of special interest, whose effectiveness is proved by numerous clinical studies and publications. Citikolin registered in over 40 countries and over 18 years, is widely used in neuroscience as a drug neurotransmitter, neuroreceptor, neurotrophic actions in patients with acute cerebral insufficiency of various origins. Pharmacotherapeutic group: nootropic drugs. Citikolin (cytidine-5-difosfoholin) - is an organic substance, which belongs to the group of nucleotides - of biomolecules, which play an important role in cellular metabolism. Citikolin (cytidine-5-difosfoholin) is an essential precursor of phosphatidylcholine (lecithin), a major phospholipid of all cell membranes, including neuronal membranes. Choline is also involved in the synthesis of acetylcholine, and citikolin is a donor of choline in the synthesis of acetylcholine. All these effects contribute to the activation energy processes in neurons recovery of neuronal mitochondrial cytochrome oxidase, which normalizes the processes of tissue respiration, lead to inhibition of glutamatinduces apoptosis. Analyzing the pharmacokinetics of the Citikolin, it should be noted such features as water solubility, bioavailability to 99%.

So, given all the positive effects of the Citikolin can be argued that the choice of this drug for our study is justified. The aim of this study was to examine the effectiveness of complex treatment of refractive amblyopia patients with high myopia by using drugs Ceraxon with subsequent electrical stimulation of retina and optic nerve.

Materials and methods

A complex examination of 70 persons (128 eyes) with refractive amblyopia of 1 and 2 degrees, operated by the Epi-LASIK in Amur Regional Clinical Hospital was conducted.

The study included 31 women (56 eyes) and 39 men (72 eyes) aged from 20 to 30 years.

All patients had revealed high myopia complicated by amblyopia one or both eyes with central fixation. The average value of the spherical component was $-8,0 \pm 0,32$ diopters (sphere size ranged from -6.5 to -9.5 diopters). Amblyopia of 1 degree is occurred in 92.3% of cases (118 eyes) and in 7,7% of cases - amblyopia of 2 degree (10 eyes). The study was not included the cases when the patient's visual acuity with a maximum spherocylindrical correction was 0.8 or higher. Visual acuity in the amblyopic eye with maximum spherocylindrical correction before surgery ranged from 0,15 to 0,75 and in average it was $0,58 \pm 0,02$, while portable correction gave a significantly lower visual acuity.

Binocular vision were detected in all patients with amblyopia of 1 degree, while in all patients with 2 degrees of amblyopia monocular vision was determined.

Indicators of intraocular pressure, static computer perimetry were within normal limits both at baseline and during subsequent surveys. A number of patients underwent peripheral retinal laser coagulation if it necessary according to the results of ophthalmoscopic examination.

All patients underwent excimer laser refractive surgery (Epi-LASIK) by the excimer laser "Microscan - 2000" (Russia). Standard course of anti-inflammatory therapy were performed for all patients postoperatively.

Study group of patients with high myopia and refractive amblyopia (35 persons (65 eyes)) between the ages of 20 to 30 years after the excimer laser correction of the drug Ceraxon was injected intravenously in 500 mg daily for 10 days in combination with electrical stimulation of the retina and optic nerve. Electrical stimulation was carried out with use ESOM MNPP "Neuron" daily 1 per day for 12 minutes, the treatment consisted of 10 sessions.

Treatment results of the study group compared with the results of the control group (35 patients (63 eyes)) who underwent excimer laser refractive surgery (Epi-LASIK). Observation period was 3 months after surgery. Studies of visual acuity, autorefraktometries, electrical sensitivity threshold and electrical lability of retina and optic nerve, hemodynamics of ophthalmic artery, central retinal artery, and short posterior ciliary arteries with use ultrasound machine Toshiba Aplio conducted in dynamics: before treatment, after treatment, after 1 and 3 months.

Results and discussion

Conducting excimer laser refractive surgery Epi-LASIK resulted in a statistically significant change in refractive error compared with the preoperative performance. Averages of residual ametropia in all patients did not exceed $\pm 1,0$ dpt. Visual acuity in the amblyopic eyes in the study group increased 3 months after surgery in 95% of cases in the control group, only 75% of cases.

In the study group after treatment, uncorrected visual acuity increased in average by $0,25 \pm 0,02$ (n = 65) (p <0.001) after 3 months, reached 0,9-1,0. In the control group, the increase in visual acuity, in average by $0,1 \pm 0,02$ (n = 63) (p <0,001) after 1 month and 3 months the trend of rising acuity in average 0,6-0,7.

Differences of electrical sensitivity threshold and electrical lability of retina and optic nerve before and after treatment in the study group patients were statistically significant after treatment in the direction of decreasing 2-fold from baseline. In the control group also noted a slight decrease in these parameters or they remained unchanged in the determination by an equal amount of time with the study group.

In the study group showed a significant increase of blood flow velocity indices after treatment: the ophthalmic artery in average by 32%, the central retinal artery in average by 24% and short posterior ciliary arteries in average by 20%, decrease of the peripheral resistance indices. In

the control group Hemodynamic indices significantly did not change during 3 months of observation.

Thus, the received results suggest the usefulness of the drug Ceraxon in the complex treatment of refractive amblyopia patients with high myopia.

Conclusions

1. Excimer laser refractive surgery (Epi-LASIK) is the most effective method for correcting high myopia, allowing in fact improve visual acuity in cases with refractive amblyopia.
2. Adoption complex surgical treatment lead to increasing visual acuity after treatment in average by 25%, decrease period of visual functions revitalizing and made postoperative period of visual rehabilitation faster, contribute to stability of treatment results.
3. Application of the drug Ceraxon in combination with electrical stimulation of the retina and optic nerve in the surgical treatment of refractive amblyopia patients with high myopia in fact improve hemodynamic of vessels of the eye and orbit.

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