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OPTIMIZATION OF MODERN TREATMENT OF POST-TRAUMATIC DISEASES OF THE CORNEA

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Abstract.
Currently, one of the urgent tasks of preventive medicine and ophthalmology is to increase the effectiveness of rehabilitation measures in patients with diseases of the organ of vision, among which post-traumatic corneal damage occupies an important place. Cornea pathology accounts for 1/4-1/5 of all eye diseases. In 25-75% of cases, the disease process can end with consequences ranging from various blurs leading to vision loss or vision loss. It is especially relevant to research treatment methods aimed at accelerating the regeneration process and maintaining the transparency of the cornea in various diseases. In the search for the most effective methods of treating post-traumatic corneal damage, we focused on the positive features of using a low-frequency magnetic field.
Keywords: *cornea,* eye damage, corneal ulcer, *low-frequency magnetic field, magnetotherapy, "Ophtalmag".*

1. Introduction.

The cornea is the least protected part of the eye from external influences, and it is often damaged. Corneal diseases, including traumatic injuries, account for at least 25% of all eye pathologies, 47-70% of all corneal diseases, the consequences of corneal diseases and injuries are the most common cause of blindness from corneal pathology [1, 3, 5].

In the World, the number of patients with monocular blindness as a result of corneal damage and ulcer increases by 1,5-2 million people every year. 8-9% of corneal ulcers lead to loss of the eye as an organ, 25% to visual impairment, and 17% to enucleation due to ineffective treatment, and therefore the problem of corneal damage and wound healing becomes important [6, 7, 9]. Annual health care costs for corneal ulcers in the USA are estimated at $175 million [10, 12].

The etiology of a corneal ulcer can be related to both exogenous factors - injury, infection, and endogenous factors - general, infectious and systemic diseases. It should be noted that among all types of wounds, traumatic wounds are the most common cause of eye loss [2, 8, 11]. Therefore, it is especially relevant to research treatment methods aimed at accelerating the regeneration process and maintaining corneal clarity in corneal pathologies. In medicine, the use of a magnetic field through magnetotherapeutic devices has anti-inflammatory and anti-tumor, trophic, reparative and immunomodulatory effects. Saveleva M.V. *and according to the co-authors, low-frequency magnetic therapy has a positive effect in the recovery from herpetic keratitis, in reducing corneal edema after cataract extraction surgery [4]. In the search for the most effective methods of treating post-traumatic corneal damage, we focused on the positive features of using a low-frequency magnetic field.*

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2. Purpose of the Study.

Improvement of comprehensive treatment using low-frequency magnetic field in the treatment of post-traumatic corneal lesions.

3. Materials and research methods.

40 patients (40 eyes) from 19 to 72 years of age who received treatment for post-traumatic corneal damage at the Republican Clinical Ophthalmological Hospital of the Ministry of Health of the Republic of Uzbekistan *participated in the study, their average age was 42,9±2,32 years, of which 36 were men and 4 were women. Indications for treatment in patients were post-traumatic corneal ulceration. All patients were divided into 2 groups, which were compared according to gender, age, visual acuity, size of wound and infiltrate. In the control group (20 patients), the treatment was carried out in the traditional way based on the standard. The treatment was carried out with the help of antiseptic, antibacterial, keratoprotector, antibiotic, antiviral drugs and mydriatics. In the main group (20 patients) in addition to standard treatment, magnetotherapy using a low-frequency magnetic field was used. Magnetotherapy with the help of a low-frequency magnetic field was carried out on the "Oftalmag" device manufactured at the "Елатомский приборный завод" of the Russian Federation, the inductor was symmetrically placed in the orbital area without contact, the induction was 6 mTl, the frequency was 2 Hz, the exposure mode was continuous. The treatment course consisted of 10 sessions lasting 20 minutes each day (Figure 1).*

Figure 1. *"Oftalmag" device.*

Visual acuity, infiltration, and wound defect size were measured in all patients to evaluate treatment efficacy.

4. Results and its Discussion.

Patients had complaints of blurred vision, eye redness, sensation of a foreign body in the eye, lacrimation and photophobia, and pain in the eye before admission to inpatient treatment (Figure 2).

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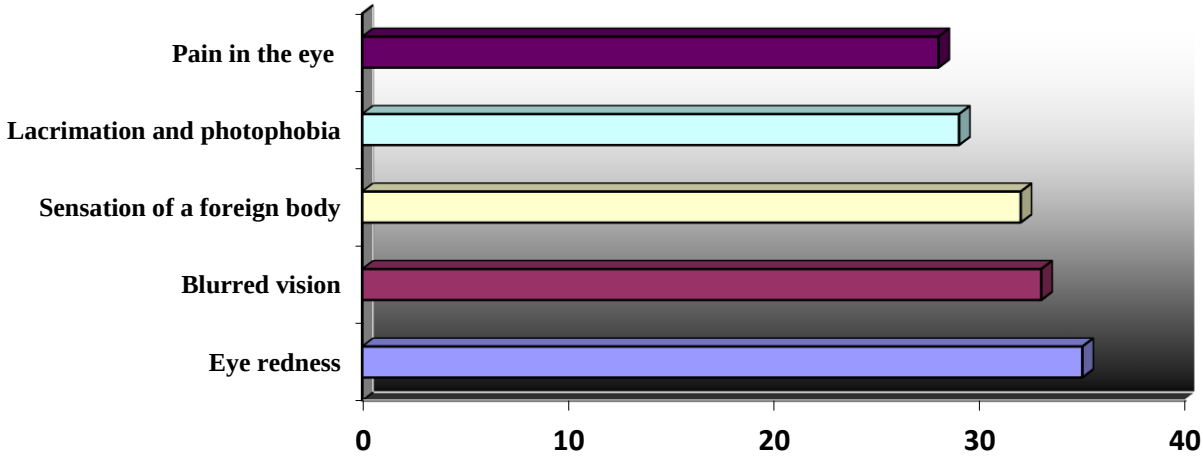

Figure 2. *The most frequently observed complaints in patients.*

All patients had a decrease in visual acuity before treatment, which was 0,4 from light perception (1/∞ pr. l. certa) in the right projection. Light perception in the right projection, which is considered a severe condition of visual acuity , was observed in 15 eyes, in the main group – 8 eyes, in the control group – 7 eyes. On the 10th day of treatment in the main group, the mean visual acuity was 0,38±0,07, which was significantly higher than the value in the control group (0,23±0,05).

The average visual acuity in the main group remained higher than that of the control group during the 2-month follow-up, that is, throughout the study ($p<0.05$). After 2 months, the mean visual acuity in the main group was 0,68±0,07, and in the control group – 0,41±0,07, there were significant differences in visual acuity between the groups (Figure 3).

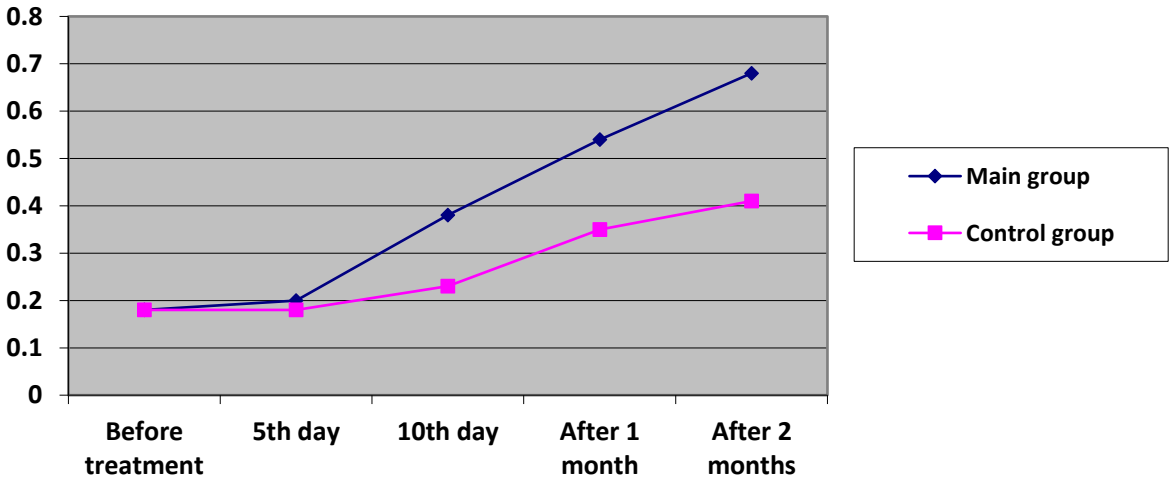

Figure 3. *Dynamic changes in visual acuity.*

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Also, patients in the groups were compared according to the size of the corneal ulcer and infiltrate. Before treatment, corneal ulcer diameter ranged from 1,8 to 4,9 mm (mean diameter 3,25±0,17 mm) and mean infiltrate diameter 6,0±0,35 mm in all patients. The largest amount, 3,1 mm corneal ulcer was observed in 8 clinical cases. None of the patients showed signs of corneal ulcer perforation. One month after treatment, complete epithelialization was noted in all patients in the main group, while in the control group, 3 patients had very small ulcers (Table 1).

Table 1.

Dynamics of corneal ulcer size

Treatment and follow-up period	1th day	5th day	10th day	After 1 month	After 2 months
Main group (n=20)	3,23±0,23 mm	1,81±0,16 mm	0,47±0,04 mm	0±0 mm	0±0 mm
Control group (n=20)	3,27±0,24 mm	2,17±0,19 mm	0,72±0,06 mm	0,02±0,01 mm	0±0 mm

The analysis of the effectiveness of the treatment by means of a two-way comparison of the size of the infiltrate in the cornea of patients showed that the size of the infiltrate decreased by 12% more in the main group than in the control group on the 10th day of treatment, and a positive dynamic was observed. During the treatment, the effectiveness of low-frequency magnetic field application in the size of the corneal infiltration area was higher than that of the standard conventional treatment (Table 2).

Table 2.

Dynamics of corneal infiltrate size

Treatment and follow-up period	1th day	5th day	10th day	After 1 month	After 2 months
Main group (n=20)	5,98 ±0,47 mm	4,48±0,35 mm	2,67± 0,21 mm	1,88 ± 0,15 mm	1,16 ± 0,10 mm
Control group (n=20)	6,02±0,52 mm	4,67±0,41 mm	3,39±0,30 mm	2,62±0,23 mm	2,02±0,18 mm

Thus, the analysis of the results showed that, in addition to the standard conventional treatment, complex treatment with a low-frequency magnetic field significantly improved visual acuity, and reduced the size of the wound defect and infiltration area more in patients with corneal ulcers. In addition to a decrease in the size of the infiltrate, the patients had a very rapid epithelization of the corneal tissue defect. Reduction and improvement of subjective

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symptoms were noted in all treated patients. It should be noted that all patients noted a decrease in photophobia and lacrimation, as well as the disappearance of foreign body sensation and blepharospasm. There were no side effects of using the magnetotherapy device during the treatment.

In conclusion, the use of low-frequency magnetic field in addition to standard conventional treatment showed a positive therapeutic effect for post-traumatic corneal wound, reducing the time of corneal wound epithelialization and faster resolution of corneal inflammatory response compared to standard conventional treatment. and helped to improve the clinical and functional indicators of the eye.

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