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First Results of Treatment of Patients with Bullous keratopathy by Corneal Collagen Cross - Linking Method

ABSTRACT

Cross - linking method is based on the combined use of ultraviolet radiation and photosensibilizer. The method relies on increasing the number of inter-and intra fibrillary covalent links between collagen fibers. In recent years, researches on the applicability of cross-linking in patients with endothelial- epithelial dystrophy of the cornea were held. 8 patients (8 eyes) with bullous keratopathy were observed who underwent the cross-linking of the cornea. Conducting cross-linking of corneal collagen in patients with bullous keratopathy in the early postoperative period can reduce swelling, increase the transparency of the cornea, and improve visual acuity and corneal arrest syndrome.

Keywords: cross-linking, collagen, keratopathy.

INTRODUCTION

Bullous keratopathy is a dystrophic disease of the cornea that develops as a result of the loss or dysfunction of endothelial cells. As a consequence there is penetration of intraocular fluid in the cornea, impregnating her layers and disruption of water and salt metabolism. As a result, there is swelling, corneal opacity, which is manifested decrease in visual acuity, as well as the formation of bubbles in the epithelium - "Bull", which, torn form erosive surface and thereby cause severe pain, tearing and photophobia [3].

Drug treatment of bullous keratopathy and ineffective is that a symptomatic drugs.

Currently, a new method of treatment of corneal pathologies - corneal collagen cross linking [4,5].

Cross linking is based on the combined use of ultraviolet radiation and photosensibilizer helps to strengthen collagen fibrils and increase biomechanical stability of the cornea. The method relies on increasing the number of inter-and intra fibrillary covalent links resulting from exposure to ultraviolet radiation on riboflavin, with the release of free radicals, which induce the formation of cross-links between collagen molecules [1,2].

Designed Seiler T., Wollensak G. 2003 collagen cross-linking method has been used successfully in the treatment of progressive corneal ectasia different etiology [6,7].

In recent years, research on the applicability of cross-linking in patients with endothelial-epithelial dystrophy (EED) of the cornea [1,5].

Purpose - to determine the efficacy of corneal collagen crosslinking treatment bullous keratopathy.

MATERIAL AND METHODS

The Department of Eye Microsurgery of the Amur Regional Hospital under observation were 8 patients (8 eyes) aged 65 - 83 years from the bullous form of induced corneal dystrophy (photo № - 1), which in the acute phase was conducted cross-linking of corneal collagen.

Indication for the procedure UV - irradiation with riboflavin was bullous stage endothelial - epithelial corneal dystrophy with severe corneal syndrome.

Contraindication for cross linking was the presence in patients with a history of herpetic keratitis, increased intraocular pressure, corneal thickness less than 400 microns, allergic reactions to riboflavin.

All patients underwent pre-and postoperative period received a standard eye examination. Besides it the patients underwent pachymetry.

During the night before the operation antiinflammatory (diclofenac 0.1 % solution) and antibiotics (ciprofloxacin 0.3 % solution), 4 times a day were prescribed. The operation was performed by standard procedure. Local anesthesia was carried instillation of 0.4 % solution oxibuprocaine. After blefarostat installing there was performed corneal deepitelization, short 1 - 2 mm to limb area. Thorough and complete removal of the epithelium is necessary in order to more easily riboflavin below lying in a penetrated layers of the cornea , which is necessary to protect the corneal endothelium , lens and retina from the damaging effect of UV light. Thereafter, the patient was instilled a solution containing 0.1% of riboflavin, for 30 minutes every 3-5 minutes. The unit UFalink (Russia) effects on the cornea was performed with ultraviolet irradiation (370 nm, E = 3,0 mW/cm2) for 30 minutes. During UV- irradiation continued instillation of riboflavin solution every 5 minutes. After an automatic shutoff device cornea was washed with saline was instilled into the conjunctival cavity antibacterial drops - ciprofloxacin 0.3%, imposed a soft contact lens. Postoperatively topically administered antibiotic (ciprofloxacin 0.3% solution), anti-inflammatory (diclofenac 0.1% solution) and reparative (korneregel) therapy (photo № - 3). Contact lens removed after complete epithelialization of the cornea.

Follow-up examinations were carried out on the 1st, 7th, 14th day and at 1, 2, 3 months postoperatively.

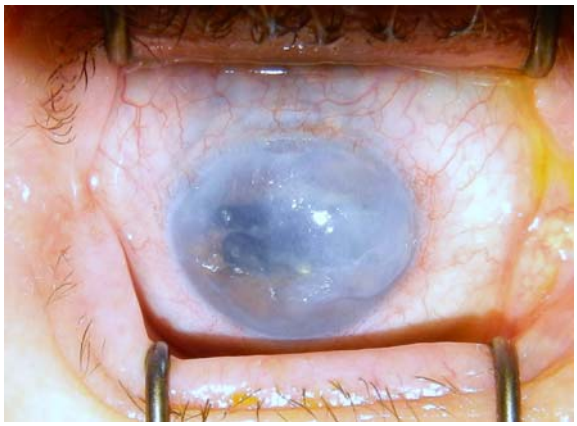
RESULTS AND DISCUSSION

As a result of surgery all patients had preserved the integrity of the cornea, docked and inflammatory pain. Corneal epithelialization process was completed in an average of 6,1 ± 1,2 day. Biomicroscopy after removing the lens epithelium full (photo № - 2). According pachymetry after 14 days there was a tendency to a decrease of the average cornea thickness of 65 ± 3,1 mm and hence the reduction of edema. After 3 months pachymetry indicators were below baseline by 134 ± 2,6 mm. By the end of the first week after crosslinking was an increase in visual acuity from 0.01 to 0.06. In one case, an increase in visual acuity from 0.05 to 0.4. Increased considerably and the transparency of the cornea was stable, even at day 7 became more clearly the detailed structure of the anterior chamber (photo № - 3). 6 patients showed a significant decrease corneal syndrome throughout the observation period in 2 patients operated relapse pain of varying severity that required additional medical correction destination.

Positive clinical corneal collagen cross linking effect in patients with bullous keratopathy , presumably associated with the effect of " contraction " which occurs when reducing the area for the number of existing corneal endothelial cells , they can improve the barrier function of [1,2] . Also occurs after exposure to strengthen the links between collagen fibers prevent the penetration of intraocular fluid in the layers of the cornea .Using the method of cross-linking of collagen in the treatment of patients in the advanced stages of EED requires further research and analysis of long-term results.

CONCLUSIONS

Conducting cross-linking of corneal collagen in patients with bullous keratopathy in the early postoperative period can reduce swelling, increase the transparency of the cornea, and improve visual acuity and corneal arrest syndrome.



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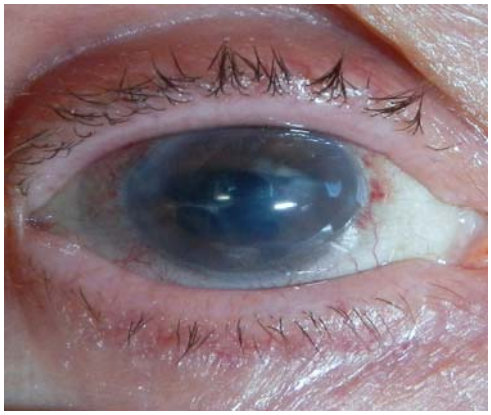

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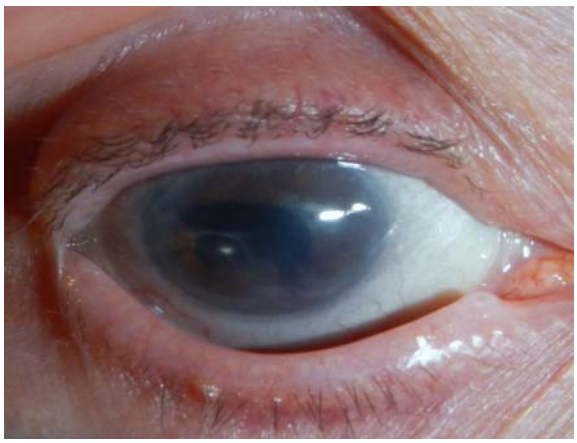

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The patient's eye before cross linking (a), after 1 day (b) and 7 days after cross linking.

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