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• 4231

S.Fyodorov Eye Microsurgery Complex: Past, present and future

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Prof. S. Fyodorov is known for his multiple innovations in refractive and cataract surgery fields. He founded Eye Microsurgery Institute in 1980. The main concept was to combine clinical, research, educational and manufacturing activities under one roof. In 1986, Eye Microsurgery Complex was created, headquartered in Moscow with satellite clinics installed in 11 cities. This allowed spreading modern eye surgery technologies, covering all Russian territories and providing high quality eye care. In 2000, after Fyodorov passed away, the Complex started to bear his name. Currently the number of employees is exceeding 4,500 employees. In 2013 all clinics jointly performed over 225,000 eye surgeries. Along with the clinical activities; extensive scientific and educational work is being performed. Wet Labs for teaching ophthalmic surgeries are established in 6 locations including Moscow. Wide range of research activities is focused on the new surgical technologies in cataract and implant surgery, corneal transplantation, laser refractive surgery, glaucoma, pediatric eye care, stem cell research, and many others. Overview of the historical and current activities of the S. Fyodorov Eye Microsurgery Complex will be presented.

• 4233

Local immunocorrection with MMSC-like limbal cells in high-risk keratoplasty patients

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Background. Local immunosuppressive therapy resistance in over that 45% of recipients in high-risk keratoplasty determines search for the new methods of immune reaction suppression by activation of physiological tolerance mechanisms based on the cell technologies. With this in view mesenchymal stem/progenitor limbal cells with phenotype and properties of bone marrow MMSCs are of great interest as they form an outer cell-tissue niche of the eyeball, accomplish local immunity regulation, physiological and reparative corneal regeneration. Purpose. To evaluate cadaveric donor graft survival rate in high-risk recipients by co-transplantation of pre-cultured allogenic limbal transplants. Materials and methods. As a first step limbal transplants taken from the cadaver eye were cultured for 25.0 ± 3.0 days in the medium (Borzenok-Moroz). Functional activity of the cells was monitored by the content of pro- and anti-inflammatory cytokines in the culture medium by ELISA. Phenotype of the cells after culturing was determined by flow cytometry with a panel of antibodies to MMSCs. At the second (clinical) step penetrating keratoplasties were carried out in 69 high-risk patients. Experimental group (1st) comprised of 36 patients whom cultured limbal cells and cadaver corneas were transplanted simultaneously. In the 2nd (control) group (n=33) standard penetrating keratoplasty was performed. Results. The results of observation during the first 12 months after the surgery showed that in the 1st group transplant survival rate was much higher than in the 2nd group, 31 recipient (86.1%) and 23 recipient (69.7%), respectively. Endothelial cell loss was also much higher in the control group as opposed to the experimental group, $23.8 \pm 1.4\%$ and $14.1 \pm 0.57\%$, respectively. Conclusion. Limbal transplants preserve their viability, demonstrate immune-regulatory activity, and contribute to reprogramming of pro-inflammatory to anti-inflammatory local immune response after keratoplasty. Inhibition of local immune reactions by limbal cells co-transplantation contributes to long-term survival rate of the corneal grafts and preserved endothelial cells.

• 4232

Russian KPro – UV crosslinked cornea complex implantation: Techniques and clinical results

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Penetrating keratoplastics of thin irregular corneal leukomas requires several preliminary surgical procedures. To reduce the period of visual rehabilitation and number of operations for this group of patients a new type of surgical treatment, combining keratoplasty and keratoplastics, was developed in 1996. This technique was named "K-Pro – cornea" complex transplantation. Methods: At first collagen-crosslinking procedure was performed for allogeneic preserved donor cornea according to the Zurich protocol with the use of UV-X-1000 (IROC Innocross, Switzerland) and 1% riboflavin solution (Dextralink). Further Fedorov-Zuev keratoprosthesis was implanted into the modified cornea. Resulting complex was cut out of the corneal-scleral rim with 9.0 mm trephination blade. Recipients corneal disk of the same diameter was removed and all procedures, necessary for the lens and anterior chamber, were performed before placing "K-Pro – cornea" complex into the bed and fixing it with interrupted sutures. All in all 64 patients with vascularized leukomas were treated with the use of this technique. Observation period was up to 10 years. Results: Best spectacle-corrected visual acuity (BSCVA) rose from pr. l. certae before surgery to 0.01-1.0 after. Following complications were met in the postoperative period: retroprosthesis membrane (99.9%), aseptic necrosis (39.6%), K-Pro protrusion (11%). Conclusions: Developed technique of transplantation of "K-Pro – cornea" complex enabled to reduce the number of main and preliminary surgical procedures and the period of patients visual rehabilitation. Key words: K-Pro, keratoplasty, collagen-crosslinking.

• 4234

Simultaneous penetrating keratoplasty and artificial iris-lens diaphragm implantation

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Materials and methods: Forty four eyes of 44 patients with aniridia after penetrating corneal injuries and traumatic post radial keratotomy wound dehiscences have undergone penetrating keratoplasty (PKP) and simultaneous artificial iris-lens diaphragm (ILD) implantation. The average age was 36 years (8-60 years). Time since trauma ranged from 3 months to 17 years. In 27 eyes intraocular pressure (IOP) was normal preoperatively, while 17 eyes were diagnosed with glaucoma. IOP was managed medically in 9 of these eyes, and 8 eyes had been operated for glaucoma before PKP + ILD. PKP was performed with the assistance of femtosecond laser in 10 eyes, and 34 eyes were operated with the use of Barron vacuum trephine. Five eyes had previous successful retinal detachment surgery, and 8 eyes had subtotal vitrectomy for vitreous hemorrhage. Results: Preoperatively mean non-corrected distance visual acuity (NCDVA) was 0.03 ± 0.04 (m \pm SD), corrected distance visual acuity (CDVA) was 0.04 ± 0.07 , preoperative corneal astigmatism was 8.3 ± 5.8 diopters (D). Twelve months after the surgery mean NCDVA after traditional PKP was 0.08 ± 0.09 , CDVA was 0.2 ± 0.19 , corneal astigmatism was 4.7 ± 3.9 D; and after femtolaser-assisted PKP NCDVA was 0.1 ± 0.12 , CDVA 0.3 ± 0.28 , corneal astigmatism was 3.9 ± 3.1 D. In the group of 8 eyes previously operated for glaucoma only 1 eye experienced worsening of IOP control, requiring 2 extra filtering procedures including drainage device implantation. In the glaucoma medical management group of 9 eyes 1 eye required filtering surgery 1 month after PKP + ILD, while four more had to be operated for glaucoma as late as 9 to 24 months. Due to transplant failure cornea had to be regrafted in 6 of 9 patients in the glaucoma medical management group, and only in 2 of 8 patients who were previously operated for glaucoma. Conclusion: In patients after simultaneous penetrating keratoplasty and artificial iris-lens diaphragm implantation surgery corneal transplant failure rate increases with IOP decompensation. Previous glaucoma surgery improves IOP control.