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The optic nerve regeneration surgery

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Abstract

Background: The optic nerve pathology is one of the most complicated problems in ophthalmology. The optic nerve atrophy is a complication or outcome of many diseases and consists in the gradual substitution of nerve fibres by the connective tissue.

Aim: To show the possibility of the optic nerve atrophy surgical treatment with the aid of allogeneic Alloplant biomaterials.

Methods: There have been examined 317 neuritis patients and 354 optic nerve atrophy patients following the revascularization surgeries with the use of the biomaterials. The method of the surgery was based on the use of the membrane made from the biomaterial and episcleral flap to improve the optic nerve blood supply through the peripapillary choroid. Injections in the form of the dispersed biomaterial suspension were used in the late postoperative period. The described methods were realized on 32 rabbits with the optic nerve lesion following the simulation of the corticosteroid glaucoma. The enucleated eyeballs were studied with the use of the histological and immunohistological methods as well as with the aid of the electron microscopy.

Results: The use of the above-described surgery allows to improve the optic nerve trophism and to prevent or decrease fibrosis which is manifested in the reduction of the transforming growth factor β-1 (TGFβ -1) expression. All the optic nerve neuritis patients had the visual acuity improvement and visual field expansion, the magnitude of which depended on the time of the performed surgery from the onset of the disease. The optic atrophy patients had a statistically reliable visual acuity and visual field improvement as well as better electrosensitivity and electrolability. The magnitude growth of these parameters varied depending on the ethiology and the disease prescription.

Conclusions: The surgical treatment of neuritis and optic nerve atrophy with the use of allogeneic biomaterials allows to essentially improve the visual functions, decrease or stop further progression of fibrosis thanks to the activation of resident macrophages and reduction of TGFβ -1 expression.

Biography

Ernst Muldashev is a professor of ophthalmology, Director of the Russian Eye and Plastic Surgery Centre. He graduated as a physician at the age of 24 years at the Bashkir State medical university, Ufa, Russia. Professor E.Muldashev is honorary consultant of the Louisville University (USA), member of the American Academy of Ophthalmology. He has published more than 120 papers with 40 of them PubMed-indexed.