NEW TRANSPLANT FOR SCLEROPLASTY IN MYOPIA AND ITS EFFICIENCY IN 1.500 OPERATIONS

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Allotransplant had been selected as a single block with eye-ball. On the 3rd day band- fibrous structure of allotransplant was completely preserved. The most peculiar thing is the strengthening of argentophylia of fibrous bands and prolapse of separate cores of silver in impregnation of preparations by V.V. Kuprianov. Distraction of cellular elements of a transplant- nuclear dicensation and deformation, wrinkling of cytoplasm. Insignificant macrofagal- fibroblastic infiltration of surrounding tissues, primarily in the field of suture fixation. On the 7th day along with preserving For the last time one of the most effective methods of treatment of progressive myopia are sclerostrengthening opera-tions (Avetisov E.S., 1931).

The use of wide thigh fascia as plastic material of Y & X - sclerooplasty in progressive myopia promotes stabilization of the process in 95% of operated patients (Nesterov A.P., Libencon N.B., 1976), sclera- for intralamellar scleroplasty-in 96,1% (Panfilov N.I., 1977), sclera- for sectoral scleroplasty- 88% (Zaikova M.V., Mazchenko V.P., 1979), dura mater accord. to Pivovarov’s method-87,3% (Pospelov V.J., 1937), at the same time transplant gives stabilization of the process in 38,7% of cases (Butiukova V.A., Rosliakova A.G., 1937).

Such a great difference in showings of Myopia stabilization, discribed by many authors, is the result of absence of the single method of the results accord. to degrees and development of myopia, varied from the age of patients, unequal term of follow-up observation (from 0,5 to 7 years) and other com-ponents.

Allotransplant for sclera is widely used (Kagermazova N.V., 1975). But the application of this transplant is restricted by its small anatomical structures and difficulty of tissue selec-tion from dead eyes because of national- religious traditions. Dura mater (Khatminsky Y.Ph., 1986), amnion (Zaikova M.A., 1983), wide fascia of thigh (Adygezalova- Ponchaeva K.A., 1984) have more large structures, and because of friable many-oriented position of collagenic structures in the process of substitution in transplantation, in its place there is formed a friable regenerabor with less sclerostrengthening effect.

The aim of this publication is the investigation of scleroexternal effect of the new allotransplant "Alloplant", elaborated in Ufa’s laboratory of transplants for ophthalmosurgery MNTK "Eye Microsurgery" in case of progressive myopia, and it depends on the degree, character of growth, the age of patients, and complications.

Using this transplant, we issued from the fact that accord. to biomechanical properties tendons are the most firm, elastic and indifferential transplants in immunological meaning (Obusov A.S., 1971; Sorokin A.P., 1973). The latest in allotransplantation are well used and substituted by dense connective tissue, which can fulfil the fixative function (Efimov A.P., 1976).

The conducted biomechanical investigations on the material of 38 corpses showed the high firmative properties of the given transplant- \( Q = 19 - 20 \text{ kgs/mm}^2 \); in comparatively small deformative possibilities \( E = 0,14- 0,22; \) high indices of density module - \( E = 91- 159 \text{ kgs/mm}^2 \). For comparison it is possible to give the same indices for wide fascia of thigh - \( Q = 8- 16 \text{ kgs/mm}^2 \). This "stock of density" is especially important for transplants in fixative and strengthening operations.

Besides, lamellar structure, optimal thickness 0,8 - 1,0 mm sufficient optional square in- 120 - 180 cm2; two - layeredfirm dislocation of connective tissueed structures in the angle towards each other
and by firm tie between the layers give good suture fixation and the formation of firm regenerator.

The experimental investigations have been carried out on the material of 40 rabbits. Scleroplasty by
tendon-fascial allotransplant is performed under tiopental narcosis. Animals were taken out of
the experience on the 3, 7, 14, 21, 30, 90, 120, 360 days by air embolism. Of allotransplants’ structure,
there marked the invasion of cellular elements in marginal zones into interbanding gaps. Fibroblasts are forming the chains of 2-3 cells. Macrophages are settled separately. During this term there determined friable connective-tissue capsule around the transplant, containing large 2-3 nuclear cells, and new-forming capillaries. In marginal zones of allotransplant there determined new-formed capillaries, often without a gap.

The 14-21 days are characterized by widening of zone of cellular allotransplant infiltration. In
marginal zones there occurred the breaking up of bands into separate fibres and the appearance of
cells between fibres. The capillaries are ingrown behind cells in interbanding gaps, and connected
with parallel one they form capillary loop with buds of growth on the top. In a part of capillaries in
peripheral fields of allotransplant there appeared the separate smooth muscular and adventive cells,
the gap in this place is changed. By 30th day the process of dissolution-replacement of allotransplant is increasing. The part of fibrous bands in peripheral field is fragmentized and surrounded by new-forming tissue, the fibres of which have not strict orientation. The central sections of allo-
transplant preserves the structure of tendon, though they are much infiltrated by macrofages and
fibroblasts.

Zones of newformations and differentiation of microvessels are clearly observed. The net con-
struction of microhemo-circulatory system with alveolas of different forms and sizes is most pecu-
liar. In follow-up (90-130-360 days) there takes place the final substitution of allotransplant and
the formation of regenerator in its place, which is alike in its structure to tendon-fascial one. In
transplant microcirculatory bed is represented by all links, though the density of capillaries in
square unit is increased; the process of differentiation of capillaries lasts till 360 days. Separately
located fibres are gathered in bands of 2-3 order, oriented on mutual crossed cavities.

So, by the 360th day there is forming dense regenerator, which in its structural signs resembles ten-
don-fascial allo-transplant. Allotransplant has very weak antigenic proper-ties, rouses insignificant
reaction of surrounding eye tissues.

Clinical investigations are carried out on the material of 2768 (3256 eyes) patients with progressive
myopia. The follow-up are observed in 1500 patients. They are distributed so: till 14 years-
155 (10,3%), 15-19 years- 472 (31,5%), 20-29 years- 585 (38,7%), 30-39 years- 210 (14%), 40-
49 years-67 (4,0%), 50-59 years- 11 (0,7%), 70% of patients are of workable age.

The refraction index is varied from 0-1,7 D up to 30,0 D; anterior-posterior visual axis is in the
range of 25-37,5mm. During the period of observation from 1 up to 5 years there marked the
increase of anatomical axis till 1,7 mm, decrease of refraction-till 6,0 mm. The patients with a high
axial myopia and complicated forms were preliminary performed for prophylaxis lazerocoagula-
tion. For all the patients there was made strengthening of external half and posterior pole of eye-
ball.

The operational technique. The conjunctival eye-ball inci-sion is made in external upper and lower
quadrant on the level of straight muscles’ fixation. The external straight and oblique muscles, and
also the conjunctiva are taken on suture-holders. The trapezium-transplant with distinct wide
ground and concave top is cut out. The hole of 4-5 mm in diameter is made paracentral rally in 7-0
mm from the top of trapezium up to the wide root of it, there a triangle shaft with 3 mm of width
is carved. The transplant is threaded up to above-mentioned hole on lower oblique muscle, and is
put around the place of its fixation to the optic nerve and external part of eye-ball, and after pass-
ing under the external straight muscle, it is fixated by 4 banding episcleral sutures. The continuous
suture is put on conjunctiva.

Indication for scleroplasty treatment is the progressive myopia above 1.0 D in a year with length-
ening of eye axis-above 25,0 mm, and the progressiveness of eye fundus pathology.

Allotransplant has a very weak antigenic property, and facilitates the insignificant reaction of the
surrounding eye tissues. The study of humoral immunity by the reaction of in-direct hemoaggluti-
nation of 43 patients showed the negative reaction of 94 patients, and only 6% of patients have po-
positive reaction.

The sutures are taken away on the 5-7th day after the ope-ration. The follow-up are observed till 5-
11 years on the material of 1500 patients.

The stabilization of myopia indices are estimated according to comparative data of ophthalmome-
try, refractometry, echobiometry, visual field and acuity.
The increase of visual acuity is observed in 616 patients (41.1%), without change- 794 patients (52.9%), decrease of visual acuity- 90 (6.0%). The intensity of refraction is marked in 629 patients (41.9%); without change- 793 patients (52.9%); decrease of refraction- 70 (5.2%). According to data of echo-biometry (Humphry 020, Echo- 21), shortening of eye axis is observed in 535 patients (39%), without change- 831 (55.4%), lengthening of axis- 84 patients (5.3%). Myopia stabilization is marked in 1420 patients (94.7%), in case of refraction- till 6.0 D, stabilization- 100% of patients; 10.0 D- 95.8%; 10.2- 18.0 D- 96.2%; in complica-ted myopia- 84.4%. With this the patients till 14 years have myopia stabilization in 150 (96.9%), from 15 up to 19 years- in 450 (95.4%), 20- 29 years- in 546 (93.4), 30- 39 years- in 191 (90.9%).

So, the use of tendinous-fascial complex in a form of a transplant for scleroplasty allows to achieve stabilization of myopia in 94.7% of operated patients, the earlier patients are operated, and the less are their retractions, the more probable is myopia stabilization.

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CONCERNING THE TERMS OF CONDUCTING RADIAL KERATOTOMY AFTER SCLEROSTRENGTHENING OPERATIONS AT PROGRESSIVE MYOPIA

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Scleroplasty allows to stop myopia progressing and gives an opportunity to further carry out refractive operations, radial keratotomy, in particular. However, the question concerning the terms of conducting radial keratotomy is not resolved yet.

Analysis of remote (up to 3-5 years) results of 165 sclerostrengthening operations showed refraction’s diminuation at 47.3% of patients, its increase - at 0.6% and refraction decrease takes place within the limits of 1-3 diopters and, as a rule, during the first 1.5 years after the operation. This is connected with the contraction process during transplant’s replacement.

Thus, it is expedient to carry out radial keratotomy approximately in 1.5 years after scleroplasty.