

Summary

Assumptions of the study:

The study made the assumption that the application of the modern method of surgical removal of primary pterygium using amniotic membrane transplant mounted on freeze-dried fibrin glue is safe for the cornea and does not cause adverse effects for the non-renewable pool of endothelial cells which are so essential for the condition of the cornea. The measurable parameters evaluating the state of the cornea prior to the operation and during the postoperative healing were analysed in detail in order to visualise the changes that take place in the cornea after removing the pterygium. At the same time, the most important subjective parameter, i.e. visual acuity, was also analysed. The results obtained will enable a full evaluation of the safety of the surgical method used for the patient's cornea as well as of the possibilities of improving vision after the procedure.

Aim of the study:

The aim of the study is to analyze changes in corneal parameters after pterygium resection with amniotic membrane transplant mounted on frozen fibrin glue, assessed by the following tests:

- visual acuity and total refraction;
- keratometry;
- pachymetry;
- corneal endothelial cell density;

It will be checked if there is a difference in postoperative assessment of the above corneal parameters for right and left eye surgery. In addition, the relationship between age, gender and changes in the above parameters will be examined. The patient's sense of comfort after surgery and the frequency of postoperative complications will also be assessed.

Patients and methods:

The study analysed results of examinations of twenty-seven patients treated at the Department of Ophthalmology at the Provincial Hospital of Ophthalmology in Krakow. The study enrolled patients with primary pterygium and with a negative history of ophthalmic injuries, without concomitant ophthalmic conditions, and not on ophthalmic medication.

The analysis included the best corrected visual acuity, spherical refraction and refractive astigmatism, keratometry, pachymetry and density of the corneal endothelial cells examined according to the schedule: day 0 – condition before surgery and on days 7, 30 and 60 after surgery, with ophthalmic examinations and photographs taken to document the healing process on days 0, 1, 7, 30 and 60.

Results:

Before the surgery, the density of the endothelial cells was on average $2,231/\text{mm}^2$ and maintained an upward trend throughout the study period. The endothelial cell growth, with a final value in the range $1,896\text{--}2,763/\text{mm}^2$, is a desirable outcome because it allows for maintaining the initial condition with the supposition that the cause of the ‘improvement’ was better corneal transparency and greater availability for analysis in the apparatus of the innermost layer of the cornea. The final average value of the density of the corneal endothelial cells was $2,360.56/\text{mm}^2$, i.e. it was higher than the initial value and at the same time within the permissible range indicating advantageous effects of the healing process.

Pachymetry showed variability over the observation period, initially showing an upward trend in the average values until 30-day post-operation to finally approximate the initial value 60-day post-operation.

Average BCVA began to show an upward trend already on postoperative 7 and this trend was not disturbed while the BCVA value stabilised until the last moment of making the measurements when it was equal with level 1.0. As a consequence, 26 of 27 patients finally had best corrected visual acuity while the patient whose BCVA did not rise to 1 despite the surgery also had a correction of the initial result and an improvement.

Downward trend was observed for the following variables:

- Spherical refraction – on average by -0.42 D ;

- Refractive astigmatism by -0.11 D;
- Corneal astigmatism by -0.98D;

Improvement was noted for all the indicators. The parameters that had to remain stable, remained unchanged; the values that should have been corrected were reduced to bring improvement. The method is effective, does not cause any ailments or postoperative pain; it also has a favourable effect on vision.

Conclusions:

The studies and statistical analyzes allow for drawing the following applications:

- in all patients after pterygium surgery with amniotic membrane and frozen fibrin glue improved visual acuity;
- spherical refractive changes were dynamic in the postoperative period and had mostly decrease and did not depend on gender and age;
- changes in stigmatism were individual and the effect of the treatment was lowering of the astigmatism;
- endothelial cell density minimally increased after pterygium removal;
- there were no pain symptoms in patients after pterygium surgery, no complications and recurrence of pterygium was found only in two patients in the postoperative period control;
- comfort and safety of frozen fibrin glue have been found in surgical treatment of pterygium;