MODERN MEDICINE AND PRACTICE
https://inovatus.es/index.php/ejmmp
EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE
Vol. 4 No. 10 (Oct - 2024) EJMMP ISSN: 2795-921X

RESULTS OF SURGICAL TREATMENT OF PTERYGIUM USING TWO-COMPONENT AUTOFIBRIN GLUE

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Annotation: Study included 15 patients (mean age 56 ± 5.2, men - 14, women - 1). All patients were divided into 2 groups depending on the method of fixation of the amniotic membrane: Group 1 - the main group (9 people), where the amniotic membrane was fixed with two-component autofibrin glue, Group 2 - control group, where the amniotic membrane was fixed with sutures (7 people). All patients underwent slit lamp biomicroscopy and optical coherence tomography of the anterior segment (NIDEK RS-3000 Advance2, Japan) to determine the stage of pterygium (stage 1 - 2 people, stage 2 - 11 people, stage 3 - 2 people). Before surgery, tear production was assessed using the Schirmer test. If the patient had signs of dry eye syndrome, tear replacement therapy was prescribed before surgery. The time spent on the operation was compared in the study groups. After the table analysis of the duration of the operation depending on the indicator "Operation"surgical intervention at all control periods (1, 3, 7, 14th day, 1, 3 and 6 months) photo registration, optical coherence tomography of the anterior segment, as well as an assessment of the presence of the following "symptoms" in the patient were performed: pain, foreign body sensation, itching, lacrimation, assessed in points on a visual analogue scale.

Keywords: pterygium, autofibrin glue, amniotic membrane, surgical treatment, sutures.

Introduction. Pterygium is a socially significant disease of the ocular surface. Its development is accompanied not only by a cosmetic defect, but can also lead to a serious decrease in visual functions. Currently, there are various methods of surgical treatment of this disease [1–7]. The first stage always involves removal of the pathological area itself, the second stage involves closing the defect with autologous or allogeneic tissues with the possible use of antimetabolites [1, 3, 7]. The main criterion for the effectiveness of the operation is the absence of relapse of the disease in the postoperative period. According to the literature, depending on the method of pterygium removal, the relapse rate ranges from 12 to 89% [7]. Pterygium is a degenerative disease of the conjunctiva of the eyeball. Its pronounced changes (grades III and IV according to Z.D. Tatarenko, 1993) are regarded as a vasoproliferative pathology, which in 60-70% of cases can form gross cosmetic defects, induced corneal astigmatism, clouding of the central zone of the cornea with decreased visual acuity [1, 2]. The only method of its treatment is surgical resection. Despite the many different surgical techniques, the frequency of its recurrence is high and ranges from 40 to 70% [3-5]. The risk of recurrence is highest in grades II-III pterygium (fleshy consistency, pronounced vascular network). The basis for the recurrent growth of pterygium is abundant vascularization of the semilunar fold of the inner corner of the eye and Tenon's capsule. Most often, pterygium relapses within 1 year after surgery [3, 5]. To prevent pterygium relapse after its resection, an artificial tissue barrier at the limbus is currently used. Various auto- and hetero-tissues are used as grafts: mucous membrane from the lip, dura mater, and renal capsule [5–9]. Among barrier biological transplant materials, amniotic membrane has been

increasingly used in recent years. This is due to the fact that amnion tissue is able to reduce the activity of fibroformation and neovascularization, stimulate the growth and differentiation of the superficial corneal epithelium [6, 10, 11]. But since the limbus zone is immunocompetent, its amnioplasty after pterygium surgery can, on the contrary, be accompanied by an inadequate inflammatory response to surgery, thereby slowing down the reparative processes in the conjunctiva and cornea. All this can lead to severe scarring of the conjunctiva of the inner corner of the eye and even to persistent corneal opacity [6].Most often, sutures are used to fix tissues when closing a conjunctival defect, while a promising alternative method is the use of adhesive compositions. According to the results of foreign studies, fibrin glues are not inferior in effectiveness to the traditional suture method of tissue fixation, and also reduce the inflammatory reaction in the postoperative period [5, 6]. In our study, an original two-component autofibrin glue (Patent for invention RU 2704256 C1, 10/25/2019) was used for the first time to fix the amniotic membrane in the surgical treatment of pterygium [8].

Purpose of the study.

To conduct a comparative analysis of the effectiveness of surgical treatment of pterygium using a two-component autofibrin glue and sutures for fixing the amniotic membrane.

Material and methods.

A total of 46 patients (46 eyes) with grade II and III primary pterygium were selected. The patients' age ranged from 52 to 73 years (mean 65±2 years). There were 25 women and 21 men. In all cases, the pterygium was localized on the inner side of the eye, had a fleshy consistency, protruding 0.8–1.5 mm above the corneal surface, and was characterized by the presence of a pronounced vascular network. In 29 eyes, it spread widely over the corneal surface, reaching 1/2 of the iris projection, and in 17 eyes it reached the projection of the pupillary margin. To evaluate the effectiveness of the developed method of surgical treatment of pterygium, all patients were divided into 2 groups comparable in terms of gender, age, severity of pterygium and its vascular network. The main group consisted of 22 patients (22 eyes) who underwent amnioplasty using the method we developed [12–15]. The essence of the technique is as follows. After resection of the pterygium head and cleaning of the corneal bed, the Tenon capsule of the inner part of the eyeball is carefully separated from the conjunctiva and resected to the semilunar fold; conjunctival. Pterygium of grade III, fleshy, with abundant vascularization. The criterion for comparison of the groups was the existence and frequency of pterygium recurrences in 10–12 months after the surgery. The criterion for comparison of the groups was the existence and frequency of pterygium recurrences in 10-12 months after the surgery. Results: in the comparison group, the graft was characterized by a sluggish vitalization, while in the main group an adequate vitilization was observed. After 1 month of observation there was an excessive limbus vascularization and tension of the lacrimal caruncle in 5 eyes of the comparison group. Despite the intensification of anti-inflammatory treatment, there was a relapse of the pterygium in 3 eyes, which required a repeated surgery using the technology applied in the main group. Conclusion: essential advantages of the developed method of surgical treatment of the pterygium are elimination of its basis — the vascularized Tenon’s capsule of the medial angle of eye; localization of the biological barrier in the area of the semilunar fold; grafting of the sclera defect by preserved conjunctival tissue. This approach allowed to achieve a statistically significant increase in transplant vitalization in the main group, against the comparison group. Assessment of the clinical efficacy of the developed technology has shown that there were no relapses during the observation period of up to 12 months, although in the comparison group relapses occurred in 3 eyes (12.5%). the flap is moved and covers the exposed area of the sclera up to the limbus; in the area of the semilunar fold, a strip of amnion 2–3 mm wide is sutured to the sclera transversely to the growth of the pterygium (4 interrupted sutures, silk 8/0). The important thing in this technique is that the amnion flap is not located in the limbus area, but at a distance from it. In addition, it is important that the sclera in the limbus area is covered with its own conjunctiva with an intact vascular network (not possessing

antigenic properties), which improves the processes of corneal epithelialization. The comparison group consisted of 24 patients (24 eyes), who had the conjunctiva with the underlying subconjunctival tissue removed after excision of the pterygium, superficial keratectomy. The scleral defect was replaced with a 3–5 mm wide strip of amniotic membrane, sutured in the limbus area to the scleral capsule of the eye with 5–6 interrupted sutures (8/0 silk) [11]. A single technique for surgical resection of the pterygium head was used in both groups. All surgeries were performed without complications. In the postoperative period, patients in both study groups were prescribed local 4-fold instillations of antibiotic and antiseptic solutions (0.3% ciprofloxacin, 0.01% okomistin), 5% dexpanthenol was placed behind the eyelids 3 times a day. After completion of the corneal bed epithelialization processes (7–10th days), antiseptic solutions were discontinued, 3-fold instillations of 0.1% dexamethasone solution were prescribed for 10 days. The sutures were removed from the conjunctiva on the 10th day after the operation. During the dynamic observation, biomicroscopic monitoring of the regenerative-reparative process in the pterygium resection area was performed. The following parameters were assessed: duration of pterygium bed epithelialization on the cornea (with instillation of 1% fluorescein solution); transplant vitalization parameters were studied (color, presence of edema, hyperemia); the presence and degree of vascular reaction of the conjunctival coating were determined (absent, moderately expressed, expressed). Additional research methods included a study of the osmolarity of the lacrimal fluid (OSF), which is an integral objective indicator for assessing the presence and degree of inflammatory reaction of the cornea and conjunctiva. The higher its value, the higher the degree of reaction, respectively [16, 17]. We assessed this parameter both initially and after 1–2 months. after surgery using the bioimpedancemetry method (TearLab Oamolarity system, USA) [16]. The observation period was 10–12 months. The comparison criteria in both groups were the presence and frequency of pterygium relapses by the end of the observation period. Results and discussion The results of postoperative monitoring of both groups of patients are presented in Table 1. Initially, the OSA indicators of the main group and the comparison group had moderately elevated values (the norm is no more than 316 mOsm/l) [16]. This indicated the presence of a moderate inflammatory reaction on the anterior surface of the eye caused by the aggressive growth of massive pterygium. On days 4–6 of the postoperative period, in all eyes of patients in the comparison group, the amniotic graft was edematous, pale in color, with a moderate amount of mucous discharge, the limbal zone was abundantly vascularized, the corneal bed was epithelialized (Fig. 2). The conjunctival covering in 8 eyes was characterized by pronounced vascular activity, edema and hyperemia, more pronounced in the area of the lacrimal caruncle, as well as at the border with the transplant.

Study included 15 patients (mean age 56 ± 5.2, men - 14, women - 1). All patients were divided into 2 groups depending on the method of fixation of the amniotic membrane: Group 1 - the main group (9 people), where the amniotic membrane was fixed with two-component autofibrin glue, Group 2 - control group, where the amniotic membrane was fixed with sutures (7 people). All patients underwent slit lamp biomicroscopy and optical coherence tomography of the anterior segment (NIDEK RS-3000 Advance2, Japan) to determine the stage of pterygium (stage 1 - 2 people, stage 2 - 11 people, stage 3 - 2 people). Before surgery, tear production was assessed using the Schirmer test. If the patient had signs of dry eye syndrome, tear replacement therapy was prescribed before surgery. The time spent on the operation was compared in the study groups. After the table Analysis of the duration of the operation depending on the indicator "Operation"surgical intervention at all control periods (1, 3, 7, 14th day, 1, 3 and 6 months) photo registration, optical coherence tomography of the anterior segment, as well as an assessment of the presence of the following "symptoms" in the patient were performed: pain, foreign body sensation, itching, lacrimation, assessed in points on a visual analogue scale. After 6 months, the presence of pterygium recurrence in the study groups was assessed. Statistical analysis was performed using the StatTech v. 2.8.8 program (developer - StatTech LLC, Russia). Quantitative indicators were assessed for compliance with the normal distribution using the Shapiro-Wilk criterion (for a number of subjects less than 50) or the

Kolmogorov-Smirnov criterion (for a number of subjects more than 50). Quantitative indicators with normal distribution were described using arithmetic means (M) and standard deviations (SD) of the 95% confidence interval (95% CI) boundaries. In the absence of normal distribution, quantitative data were described using the median (Me) and the lower and upper quartiles (Q1–Q3). Comparison of two groups by a quantitative indicator with normal distribution with unequal variances was performed using the Welch t-test. Comparison of two groups by a quantitative indicator with a non-normal distribution was performed using the Mann–Whitney U-test.

Conclusion

As a result of assessing the “duration of surgery” indicator depending on the study group, we identified statistically significant differences (p = 0.032).When assessing the "Pain" indicator, statistically significant differences were found on the 1st (p = 0.007), 3rd (p = 0.03) and 7th days (p = 0.047) after the operation. Only by the 14th day after the operation, the differences between the groups were not determined; this symptom was not determined in any patient. When assessing the "Foreign body sensation" and "Itching" indicators, statistically significant differences between the groups were found only on the 1st day after the operation (p = 0.04 and p = 0.017, respectively), at the other control periods, no differences were found between the groups. When analyzing the "Lacrimation" indicator, statistically significant differences between the study groups were found.

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