



Recurrence of pterygium after surgery with conjunctival autograft – long-term follow-up

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ABSTRACT

Aim of the study: To evaluate the results and recurrence of pterygium after surgical treatment of the primary condition with autotransplantation of the conjunctival tissue of the ipsilateral eye to the defect site at our workplace with a follow-up period of at least one year.

Material and methods: The medical documentation of all patients who underwent primary pterygium surgery with conjunctival autograft in the monitored period February 2018 to July 2019 was retrospectively evaluated. The authors mainly studied the recurrence of the disease using this surgical technique. Furthermore, the influence on visual functions, refractive parameters and possible complications of therapy was evaluated. The average follow-up time of our cohort was 21.8 months.

Results: We did not observe recurrence in any patient during the entire follow-up period. Uncorrected visual acuity was improved by at least one line of the logMAR optotype in 5 eyes

and corrected visual acuity in 2 eyes. According to Wilcoxon's paired test, changes in uncorrected and corrected visual acuity were not statistically significant at a significance level of 0.05. In 5 patients the astigmatism was reduced by at least 0.5 cylindrical diopters (Dcyl), while in other patients the astigmatism remained stable after surgery. We did not observe any complications during or after surgery.

Conclusions: Excision with conjunctival autograft is an effective and safe method of treatment of primary pterygium. This technique has a low incidence of disease recurrence. We did not observe the return of the pathology in any of our patients during the follow-up.

It was possible to stabilize or improve the patients' visual functions and refraction.

KEY WORDS: recurrence, cornea, pterygium, conjunctival autograft, anterior segment optical coherence tomography, Pentacam.

INTRODUCTION

Pterygium is a degenerative disorder of the conjunctiva characterized by fibrovascular proliferation from the bulbar conjunctiva onto the limbus within the palpebral fissure. Typically it has the shape of a comet (Figure 1) [1]. Histological analyses are identical to pinguecula [2]. The exclusive locations of this disease are the horizontal meridians of the cornea [3]. It is more often located nasally than temporally, but exceptionally it can be present in both locations simultaneously; then it is called "double" pterygium [4]. The base of the lesion is located on the limbus with the head pointing to the center of the cornea. Pterygium disrupts Bowman's membrane by its growth, which serves as a growth substrate for pterygium [3]. The etiology of the disease is not completely understood. It is observed twice as often in men. The prevalence increases with age and has been shown to be associated with excessive exposure to ultraviolet (UV) radia-

tion [5]. For this reason, it occurs more frequently in southern countries [2]. Other factors which may influence the inci-



Figure 1. A typical finding of pterygium

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Table 1. Clinical and demographic characteristics of patients with operated pterygium

Age	Sex	Eye	Localization of pterygium	Area of conjunctival graft	Follow-up time (months)
55	Woman	OD – dominant	Nasal	Superior	27
76	Man	OD – nondominant	Nasal	Superior	31
65	Man	OS – nondominant	Temporal	Superior	33
77	Man	OD – nondominant	Nasal	Inferior	32
75	Woman	OS – nondominant	Nasal and temporal	Superior and inferior	25
78	Woman	OD – dominant	Nasal	Superior	22
70	Woman	OD – dominant	Temporal	Inferior	23
80	Woman	OS – nondominant	Nasal	Superior	19
64	Man	OD – dominant	Nasal	Superior	15
79	Woman	OD – nondominant	Nasal	Superior	18
53	Man	OS – nondominant	Nasal	Superior	12
65	Man	OS – nondominant	Nasal	Superior	18
71	Woman	OS – nondominant	Nasal	Superior	19
59	Man	OS – dominant	Nasal	Superior	22
77	Man	OS – nondominant	Nasal	Superior	20
57	Man	OS – nondominant	Nasal	Superior	18
76	Man	OS – nondominant	Nasal	Superior	17

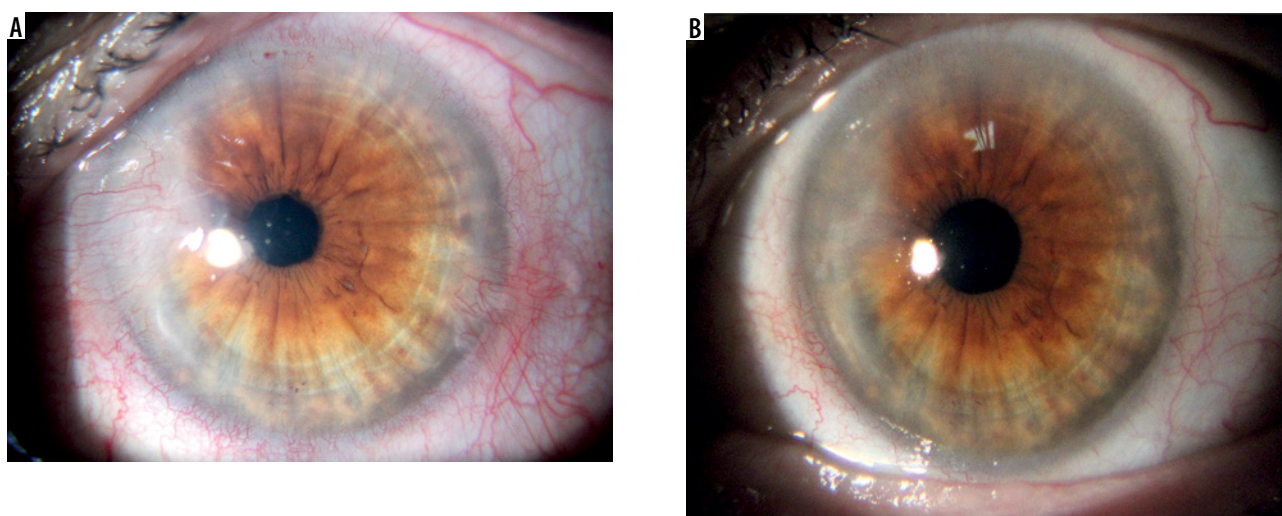


Figure 2. Preoperative finding in patient No. 5 with symptomatic “double” pterygium on the left. Postoperative finding of patient No. 5 on the right

dence are tear film abnormalities, cytokine and growth factor imbalances, viral infections, or genetic mutations [6]. One of the proven genetic causes is the mutation of p-53 limbal epithelial cells, which leads to the development of pterygia [7].

The disease tends to recur. Recurrence is more common in younger patients and usually occurs in the first year after surgery [8, 9].

The initial stages are often asymptomatic. Once progressed the following are characteristic complaints of patients: eye discomfort, the feeling of traction or pressure during abduction, and a decrease in visual acuity. Impaired vision may be caused by increasing irregular corneal astigmatism or optical axis oc-

clusion. Conservative treatment of incipient findings includes lubricants or corticosteroids with inflammatory complications. Surgical therapy offers a range of procedures. Historically, a simple surgical excision was performed, which, however, showed a recurrence of up to 80%. Also, these recurrent lesions were more aggressive than the initial pathology [10]. For this reason, combined operations such as surgical excision with the adjuvant application of an antimetabolite (most often Mitomycin C or 5-fluorouracil) predominate today, or we can possibly supplement the operation with a vascular endothelial growth factor (anti-VEGF) blocker [6]. Some authors apply Mitomycin C to the pterygium head even one month before

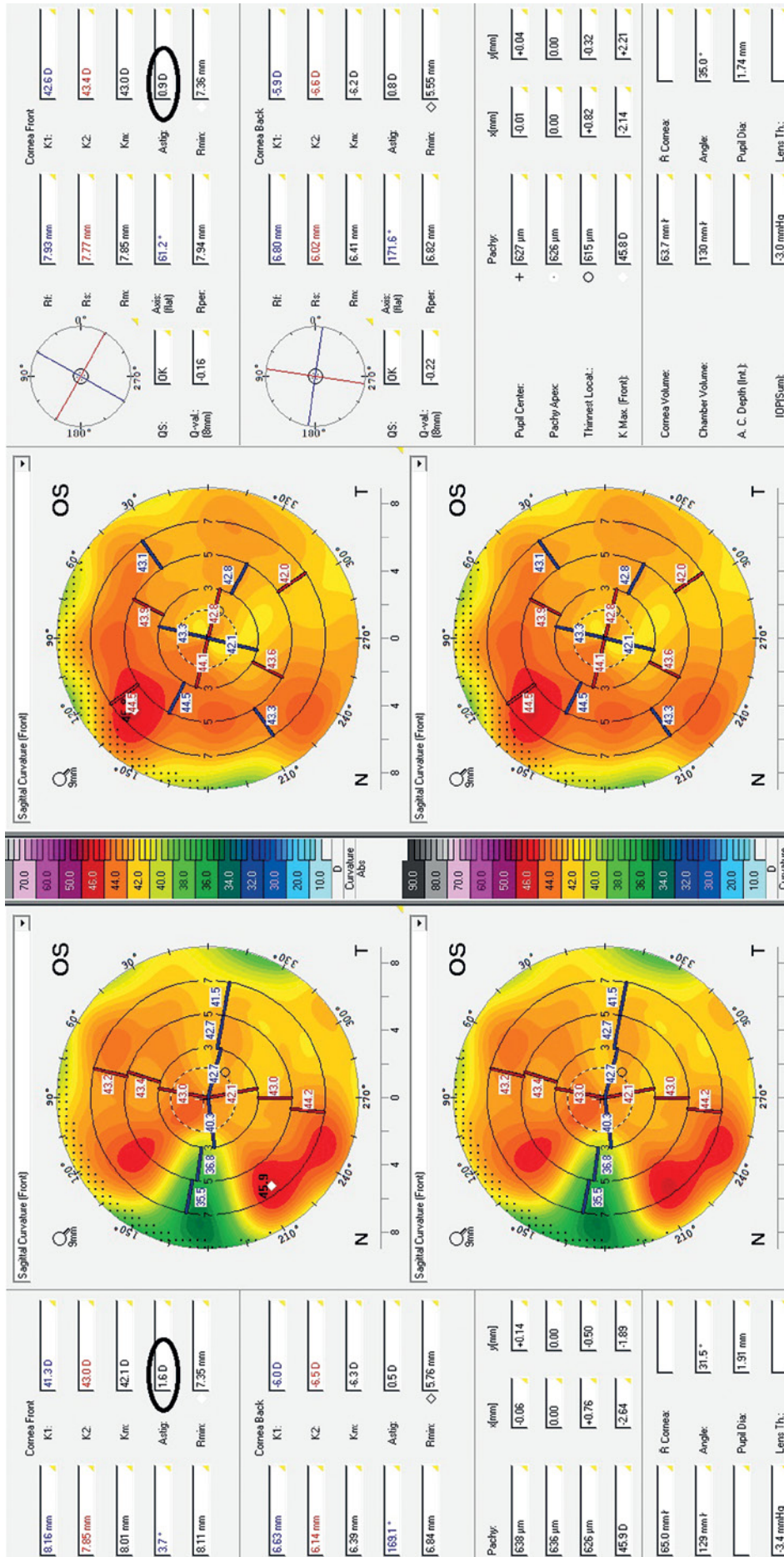


Figure 3. Comparative image of preoperative (left) and postoperative findings (right) on Pentacam in patient no. 5. Black ovals highlight regression of corneal astigmatism from 1.6 Dcy to 0.9 Dcy

the planned operation [11]. Antimetabolites or other adjuvant therapies, such as beta radiation, reduced the incidence of recurrence to 4-43% [12]. Other possibilities are excision with fixation of the amniotic membrane or autologous conjunctival graft to the defect site [13]. At present, surgery with subsequent autotransplantation of conjunctival tissue is the gold standard of treatment. Recurrence after these operations is reported to range from 2% to 9% [14]. A conjunctival graft without Tenon's fascia gives better results [15]. An alternative to classical suture to ensure graft fixation is the use of fibrin tissue glue or autologous blood [16]. Excimer laser phototherapy keratectomy (PTK) is suitable for corneal smoothing after surgery [2]. In advanced conditions for deep lesions peripheral lamellar keratoplasty is also considered [10].

AIM OF THE STUDY

The aim of the study is to evaluate long-term postoperative results and recurrence in patients treated for primary pterygium with autotransplantation of conjunctival tissue.

MATERIAL AND METHODS

The medical documentation of all patients with symptomatic primary pterygium who underwent surgical excision with conjunctival autotransplantation at our workplace was retrospectively evaluated. Patients with a follow-up period of at least 1 year were included in the study. The patients underwent the procedures between February 2018 and July 2019. All patients underwent a comprehensive ophthalmological examination including visual acuity, intraocular pressure and a slit lamp finding. Photo documentation of the anterior and posterior segments of the eye, examination with a Pentacam Scheimpflug instrument (OCULUS) and anterior segment optical coherence tomography OCT (RTVue OPTOVUE) were also performed. A total of 18 pterygia in 17 eyes of 17 patients were treated operatively, as one patient had pterygium both nasally and temporally on the affected eye. The mean age of the patients was 69, and the median was 71 years (range 53-80 years). We observed the condition more often in men (10:7). Pterygia were more often localized medially, in a ratio of 15:3. Non-dominant eye involvement has also prevailed in a ratio of 12:5. A brief demographic and clinical description of our sample is provided in Table I.

The operation was performed in the standard way under combined local topical and infiltration anesthesia Benoxi gtt 0.4% (oxybuprocaine hydrochloride) and Supracain 4% inj. (articaine hydrochloride, epinephrine hydrochloride). All patients were operated on by the same surgeon (PK). After blunt preparation and complete excision of the pathological tissue, the conjunctival autograft was prepared from the ipsilateral eye with its subsequent suture to the site after the primary affect. The conjunctival graft is taken predominantly from the upper part of the perilimbal bulbar conjunctiva for easy healing in this area [10]. The conjunctiva suture was performed with PGA Resorba 7/0 absorbable material. No complications occurred perioperatively or postoperatively in any of the operations. After the surgery, patients used a combined ointment with antibiotic and corticosteroid Maxitrol ung (neomycin sulfate, polymyxin B sulfate, dexamethasone) 5 times a day for 3 weeks. The follow-up period ranged from 12 to 33 months with an average of 21.8 months.

RESULTS

In all cases, the pterygium was successfully removed, the conjunctival autograft healed without complications, and dehiscence and graft dislocation did not occur (Figure 2). We did not observe any recurrence of the disease in any of our patients during the entire follow-up period.

The flattening of the anterior surface of the cornea, which caused irregular astigmatism, disappeared, as verified on the Pentacam (Figure 3). At the same time, we monitored the presence of pterygia using anterior segment OCT, where postoperative images confirmed the complete disappearance of pathology in the area of the sclerocorneal interface (Figure 4).

Visual function after surgery remained stable in all patients. We observed an improvement in uncorrected visual acuity of at least one line of the logMAR optotype in 5 eyes and corrected visual acuity in 2 eyes. However, changes in both natural and corrected visual acuity were statistically insignificant according to Wilcoxon's paired test at a significance level of 0.05 (Table II).

We also found a favorable effect on subjective refraction. In five cases the astigmatism was reduced by at least 0.5 cylindrical diopters (Dcyl) while in the rest of the patients

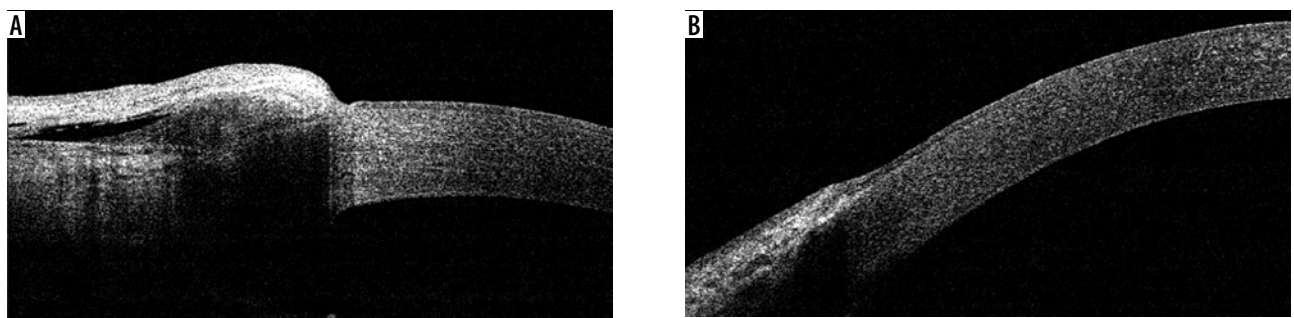


Figure 4. A) Typically formed pterygium in anterior OCT imaging - patient no.14 on the left. B) Postoperative OCT image of the same patient 22 months after the operation on the right. Noticeable complete regression of the finding, no signs of recurrence

Table II. Preoperative and postoperative visual acuity

Uncorrected visual acuity before surgery (logMAR)	Corrected visual acuity before surgery (logMAR)	Uncorrected visual acuity after surgery (logMAR)	Corrected visual acuity after surgery (logMAR)
0	0	0	0
0.5	0	0.15	0
0	0	0	-0.1
0.05	0	0	0
0.4	0.4	0.4	0.4
0.2	0.05	0.2	0
0.15	0	0	0
0.5	0.3	0.1	0.05
0	0	0	0
0.2	0.15	0.2	0.15
0.5	0	0.5	0
0.3	0	0.1	0
0.15	0	0.05	0
0.6	0	0.6	0
0.1	0.1	0.1	0.1
0	0	0	0
0.15	0	0.15	0

the astigmatism remained unchanged. We did not observe local or systemic complications of the therapy.

DISCUSSION

Pterygium is a degenerative conjunctival disease that has been known for over 3000 years. In ancient Egypt and Greece, various potions were applied to the surface of the eye to eradicate the lesion [17]. The term pterygium comes from the Greek word *pterygion*, which means “small wing”. Among the first authors to mention the disease and its surgical solution were Hippocrates, Celsus, Pallus and Sushruta [18]. Historically, it has been treated with simple surgical excision; however, this method has shown up to 80% recurrence [10]. Therefore, classical surgery was gradually combined with the application of antimetabolites or anti-VEGF. Another way is to replace the tissue with an amniotic membrane or a healthy conjunctival autograft to the defect site, which competitively prevents the return of the disease [19]. The graft is most often taken from the upper quadrant of the perilimbal bulbar conjunctiva. In selected patients, such as those with glaucoma, a transplant from the lower quadrant is more appropriate to maintain an intact conjunctiva at the top before any filtering operation. There are works that mention femtosecond laser-assisted surgery in graft preparation [15, 20]. Graft fixation is classically performed using suture or tissue glue. An alternative to glue is autologous blood [16]. At our workplace, we perform suturing with the absorbable material PGA Resorba 7/0. In a prospective study Uy *et al.* verified

the comparable effectiveness of suture fixation and fibrin glue in 11 eyes in each group, and did not detect recurrence in any patient [14].

In postoperative care, in addition to the necessary anti-inflammatory medication (combined antibiotic and corticosteroid), it is also possible to use drops from autologous serum, which accelerate epithelial healing and reduce postoperative pain [21]. A prospective randomized study by Becerril *et al.* demonstrated the efficacy of the preoperatively administered vasoconstrictor phenylephrine in reducing perioperative bleeding. This reduced the need for coagulation and shortened the operating time [22].

We did not note any complications associated with this technique perioperatively or postoperatively. At the same time, we did not observe any recurrence of the disease in any of the patients. The frequency of recurrences described in the literature is similarly optimistic. In a comparable size group, Kheirkhah *et al.* reported 2 cases of recurrence out of 21 patients [23]. Bilge described 1 recurrence of 21 eyes operated on by this technique [24]. Akbari *et al.* reported recurrent pterygium in only one case out of 30 [5]. Hirst in a large group of patients observed only 1 recurrence out of 1000 eyes operated on [25]. These studies and our long-term results are similar in the frequency of pterygium recurrence. At the same time, they show a dramatic decrease in the incidence of recurrent pterygium in comparison to simple surgical excision. Regarding the complications of treatment, isolated cases of granulomas or inclusion cysts at the site of primary pathology, strabismus or the need for transplant replacement by another procedure are described [23, 25]. We did not observe these or other complications in our patients.

CONCLUSIONS

Excision of pterygia with autotransplantation of the conjunctiva to the site of primary pathology is a safe and very effective treatment with minimal complications. Based on our experience, this technique clearly has a lower incidence of disease recurrence. In our patients, we did not observe a return of pathology during the entire follow-up period.

Visual functions were maintained in all patients. In 5 eyes the uncorrected visual acuity improved by at least 1 line logMAR, and in 2 eyes the corrected visual acuity also improved. Similarly, we observed a positive effect on the refraction of patients. Stabilization or improvement of postoperative astigmatism was achieved in all of them. However, the changes in visual acuity were not statistically significant.

DISCLOSURE

The authors declare no conflict of interest.

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