

A COMPARATIVE STUDY OF VISUAL ACUITY BEFORE AND AFTER PTERYGIUM EXCISION BY CONJUNCTIVAL AUTOTRANSPLANTATION TECHNIQUES

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Abstract

Purpose: To evaluate the visual acuity and corneal astigmatism preoperatively and after the excision of pterygia by conjunctival auto transplantation techniques. **Material and methods:** 120 patients were divided in two groups of 60 patients depending of the used surgical methods. A group of 60 patients (group No.1) treated by the technique of pterygium excision with the conjunctival auto graft transplantation with graft from the inferior temporal bulbar conjunctivae (ITBC) and a group of 60 patients (group No.2) treated by the technique of pterygium excision with the conjunctival autotransplantation with graft from the superior temporal bulbar conjunctivae (STBC). The both groups were subdivided on two groups, a group of 30 patients with stationary pterygium and 30 patients with progressive pterygium. Preoperatively and postoperatively, all patients were assessed for visual acuity, anterior and posterior segments, autorefraction, and autokeratometry. **Results:** In 76,6% of the patients from the group No.1 and in 60% of the patients from the group No.2 with stationary pterygium the postoperative visual acuity was significantly better with no statistical significant difference between the groups ($p=0,1724$). In 86,6% of the patients from the group No.1 and in 63,3 % of the patients from the group No.2 with progressive pterygium, the postoperative visual acuity was significantly better with no statistical significant difference between the groups ($p=0,1417$). **Conclusion:** Pterygium excision with conjunctival autotransplantation procedures (STBC and ITBC) results in significant reduction in astigmatism which leads to improvement in visual acuity.

Keywords: pterygium, astigmatism, conjunctival autotransplantation procedures

КОМПАРАТИВНА СТУДИЈА ЗА ВИЗУЕЛНАТА АКТИВНОСТ ПРЕД И ПОСЛЕ ЕКЦИЗИЈА НА НАДВОРЕШНО ПЕРДЕ СО КОЊУНКТИВАЛНИ АВТОТРАНСПЛАТАЦИОНИ МЕТОДИ

Апстракт

Цел: Да се одреди видната острина и корнеалниот астигматизам пред и по екцизија на надворешно перде со конјунктивални автотрансплантациони методи. **Материјал и метод:** 120 пациенти беа поделени во две групи од 60 пациенти во зависност од изведената хируршка метода. Кај групата од 60 пациенти (група бр.1) е изведена хируршка метода на екцизија на птериgium со конјунктивална автотрансплантација со графт од долно темпоралната булбарна конјунктива (ИТБК) и друга група од 60 пациенти (група бр.2) оперирана со хируршката метода на екцизија на птериgium со конјунктивална автотрансплантација со графт

од горно темпоралната булбарна конјунктива (СТБК). Секоја група е поделени на уште две подгрупи од 30 пациенти со стационаран птериgium и 30 пациенти со прогресивен птериgium.

Предоперативно и постоперативно, кај сите пациенти беше испитана видната остринa, предниот и заден сегмент, авторефракција и автокератометрија. Резултати: кај 76,6% пациенти од групата бр.1 и 60% пациенти од групата бр.2 со стационаран птериgium постоперативната видна остринa беше значајно подобренa без статистичка значајна разлика помеѓу групите ($p=0,1724$). Кај 86,6% пациенти од групата бр.1 и кај 63,3% пациенти од групата бр.2 со прогресивен птериgium, постоперативната видна остринa беше значајно подобрена но без статистички значајна разлика помеѓу групите ($p=0,1417$).

Заклучок: По изведената хируршка екцизија на птериgium со конјунктивална автотрансплантација од долна или горна булбарна конјунктива (ИТБК и СТБК) се подобрува видната остринa и намалува индуцираниот астигматизам.

Клучни зборови: птериgium, астигматизам, процедури на конјунктивална трансплантација

Introduction

Pterygium is an active invasive inflammatory process, a key feature of which is focal limbi failure (1). The pterygium is a chronic and recurrent illness, one that leads to permanent decrease of the visual acuity. In the Caucasian population the prevalence of pterygium is between 1-7,7%, a number that is directly proportional to the geographic location of the country (2). Macedonia, a country notable with a high number of sunny days, is also distinctive with a high prevalence of pterygium especially in the capable working middle aged people those with a permanent damage of visual acuity and with a cosmetic insufficiency (3). Pterygium causes visual problems due to induced corneal astigmatism or direct encroachment onto the visual axis (4). Corneal astigmatism can be more or less successfully reduced by pterygium excision surgery which involves the use of different autotransplantation techniques (5).

Aim

The aim of the research was to evaluate the visual acuity and corneal astigmatism before and after the surgical excision of pterygium with auto transplantation techniques. The correlation between stationary and progressive primary pterygium and the effectiveness of the surgical method was determined with the best visual acuity and changes in the corneal astigmatism gain after the excision of the pterygium.

Material and method

120 patients with unilateral nasal pterygium were divided in two groups depending of the type of surgery procedure. A group of 60 patients treated by the technique of pterygium excision with the conjunctival auto transplantation with graft from the inferior temporal bulbar conjunctivae (ITBC) and a group of 60 patients treated by the technique of pterygium excision with the conjunctival autotransplantation with graft from the superior temporal bulbar conjunctivae (STBC). Both groups were subdivided in two groups depending on the length of pterygium from the limbus to the apex of

cornea, i.e. a group of 30 patients with stationary pterygium (from 1,0mm to 3,0mm) and progressive pterygium(3,0mm and more).

Group No.1 of 60 patients with pterygium (30 patients with stationary and 30 patients with progressive pterygium)treated by the technique of pterygium excision with the conjunctival autotransplantation with graft from the inferior temporal bulbar conjunctivae (ITBC)

Group No.2 of 60 patients with pterygium (30 patients with stationary and 30 patients with progressive pterygium) treated by the technique of pterygium excision with the conjunctival autotransplantation with graft from the superior temporal bulbar conjunctivae (STBC)

All the patients were preoperatively assessed for visual acuity, anterior and posterior segment, keratometry, autorefraction and autokeratometry. Postoperatively, the patients were assessed for visual acuity, autorefraction, and autokeratometry after a day, 1 week, 1 month, and every third month till the end of the first postoperative year. After a year, the patients were examined twice a year. Furthermore, preoperative and postoperative, the patients were photographed with Topcon Red Camera.

The surgical technique of pterygium excision with conjunctival autotransplantation was performed using topical and sub conjunctival anesthesia. A rigid lid speculum facilitates maximal exposure. A disposable scarifier Grishaber 681 and Westcott scissors was used to excise the corneal portion of the pterygium and complete resection of pterygium body. The size of exposed bare sclera was measured with calipers in order to measure an area of corresponding size from superior or inferior temporal conjunctiva. After the thin dissection of the conjunctiva from the tendon, was transferred to its anatomical equivalent position in the recipient bed. The graft was secured with sutures 8-0 vicryl. After the operation, topical corticosteroids and antibiotic ointment were administered locally. All cases were out patients.

Results

Postoperative visual acuity was expressed through Snellen chart and astigmatism.

Postoperative visual acuity expressed through Snellen chart

In 76,6% of the patients from the group No.1 with the stationary pterygium, the postoperative visual acuity was significantly better from one to four lines of the Snellen chart. In 60% of the patients from the group No.2 with the stationary pterygium, the postoperative visual acuity was significantly better from one to three lines of the Snellen chart. There was no statistical significant difference between the groups in terms of the postoperative visual acuity ($p=0,1724$).

In 86,6% of the patients from the group No.1 with the progressive pterygium, the postoperative visual acuity was significantly better from one to five lines of the Snellen chart. In 63,3% of the patients from the group No.2 with the progressive pterygium, the postoperative visual acuity was significantly better from one to four lines of the Snellen

chart. There was no statistical significant difference between the groups in terms of the postoperative visual acuity ($p=0,1417$).

Table 1 Postoperative visual acuity

		0,5 D	1 D	1,5 D	2 D	2,5 D	3 D
Group No. 1	stationary	18,00%	31,80%	9,00%	22,70%	9,00%	9,00%
	progressive	24,00%	12,00%	12,00%	28,00%	12,00%	12,00%
Group No. 2	stationary	50,00%	22,20%	22,20%	-	-	5,50%
	progressive	29,10%	50,00%	4,10%	12,50%	-	4,10%

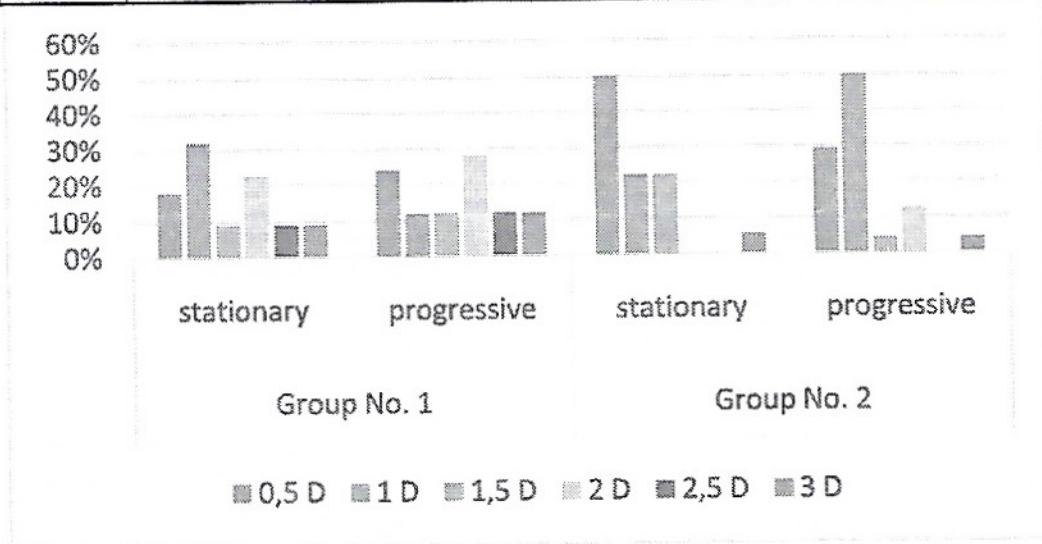


Figure 1 Postoperative visual acuity

Table 2 Improved postoperative visual acuity, expressed through Snellen chart

		Number of lines				
		1 line	2 lines	3 lines	4 lines	5 lines
Group No. 1	stationery	52,20%	17,40%	13,04%	17,30%	-
	progressive	54,20%	20,85%	12,50%	8,30%	4,20%
Group No. 2	stationery	33,30%	38,80%	27,70%	-	-
	progressive	47,40%	31,60%	15,70%	5,20%	-

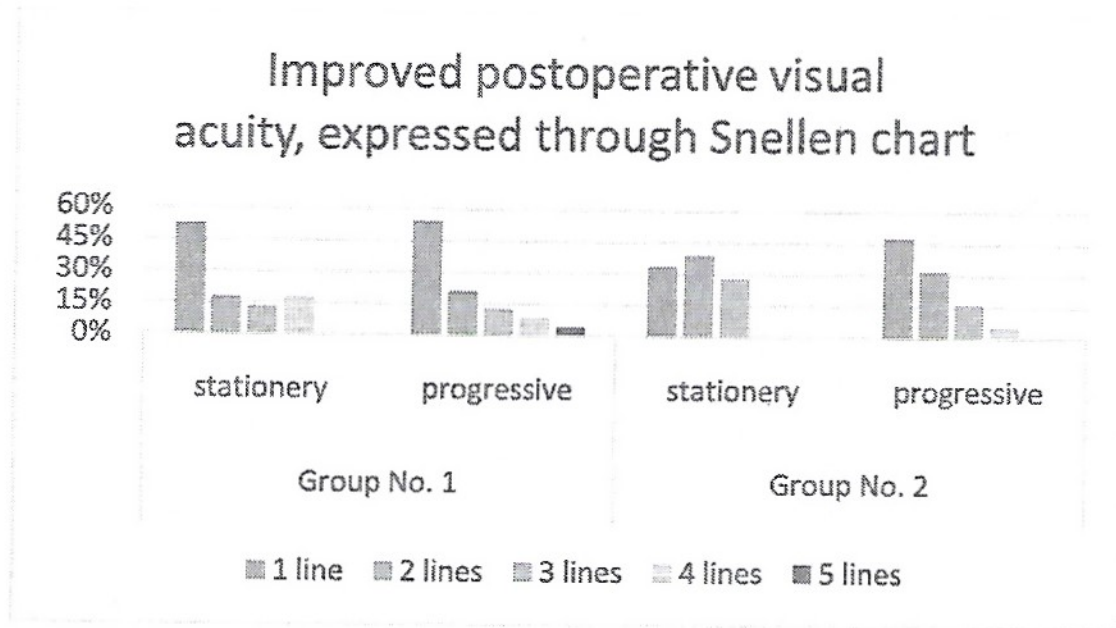


Figure 2 Improved postoperative visual acuity, expressed through Snellen chart

Postoperative visual acuity expressed through astigmatism

In the group of patients with stationary pterygium operated with the surgical excision of pterygium with modification of the reconstructive method of liberal conjunctival auto transplantation ITBC - group No.1, the postoperative astigmatismus was less in 73,3%, from 0,5 to 3,0 diopters. In the group of patients with stationary pterygium operated with the STBC - group No.2, astigmatismus reduction was noticed in 60% of patients from 0,5 to 3 diopters. There was no statistical significant difference between the groups in terms of the postoperative astigmatismus ($p= 0,2792$).

In the group of patients with progressive pterygium operated with the surgical excision of pterygium with modification of the reconstructive method of liberal conjunctival auto transplantation ITBC- group No.1, the postoperative astigmatismus was less in 83,3%, from 0,5 to 3,0 diopters. In the group of patients with progressive pterygium operated with the STBC-group No.2, astigmatismus reduction was noticed in 70% of patients from 0,5 to 3 diopters. There was no statistical significant difference between the groups in terms of the postoperative astigmatismus ($p= 0,2283$).

Table 3 Postoperative change in astigmatismus

Postoperative change in astigmatismus		reduced	no change	increased
Group No. 1	stationary	73,30%	26,60%	-
	progressive	83,30%	16,60%	-
Group No. 2	stationary	60,00%	40,00%	-
	progressive	70,00%	30,00%	-

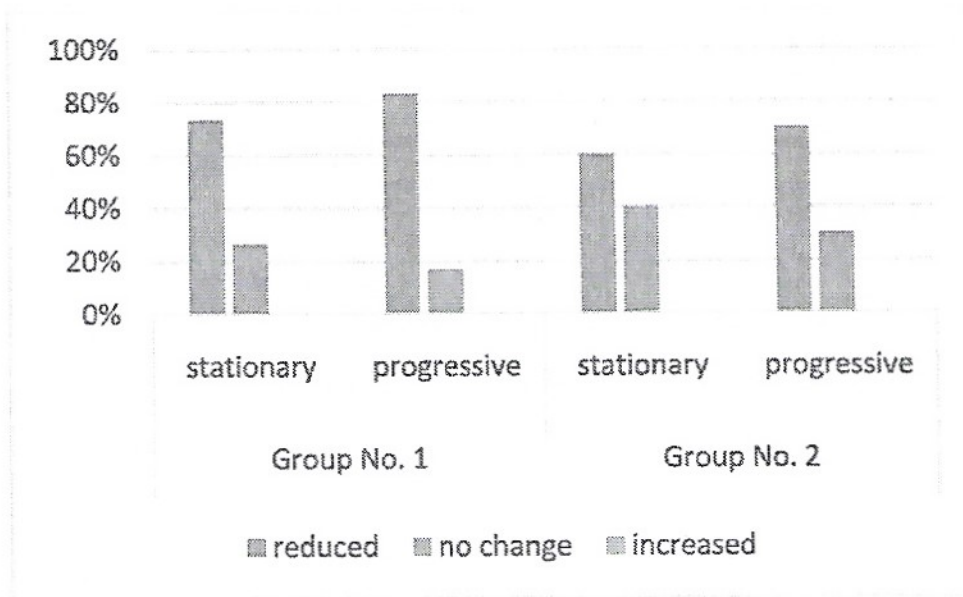


Figure 3 Postoperative change in astigmatismus

Table 4 Postoperative reduction of astigmatism in diopters

Postoperative reduction of astigmatism in diopters		0,5 D	1 D	1,5 D	2 D	2,5 D	3 D
Group No. 1	stationary	18,00%	31,80%	9,00%	22,70%	9,00%	9,00%
	progressive	24,00%	12,00%	12,00%	28,00%	12,00%	12,00%
Group No. 2	stationary	50,00%	22,20%	22,20%	-	-	5,50%
	progressive	29,10%	50,00%	4,10%	12,50%	-	4,10%

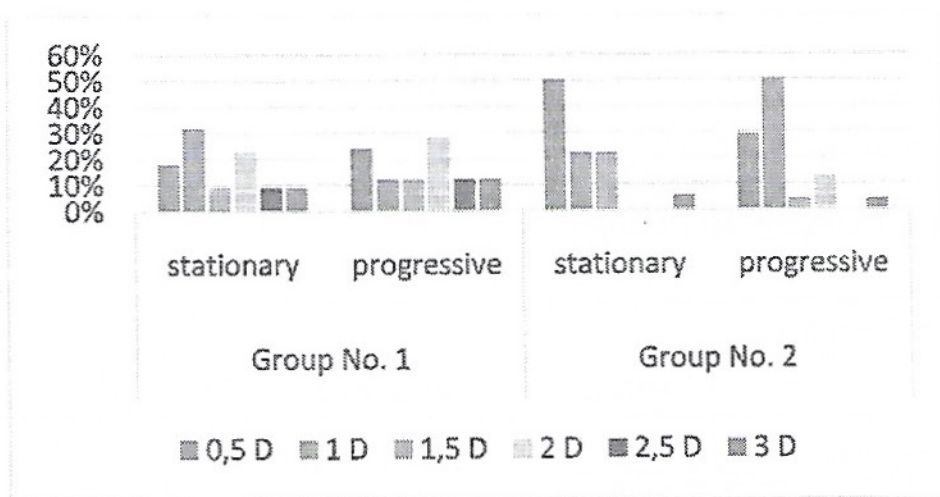


Figure 4 Postoperative reduction of astigmatism in diopters

Discussion

Pterygium causes refractive changes by inducing astigmatism or by involving visual axis which leads to visual impairment (4,5). A pterygium usually reduces the visual acuity because of blurring and overlapping the visual axis or by direct astigmatism, caused by distortion and flattening the cornea. It is thought to be caused by the formation of tear meniscus between the corneal apex and the elevated pterygium (6).

The pterygium significantly influence the visual acuity and corneal refraction including spherical power, astigmatism, asymmetry and irregularity (7). Astigmatism is in correlation with the length and progression of the pterygium in direct proportion (8). Increasing distance of the pterygium head from the limbus results in increased amount and irregularity of induced corneal astigmatism. If the length of primary pterygium from the limbus to the apex of the cornea is 1mm or more, it causes a high degree of direct or induced irregular astigmatism (9).

The results of our study also indicate that significant astigmatism is induced by pterygium of more than 1mm from the limbus. Significantly higher astigmatism was related with the group of patients with pterygium length of 3.0 mm or more (progressive pterygium) compared to the other group of patients with pterygium length less than 3.00 mm (stationary pterygium) ($p < 0,01$).

Increased astigmatism caused a decrease in visual acuity in patients with pterygium. Therefore, early surgical intervention in pterygium may be indicated when the size of the lesion is more than 1.0mm from the limbus. Pterygium exceeding 3.0 mm of length should be considered within the urgent surgery to prevent significant astigmatism changes (3).

In our study, we observed a statistically significant reduction in overall mean astigmatism postoperatively. There was no evidence of increased amount of astigmatism in diopters postoperatively. Our results show that topographic astigmatism tends to decrease after excision of pterygium with graft from the inferior temporal or superior temporal bulbar conjunctivae as a result of effectively used surgeries techniques. Corneal topographic changes caused by the pterygium are almost reversible after the surgical treatment. Successful pterygium surgery reduced the pterygium induced refractive astigmatism and improved the visual acuity (5,10,11). Cinal with his colleagues, confirmed that the visual and topographic results are significantly improved after the successful excision of the pterygium and also suggested early surgical intervention reduced the mean corneal astigmatism (11). Also, a similar observation was found by other researches (12). The visual acuity improvement i.e. reduction of astigmatism is a valid indication for surgical pterygium excision.

We observed significant improvement in the visual acuity after successful pterygium surgery that was significant in both surgical methods especially after the operation of progressive pterygium. These observations were similar to the study carried out by Maheshwari (9). Lindsay and Sullivan also found a similar significant correlation between successful pterygium surgery and improvement in visual acuity (13).

This study was contemplated with the objective to study the visual acuity and corneal astigmatism before and after pterygium excision with ITBC and STBC method. The improvement of visual acuity after the excision of pterygium with both surgeries

technique was equal, since the only difference exists in the method and site of harvesting the conjunctiva while the rest of the procedure is essentially the same.

Also, it has been found that using the pterygium excision with conjunctival autotransplantation with graft from the inferior temporal bulbar conjunctiva preserve the conjunctival deficiency or scarring in the superior temporal part for surgeries such as glaucoma procedures, if the need arises in the future (14). Also this technique is technique of choice if there is scarring or conjunctival deficiency in the superior temporal part because of prior other surgeries such as glaucoma surgery (15,16). ITBC can be considered in patients with recurrence after STBC surgery or after a glaucoma or other conjunctival operation such as excision of tumor of conjunctivae or after the trauma of the bulbus with rupture of the conjunctivae or sclera, or after the PPV (pars planvitrectomy). In other papers published in other journals, we prefer and recommended the ITBC technique for pterygium excision in cases with primary, advanced and recurrent pterygium, also(17).

Conclusion

Pterygium is associated with astigmatism. The induced corneal astigmatism increases with increase in the size of pterygium. Pterygium excision with conjunctival autotransplantation procedures (STBC and ITBC) results in significant reduction in astigmatism which leads to improvement in visual acuity. Successful pterygium surgery significantly reduce astigmatism and corneal flattening. All this suggests early surgical intervention.

The surgical autotransplantation technique with graft from inferior temporal bulbar conjunctiva, also has the added advantage as the superior conjunctiva is untouched and can be used for future surgeries if required.

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