

Nylon, fibrin glue and Vicryl[®] – the graft fixation techniques in the conjunctival autotransplant for the treatment of primary pterygium

Nylon, cola de fibrina e Vicryl[®] - Avaliação da fixação do enxerto no autotransplante conjuntival para tratamento do pterígio primário

Carla Christina de Lima Pereira¹, Edivânia Pereira Leite¹, Isabella Wanderley de Queiroga Evangelista¹, José Eduardo Lutaif Dolci²

ABSTRACT

Objective: to compare nylon, fibrin glue and Vicryl[®] in the conjunctival autograft for treatment of primary pterygium. **Methods:** Prospective study approved by the Ethics Committee following the Declaration of Helsinki. 89 eyes were underwent pterygium excision and conjunctival autograft. They were grouped according to the technique: fibrin glue, nylon 10-0 and 8-0 Vicryl[®] and followed up for 3 months. Surgical Time, intra and postoperative symptoms, biomicroscopic signs, ocular discomfort (by Visual Analogue Scale), aesthetic appearance and recurrences (day 21, 90 and 3 years) were evaluated. **Results:** The operative time was shorter with the fibrin glue ($p<0.001$). As to intraoperative symptomatology, burning sensation predominated with Vicryl[®] ($p=0,012$). The postoperative symptoms and signs: on day 1- secretion with fibrin glue ($p=0.02$), foreign body sensation ($p=0.017$) and subconjunctival hemorrhage ($p=0.022$) with Vycril[®]; on day 7- chemosis ($p=0.035$), hyperemia ($p<0.001$) and eyelid edema ($p=0.011$) with Vicryl[®]; on day 21-foreign body sensation ($p=0.001$) and conjunctival hyperemia ($p<0.001$) with nylon; on day 90- dry eye ($p=0.005$) with Vicryl[®]. Ocular discomfort was greater with Vycril[®] ($p=0.015$) on day 7. Final aesthetic appearance was superior with fibrin glue ($p=0.003$). The recurrences was greater on day 90: 20,7%(nylon), 10%(fibrin glue) and 19%(Vicryl[®]) ($p=0.496$) and after 3 years: 4.8% in NG, 0% in FGG, and 5.3% in VG ($p=0.536$). **Conclusion:** Fibrin glue showed efficacy, rapidity, less postoperative discomfort and better final aesthetic appearance. Vicryl[®] showed significant intraoperative and early postoperative symptoms and obvious signs of inflammation, beside ocular discomfort on day 7. Nylon caused more foreign body sensation and conjunctival hyperemia until its removal. The signs of recurrence were similar among the groups.

Keywords: Pterygium/therapy; Polyglactin 910; Fibrin tissue adhesive/therapeutic use; Transplantation, autologous; Sutures; Nylon

RESUMO

Objetivo: comparar o nylon, a cola de fibrina e o Vicryl[®] no autotransplante conjuntival para o tratamento do pterígio primário. **Métodos:** estudo prospectivo aprovado pelo Comitê de Ética seguindo a Declaração de Helsinque. 89 olhos foram submetidos à excisão de pterígio e autotransplante conjuntival, agrupados conforme as técnicas: nylon 10-0, cola de fibrina, e Vicryl[®] 8-0, acompanhados por 3 meses. Tempo cirúrgico, sintomas intra e pós-operatórios, sinais biomicroscópicos, desconforto ocular (Escala Analógica Visual), aspecto estético, recorrências no 21º e 90º dia pós-operatório e aos 3 anos. **Resultados:** O tempo operatório foi menor com a cola de fibrina e maior com Vicryl[®] ($p<0,001$). Sintomatologia intra-operatória: a ardência predominou com Vicryl[®] ($p=0,012$). Sintomas e sinais pós-operatórios significativos: no 1º dia, secreção com cola de fibrina ($p=0,02$), sensação de corpo estranho ($p=0,017$) e hemorragia subconjuntival ($p=0,022$) com Vycril[®]; No 7º dia - quemose ($p=0,035$), hiperemia ($p<0,001$) e edema da pálpebra ($p=0,011$) com Vicryl[®]; No 21º dia - sensação de corpo estranho ($p=0,001$) e hiperemia conjuntival ($p<0,001$) com nylon; No 90º dia - olho seco ($p=0,005$) com Vicryl[®]. Desconforto ocular: maior com Vycril[®] ($p=0,015$) no 7º dia. Aparência estética final: melhor com a cola ($p=0,003$). Sinais de recidiva: maior no 90º dia: 20,7%(nylon), 10%(cola) e 19%(Vicryl[®]) e após 3 anos: 4,8% (nylon), 0%(cola) e 5,3% (Vicryl[®]) ($p=0,536$). **Conclusão:** A cola de fibrina mostrou eficácia, rapidez, menor desconforto pós-operatório e melhor aspecto estético; o Vicryl[®], maiores sintomas intraoperatórios, pós-operatórios iniciais e sinais evidentes de inflamação, aliados ao desconforto ocular no 7º dia; o nylon, mais sensação de corpo estranho e hiperemia conjuntival até sua remoção. Os sinais de recidiva foram semelhantes entre os grupos.

Descritores: Pterígio/terapia; Poliglactina 910; Adesivo tecidual de fibrina/uso terapêutico; Transplante autólogo; Suturas; Nylon

¹Universidade Federal da Paraíba, João Pessoa, PB, Brazil.

²Faculdade de Ciências Médicas da Santa Casa de São Paulo, São Paulo, SP, Brazil.

Instituições envolvidas: Universidade Federal da Paraíba, João Pessoa, PB, Brazil; Faculdade de Ciências Médicas da Santa Casa de São Paulo, São Paulo, SP, Brazil.

Os autores declaram não haver conflito de interesses.

Recebido para publicação em 02/09/2017 - Aceito para publicação em 27/09/2017.

INTRODUCTION

Pterygium is a recurrent condition characterized as a benign, fibrovascular lesion that invades the cornea and can be surgically treated⁽¹⁾. Its main symptoms are foreign-body sensation, dry eye, burning sensation and, at advanced stages, high astigmatism and visual loss. The most common signs are conjunctival hyperemia, and, occasionally, punctate keratitis⁽²⁾. Due to the major aesthetic dissatisfaction experienced by patients, indication for surgery is frequent⁽³⁾, especially among young patients, in whom the growth is more accelerated⁽⁴⁾.

The treatment of choice for pterygium is the excision of the fibrovascular lesion coupled with conjunctival autotransplantation⁽³⁾. The techniques for fixing the graft in the conjunctiva vary according to the materials used that lead to different inflammatory responses, signs and symptoms influencing the patient's satisfaction in the postoperative period. Hence, studies evaluate the best material capable of reducing the inflammatory-exudative process, optimizing healing of the surgical procedure, and facilitating both the surgeon's work and patient's recovery⁽⁵⁾.

The conjunctival autotransplantation with sutures is a traditional method and nylon or polyglactin 910 (known as Vicryl®) sutures are the most frequently used ones^(6,7). The "Cut-and-paste method" technique introduced the use of biological fibrin glue⁽⁶⁾, which has yielded benefits by minimizing the postoperative discomfort caused by sutures and acts by mimicking the last reactions of the clotting cascade, forming a firm fibrin clot through the polymerization of fibrinogen by thrombin⁽¹⁾. This technique promotes an earlier vascularization of the graft and greater postoperative safety⁽⁸⁾.

The aim of this study is to compare the graft fixation in pterygium surgery with the use of nylon, fibrin glue and Vicryl®, assessing intra and postoperative data.

METHODS

A prospective comparative study of 89 eyes (88 patients) with primary pterygium operated between January and August 2012, at Hospital Universitário Lauro Wanderley (HULW) – João Pessoa/PB – Brazil, was approved by the HULW Human Research Ethics Committee (Project number 439/11), in compliance with the principles of the Declaration of Helsinki. The patients signed a Voluntary Informed Consent Form.

The cases of nasal pterygium with a maximum extension of 3 mm over the cornea were included in the study. Exclusion criteria were: diseases of the ocular surface, glaucoma, ocular surgeries or traumas, recurrent pterygium, and diseases preventing postoperative follow-up.

The patients were assigned to 3 groups with an equivalent number of participants each, according to the material used in the conjunctival graft fixation technique: Nylon Group (NG) - nylon 10.0 suture (Mononylon®, Ethicon, São Paulo, Brazil), Fibrin Glue Group (FGG) - biological fibrin glue (Tissucol®, Baxter AG, Vienna, Austria), and Vicryl® Group (VG) - polyglactin 8.0 (Vicryl®, Ethicon, São Paulo, Brazil). Preoperative ophthalmologic examination and surgeries were performed by the same surgeon.

The surgical technique of conjunctival autotransplantation⁽⁹⁾ was performed under topical anesthesia with 0.5% proxymetacaine eye drops (Anestalcon®, Alcon, São Paulo, Brazil) and intralesional anesthesia with 2% lidocaine (Xylestesin®, Cristália, São Paulo, Brazil). The excision of the head and body

of the pterygium with a scalpel blade and extensive resection of Tenon's capsule, followed by removal of the graft from the upper bulbar conjunctiva through hydrodissection with 2% lidocaine. The graft varied in size, between 1 and 2 mm larger than the naked sclera, and was applied onto this area with its epithelial side facing upwards. In the sutures groups, graft fixation was performed with 6 to 8 separate sutures. In FGG, one or two drops of the fibrinogen component were applied to the sclera and the same amount of the thrombin solution was applied to the inner side of the graft, then the edges of the graft of the recipient conjunctiva were cautiously brought closer together, waiting 1 minute for drying. The excess glue was removed and scleral cauterization was performed when necessary. The preparation of the fibrin glue was performed according to the manufacturer's guidelines.

After surgery, an sterile eye pad was applied with ointment containing 10,000 IU retinol acetate, 2.5% amino acids, 0.5% methionine, and 0.5% chloramphenicol (Epitezan®, Allergan, São Paulo, Brazil). Eye drops containing 0.3% gatifloxacin and 1% prednisolone acetate (Zypred®, Allergan, São Paulo, Brazil), and ocular lubricating carmellose sodium (Optive®, Allergan, São Paulo, Brazil), every 6 hours were prescribed to be used a 3-week period. Postoperative follow-up was performed on days 1, 7, 21, 90 and 3 years after surgery by a same ophthalmologist with surgical experience. Removal of the sutures in NG and VG was performed on day 21.

A clinical protocol was developed with these informations:

1. Demographic data - age, gender and laterality;
2. Operative time - measured from the placement of the blepharostat until its withdrawal;
3. Intraoperative symptoms - pain, burning sensation and foreign-body sensation;
4. Postoperative data related to days 1, 7, 21 and 90:
 - 4.1) Symptoms - pain, redness, foreign-body sensation, epiphora, secretion, burning sensation and dry eye. Ocular discomfort was assessed through the Visual Analog Scale (VAS) (ranging from 0 - minimum, to 10 - maximum);
 - 4.2) Biomicroscopic signs - conjunctival hyperemia, subconjunctival hemorrhage, chemosis, and eyelid edema, graded from 0 to 3 in intensity, and occasional complications;
 - 4.3) Patient satisfaction indexes (subjectively graded in very bad, bad, fair, good, and excellent);
5. Postoperative data relative to days 7, 21 and 90: assessment of the aesthetic aspect by the patient themselves (subjective graded in very poor, poor, fair, good, and excellent);
6. Postoperative data relative to days 21 and 90 and 3 years: presence of signs of recurrence, characterized by at least vascular proliferation exceeding the limbus by 1 mm.

Statistical analysis was carried out with the Statistical Package for Social Sciences SPSS (version 13.0). The continuous variables were described by mean and standard deviation, whereas the categorical variables were described in percentage values. Qualitative variables were compared by using Chi-square or Fisher's exact tests and quantitative variables with the Anova or Kruskal-Wallis tests. The statistical significance (pvalue) considered was 5% (p < 0.05).

RESULTS

The mean age was 44.5 ± 14.0 years. There was no significant difference among the groups with regard to age, gender or laterality. Mean operative time was statistically shorter in FGG – 17 minutes, followed by NG – 23.50 minutes and by GV – 25 minutes (p < 0.001) (Table 1).

Table 1
Patient sample data and operative time in the groups studied

		NG n = 30	FGG n = 30	VG n = 29
Age	Years	23-70	22-67	17-69
Gender	Male	15	15	12
	Female	15	15	17
Eye	Right	21	16	15
	Left	9	14	14
Operative Time (minutes)	Minimum	17	11	19
	Maximum	40	32	40
	Mean	23.50	17***	25
	Standard Deviation	±4.83	±5.05	±5.02

NG: Nylon Group; FGG: Fibrin glue Group; VG: Vicryl® Group; n: number of patients.
***significant P value <0.001 based on ANOVA test analysis.

Symptoms and biomicroscopic signs

Intraoperative

Burning sensation in VG was the most significant intra-operative symptom (p = 0.012). Pain was slightly higher in NG, whereas foreign-body sensation was slightly higher in VG, not statistically significant (Figure 1).

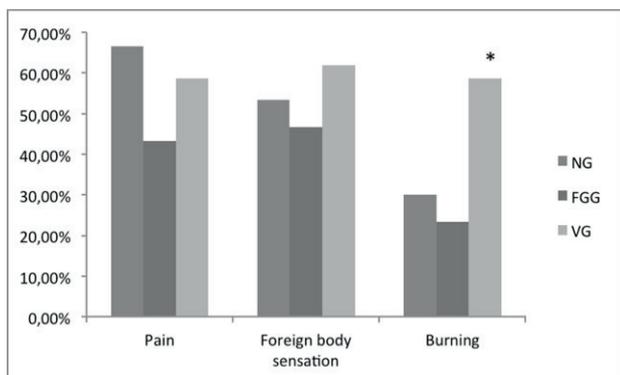


Figure 1: Comparison of intraoperative symptoms reported by patients operated on in the 3 groups - Nylon, Fibrin glue, and Vicryl®. NG: Nylon Group; FGG: Fibrin glue Group; VG: Vicryl® Group; *P value burning = 0,012 based on analysis of Pearson Chi-Square test analysis.

Day 1

Foreign-body sensation was greater in VG (82.8%), compared to FGG (53.3%) (p= 0.031); Secretion was present in 30% of FGG, 13.8% of GV and 6.7% of NG (p= 0.047). Pain, redness, epiphora, burning sensation were present in most patients in the groups (Figure 2).

Subconjunctival hemorrhage (grade 2) significantly predominated in VG, affecting 44.8% of patients (p=0.033). No statistical difference was found among the groups as to hyperemia (p=0,446) and chemosis (p=0.519).

Day 7

There was a slight increase of secretion, burning sensation and dry eye, as compared to day 1, and reduction of others symptoms.

The most evident signs on day 7 were conjunctival hyperemia, chemosis and eyelid edema in GV. Hyperemia (grade 2) predominated in 58.6% of patients (p<0.001), chemosis (grades

1 and 2) in 65.5% (p=0.022), and edema (grade 1) in 27.6% (p=0.028) (Figure 3).

Day 21

Foreign-body sensation was statistically greater in NG (70%), compared to FGG (25.9%) (p=0.004) (Figure 4).

Hyperemia was greater in NG - grade 1 in 76.7% of patients (p = 0.001). Most of the signs studied were not present after this period (Figure 5).

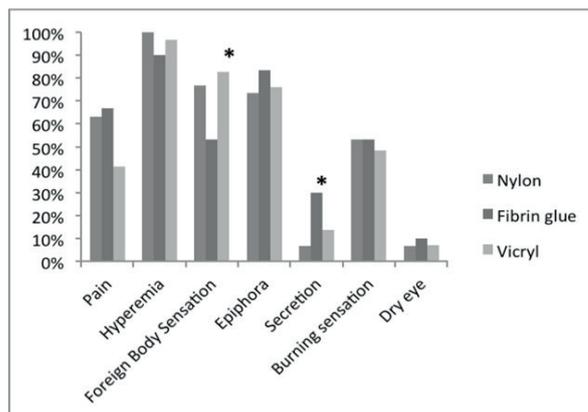


Figure 2: Comparison of postoperative symptoms reported by patients operated on in the 3 groups - Nylon, Fibrin glue, and Vicryl® - on day 1. NG: Nylon Group; FGG: Fibrin glue Group; VG: Vicryl® Group; *P value Foreign-body sensation= 0.031; *P value secretion= 0.047 based on the Pearson Chi-Square test analysis.

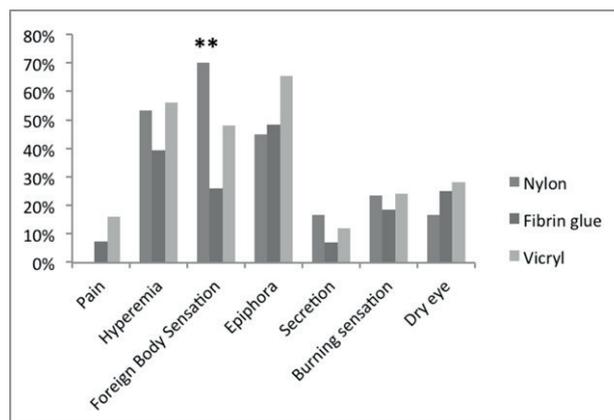


Figure 3: Comparison of postoperative symptoms reported by patients operated on in the 3 groups - Nylon, Fibrin glue, and Vicryl® - on day 21. NG: Nylon Group; FGG: Fibrin glue Group; VG: Vicryl® Group, **P value= 0.004 based on the Pearson Chi-Square test analysis

Day 90

Dry eye was statistically significant in VG (28.6%), compared to FGG (3.3%) (p = 0.042).

Ocular discomfort

Evaluation of postoperative discomfort through VAS showed that FGG presented a significantly lower index of ocular discomfort on day 7 (p=0.024) (Table 2).

Aesthetic appearance

There was no difference on days 7 and 21. On day 90, most of patients in FGG significantly reported “Excellent” appearance, whereas most in NG reported “Good” appearance (p=0.003) (Figure 6).

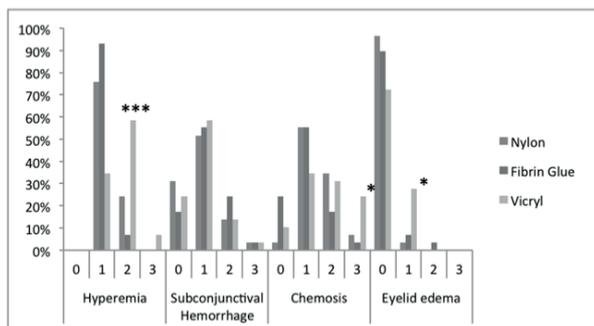


Figure 4: Assessment of the ocular biomicroscopic signs (graded from 0 to 3) of patients operated on in the 3 groups on the 7th postoperative day. NG: Nylon Group; FGG: Fibrin glue Group; VG: Vicryl® Group; ***P value Hyperemia<0.000; *P value Chemosis =0.022; *P value Eyelid edema =0.028 based on the Pearson Chi-Square test analysis; 0= grade 0; 1= grade1; 2= grade 2; 3= grade 3.

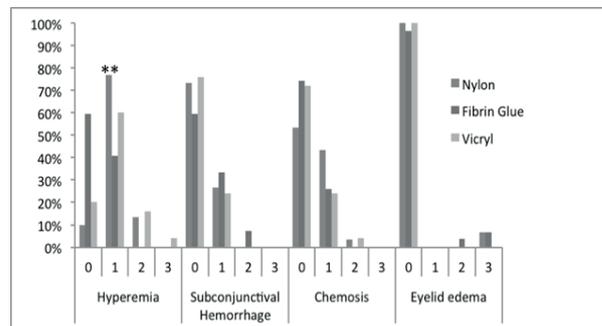


Figure 5: Assessment of the ocular biomicroscopic signs (graded from 0 to 3) of patients operated on in the 3 groups on the 21st postoperative day. NG: Nylon Group; FGG: Fibrin glue Group; VG: Vicryl® Group; **P value Hyperemia = 0.001 based on the Pearson Chi-Square test analysis; 0= grade 0; 1= grade1; 2= grade 2; 3= grade 3.

Table 2
Assessing Ocular Discomfort by the Visual Analog Scale (VAS)

VAS	1stPOD	SD	7thPOD	SD	21thPOD	SD	90thPOD	SD
NG	4.9	±3.61	3.7	±2.69	2.2	±2.10	0.8	±1.67
FGG	3.6	±3.24	2.2*	±2.62	1.6	±2.20	0.8	±1.70
VG	4.9	3.10	3.9	±3.02	2.4	±2.12	1.4	±2.47

Minimum Score 0 and Maximum Score 10; NG: Nylon Group; FGG: Fibrin glue Group; VG: Vicryl® Group; VAS= Visual Analog Scale; SD= Standard Deviation; POD= postoperative day; *P value=0.024; P value based on the Kruskal-Wallis test analysis.

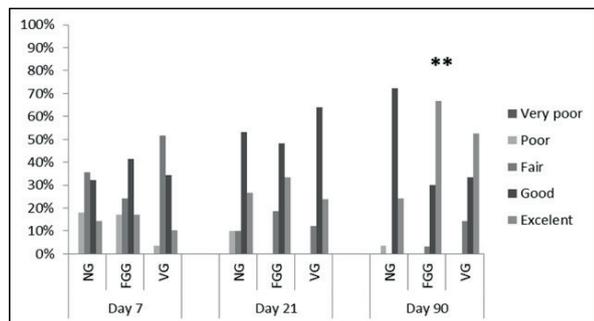


Figure 6: Comparison of the aesthetic appearance observed by patients operated on in the 3 groups - Nylon, fibrin glue and Vicryl® - over a 3-month postoperative period. NG: Nylon Group; FGG: Fibrin glue Group; VG: Vicryl® Group, **P value= 0.005 based on the Pearson Chi-Square test analysis.

Recurrences

The signs of recurrences were analyzed on days 21, 90 and 3 years. The greatest number of patients with recurrence was found on day 90: 20,7% in NG, 10% in FGG and 19% in VG (p=0.496). On day 21, 3.6% of patients in FGG presented with recurrence versus none in the other groups (p=0.363), whereas after the 3-year period, 4,8% in NG, 0% in FGG, and 5.3% in VG (p=0.536).

DISCUSSION

This prospective study compared the benefits from graft fixation techniques being practiced worldwide for the surgical

treatment of pterygium.⁽¹⁰⁻¹²⁾ Extensive PUBMED search failed to reveal any study comparing the three techniques of conjunctival fixation. A high frequency of patients with pterygium in this hospital was evidenced by the sample in this study.⁽¹¹⁾ The mean age of 44.5 shows the prevalence of this condition during an individual’s active years⁽¹²⁾ and the data reflect that either eye in both young patients and the elderly of both genders can be affected.⁽⁴⁾

The intraoperative symptoms in pterygium surgery have not been reported in the literature. Although the topical and subtenon anesthesia techniques are more commonly used,^(13,14) yielding better surgical performance⁽¹⁵⁾, can cause intraoperative ocular discomfort that do not occur in peribulbar infiltration that totally immobilizes the eye, which in turn precludes surgical manipulation in conjunctival autotransplantation.^(4,11) In this study, burning sensation in the Vicryl® group was significant, with this complaint being probably related to the greater thickness of the suture threads used, responsible for an intense burning or localized heat sensation due to greater surgical trauma and stimulation of adjacent conjunctival nerve fibers.

An important factor in the patient’s perception of the surgical procedure is operative time, which was significantly shorter in the fibrin glue group,^(1,6,10,11,14) due to reduction in surgical manipulation and allowed several surgeries to be performed with one flask of fibrin glue.

All surgical techniques caused pain, redness, epiphora, burning sensation in most patients on day 1 and confirm the intense discomfort reported by the patients, unlike a comparative study⁽¹⁰⁾ which showed greater intensity of symptoms with the use of Vicryl®.

The complaint of foreign-body sensation was more relevant on day 1 in the Vicryl®⁽¹¹⁾ group and on day 21 in the nylon

group,^(12,16) with greater discomfort in the presence of the sutures, with nylon sutures remaining in place until they are manually removed by the ophthalmologist.⁽¹⁷⁾ Accordingly, the Vicryl® suture caused foreign-body sensation earlier⁽⁶⁾ and, because this material is biodegradable, the spontaneous suture drop-off occurs, leading to relief of the symptom, whereas in the researched literature, it persisted until day 21,⁽¹⁰⁾ as compared to fibrin glue. However, the nylon suture caused greater foreign-body sensation in the later postoperative period and its presence can cause edema and tissue reaction. Removal of sutures in conjunctival autotransplantation is usually performed in the second week, up to 28 days following surgery, thereby avoiding signs of recurrence and minimizing postoperative symptoms.^(8,18)

In the fibrin glue group, the presence of secretion was more evident on day 1 and had no association with other studies. Nevertheless, this can be caused by extravasated fibrin glue and its accumulation in the bottom of the conjunctival sacs. Therefore, it is important that it be carefully removed with scissors after its adhesion time. There was observed a clinical correlation between the presence of secretion and dry eye in the groups studied on day 7, in which the increase in secretion could be due to greater mucin production, secondary to an intense inflammatory process of noninfectious etiology, caused by the surgical procedure.

The ocular discomfort was significantly higher with the use of Vicryl® on day 7 and less so with the fibrin tissue adhesive.⁽⁶⁾ Accordingly, in the first week, the suture threads caused greater inflammatory process around them, especially with the Vicryl®, due to its thickness and consequently higher discomfort.⁽⁶⁾ Other authors have demonstrated superiority of the fibrin glue relative to nylon.⁽¹⁶⁾

Although suture threads are still widely used for conjunctival autotransplantation,^(4,19) they cause tissue trauma at the lesion site and adjacent areas and interfere with the natural healing process.⁽²⁰⁾ Such tissue reaction to the material used in suturing is an important factor to be considered when choosing the best tissue adherence technique.

The most evident biomicroscopic signs were hyperemia, subconjunctival hemorrhage and chemosis, which caused a significant conjunctival reaction and prevailed in the Vicryl® group.^(10,19) Tissue trauma sustained during suturing caused more significant subconjunctival hemorrhage on day 1 and its multifilamentous structure, whose thickness is greater than that of the nylon, induced greater contact and trauma to the conjunctival surface. These data corroborate a pioneering study indicating that sutures induced the inflammatory process through the migration of Langerhans cells to the cornea.^(21,22)

Hyperemia was significantly more frequent in the Vicryl® group on day 7 and in the nylon group on day 21, especially when compared to the fibrin glue group. This earlier conjunctival inflammatory reaction in the Vicryl® group^(10,19,23) and later with nylon group was different from studies that reported significant hyperemia with nylon compared to glue from day 7 to day.^(6,18) Similar behavior was observed with chemosis, which was more frequent in the Vicryl® group on day 7,⁽¹⁴⁾ persisting until day 21, and associated with increased hyperemia as compared to the glue group.⁽¹⁰⁾ The most intense inflammatory signs with Vicryl® were in agreement with the most exacerbated symptoms discussed above. On the contrary, a more recent study has reported greater chemosis and inflammatory process with the fibrin glue, with the justification for that being the separation of the edges of the graft from the adjacent conjunctiva, a fact that was not observed in this study.⁽²⁴⁾ Others showed a significant inflammatory process in the first postoperative week with Vicryl® that reduced gradually, the

other⁽²⁵⁾ reported no significant difference between the fibrin glue and Vicryl® in the first week, but rather only after 1 month. Such disparity can be explained by the difference in the structure of the suture thread used in this study, which was multifilamentous and loosened rapidly in the first weeks, whereas in that study it was monofilamentous and slowly degraded, which could cause chronicity of the inflammatory process. In addition to the clinical data, the inflammatory potential of Vicryl® has been histologically proven in the conjunctiva, where intense inflammatory reaction has been observed.⁽²⁶⁾ The use of fibrin glue, therefore, has the advantage of inhibiting the inflammatory process due to manipulation of the tissue to a lesser extent and rapid adhesion to the graft, which consequently leads to its earlier vascularization.⁽²⁵⁾

The Graft loss and retraction are feared postoperative complications due to the risk of failure.⁽²⁷⁾ No such complications were observed in any techniques employed,⁽¹²⁾ only one instance of graft displacement was observed when using the glue and it progressed with suitable vascularization of the graft. These results corroborate a meta-analysis⁽¹⁾ which describe the good adhesiveness of the fibrin glue.^(2,7) The absence of conjunctival cysts, granulomas, dellen, showed low index of complications achieved with these techniques.⁽⁴⁾

Despite being a frequent complaint from patients literature lacks data on the postoperative aesthetic aspect in pterygium surgery. However, esthetics is a subjective and relevant factor, since it is often the only motivation for surgical treatment. Therefore, it is important that ophthalmological practice approaches the patient's expectations, being able to improve ocular aesthetics and, consequently, contribute to the patient's greater satisfaction with the procedure performed. Having exhibited satisfactory progression, in the third postoperative month, the glue was found to be superior to the suture threads, revealing an "Excellent" aesthetic appearance in most patients, especially in comparison to nylon, whose final appearance results were only "Good" in most patients. The postoperative results were concordant with the symptoms and signs reported and emphasized the difference among the groups, where the major inflammatory process in the groups of patients who underwent suturing can negatively influence the ocular aesthetics. As soon as in the first week, they showed a relatively better aspect with the fibrin glue and progressed in a significant manner at the end of the 3-month postoperative follow-up.

The recurrence rate is an important factor in the choice of technique and a reason for frustration on the part of both the physician and the patient.⁽¹⁾ It usually occurs in the first postoperative months and the follow-up should be more rigorous^(17,28) with controlling the inflammatory process, whose intensity correlates with greater pterygium vascularization⁽²⁰⁾ and highest recurrence rates.⁽¹⁹⁾ In the first 3 months, the recurrence signs were observed in 16.3% of patients - usual rate with conjunctival autotransplantation.⁽²⁰⁾ The cases were below of 35, the age group with the greatest propensity for that.⁽²⁹⁾

The patients could be observed after 3 years of postoperative follow-up and this maximum period for monitoring recurrences was determined in order to assess each technique's effectiveness more precisely.⁽²⁹⁾ In this study, the signs of recurrence observed on postoperative day 90 had a significant reduction after a 3-year follow-up, similarly to a study which found incipient signs of recurrence in 12.1% of patients, presented as a fibrovascular growth advancing over the limbus and of which only 4.3% were definitive recurrences.⁽³⁰⁾ Therefore, it can be emphasized that not all fibrovascular growths correspond to recurrence and may represent vascularization resulting from some residual postopera-

tive thinning. The low recurrence rates showed quite satisfactory results with the 3 techniques evaluated.^(2,11)

Authors have reported greater efficacy with fibrin glue than nylon,⁽¹⁸⁾ whereas others showed higher rates with fibrin glue than Vicryl®⁽¹⁰⁾. Although thicker suture threads may predispose patients to recurrences, this analysis presented no statistical differences across the sutures and fibrin glue groups.⁽²⁹⁾

This study highlights the efficacy of the surgical techniques presented and the most important factors enumerated by the patient, such as discomfort, recurrence, aesthetic appearance and surgical time, who reported satisfactory results, especially with fibrin glue, which was proven to be an excellent technique for graft fixation in cases of primary pterygium.⁽⁷⁾ The use of fibrin glue requires a short learning curve and, among its benefits, graft safety with little displacement due to earlier vascularization⁽¹⁾, and less postoperative discomfort, which provide the patient with better well-being. With our data, we hope to have been able to contribute to and elucidate these important issues for pterygium surgeons in their daily practice.

REFERENCES

- Pan HW, Zhong JX, Jing C. Comparison of fibrin glue versus suture for conjunctival autografting in pterygium surgery: a meta-analysis. *Ophthalmology*. 2011;118(6):1049-54.
- Catagay HH, Gokce G, Ekinci M, Koban Y, Daraman O, Ceylan E. Long-term comparison of fibrin tissue glue and vicryl suture in conjunctival autografting for pterygium surgery. *Postgrad Med*. 2014;126(1):97-103.
- Janson BJ, Sikder S. Surgical management of pterygium. *Ocul Surf*. 2014;12(12):112-9.
- Prabhakar SK. Safety profile and complications of autologous limbal conjunctival transplantation for primary pterygium. *Arábia J Ophthalmol*. 2014;28(4):262-7.
- Gartti-Jardim EC, de Souza AP, Carvalho AC, Pereira CC, Okamoto R, Magro Filho O. Comparative study of the healing process when using healing process when using Vicryl®, Vicryl Rapid®, Vicryl Plus® and Monocryl® sutures in the rat dermal tissue. *Oral Maxillofac Surg*. 2013;17(4):293-8.
- Koranyi G, Seregard S, Kopp ED. The cut-and-paste method for primary pterygium surgery: long-term follow-up. *Acta Ophthalmol Scand*. 2005;83(3):298-301.
- Por YM, Tan DT. Assessment of fibrin glue in pterygium surgery. *Cornea*. 2010;29(1):1-4.
- Kuçukerdonmez C, Karalezli A, Zengin MO, Akova YA. Vascularization of conjunctival autografts in pterygium surgery: comparison of fibrin glue with sutures. *Eur J Ophthalmol*. 2014;24(6):824-9.
- Kenyon KR, Wagoner MD, Hettinger ME. Conjunctival autograft transplantation for advanced and recurrent pterygium. *Ophthalmology*. 1985;92(11):1461-70.
- Bahar I, Weinberger D, Gatton DD, Avisar R. Fibrin glue versus vicryl sutures for primary conjunctival closure in pterygium surgery: long-term results. *Curr Eye Res*. 2007;32(5):399-405.
- Sati A, Shankar S, Jha A, Kalra D, Mishra S, Gurnadh VS. Comparison of efficacy of three surgical methods of conjunctival autograft fixation in the treatment of pterygium. *Int Ophthalmol*. 2014;34(6):1233-9.
- Vichare N, Choudhary T, Arora P. A comparison between fibrin sealant and sutures for attaching conjunctival autograft after pterygium excision. *Med J Armed Forces India*. 2013;69(2):151-5.
- Catagay HH, Gokce G, Mete A, Koban Y, Ekinci M. Non-recurrence complications of fibrin glue use in pterygium surgery: prevention and management. *Open Ophthalmol J*. 2015;9:159-63.
- Han SB, Jeon HS, Kim M, Lee SJ, Yang HK, Hwang JM, et al. Risk factors for recurrence after pterygium surgery: an image analysis study. *Cornea*. 2016;35(8):1097-103.
- Pereira CCL, Vieira SA, Leite EP, Felix GAL, Torquato JA. Estudo descritivo de cirurgia de pterígio primário com adesivo de fibrina. *Rev Bras Oftalmol*. 2013;72(4):227-31.
- Uy HS, Reyes JMG, Flores JDG, Lim-Bon-Siong R. Comparison of fibrina glue and sutures for attaching conjunctival autografts after pterygium excision. *Ophthalmology*. 2005;112(4):667-71.
- Sharma A, Raj H, Gupta A, Raina AV. Sutureless and glue-free versus sutures for limbal conjunctival autografting in primary pterygium surgery: a prospective comparative study. *J Clin Diagn Res*. 2015;9(11):NC06-NC09.
- Cha DM, Kim KH, Choi HJ, Kim MK, Wee WR. A Comparative study of the effect of fibrin glue versus sutures on clinical outcome in patients undergoing pterygium excision and conjunctival autografts. *Korean J Ophthalmol*. 2012;26(6):407-13.
- Ratnalingam V, Eu AL, Ng GL, Taharin R, John E. Fibrin adhesive is better than sutures in pterygium surgery. *Cornea*. 2010;29(5):485-9.
- Sridhar MS, Bansal AK, Rao GN. Surgically induced necrotizing scleritis after pterygium excision and conjunctival autograft. *Cornea*. 2002;21(3):305-7.
- Suzuki T, Sano Y, Kinoshita S. Conjunctival inflammation induces Langerhans s'cell migration into the cornea. *Curr Eye Res*. 2000;21(1):550-3.
- Hirst LW, Sebban A, Chant D. Pterygium recurrence time. *Ophthalmology*. 1994;101(4):755-8.
- Huerva V, March A, Martinez-Alonso M, Muniesa MJ, Sanchez C. Pterygium surgery by means of conjunctival autograft: long term follow-up. *Arq Bras Oftalmol*. 2012;75(4):251-5.
- Mejía LF, Santamaría JP, Cuevas M, Córdoba A, Carvajal SA. Comparison of 4 techniques for limbal-conjunctival autograft fixation in primary pterygium surgery. *Eur J Ophthalmol*. 2017;27(4):466-9.
- Srinivasan S, Dollin M, McAllum P, Berger Y, Rootman DS, Slomovic AR. Fibrin glue versus sutures for attaching the conjunctival autograft in pterygium surgery: a prospective observer masked clinical trial. *Br J Ophthalmol*. 2009;93(2):215-8.
- Pereira-Lucena CG, Artigiani-Neto R, Lopes-Filho GJ, et al. Experimental study comparing meshes made of polypropylene, polypropylene + polyglactin and polypropylene + titanium: inflammatory cytokines, histological changes and morphometric analysis of collagen. *Hernia*. 2010;14(3):299-304.
- Yüksel B, Unsal SK, Onat S. Comparison of fibrin glue and suture technique in pterygium surgery performed with limbal autograft. *Int J Ophthalmol*. 2010;3(4):316-20.
- Anbari AA. Autologous cryoprecipitate for attaching conjunctival autografts after pterygium excision. *Middle East Afr J Ophthalmol*. 2013; 20(3):239-43.
- Varssano D, Shalev H, Lazar M, Fischer N. Pterygium excision with conjunctival autograft: true survival rate statistics. *Cornea*. 2013;32(9):1243-50.
- Kwon SH, Kim HK. Analysis of recurrence patterns following pterygium surgery with conjunctival autografts. *Medicine (Baltimore)*. 2015;94(4):e518.

Corresponding author:

Carla Christina de Lima Pereira
Av Rui Carneiro, 115 - Tambauzinho, Zip code: 58032-110
João Pessoa, PB, Brazil.
Phone: +5511 83 999409981.
E-mail: hicajr@hotmail.com