

# Pterygium surgery with conjunctival limbal autograft in an eye clinic from Villavicencio, Colombia

Cirurgia de pterígio com autoenxerto conjuntival em uma clínica de oftalmologia em Villavicencio, Colômbia

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## ABSTRACT

**Objective:** To describe results of pterygium surgery at *Clínica de Cirugía Ocular Villavicencio*, in Meta, Colombia.

**Methods:** A retrospective analysis of pterygium surgeries performed between January 2017 and December 2019.

**Results:** Approximately 1,200 records were reviewed, and 1,200 procedures included. The most frequent complications were corneal Dellen, pterygium recurrence, graft retraction and pyogenic granuloma (7.5%, 2.5%, 3% and 0.75% respectively). These were identified within the first 6 months of surgery.

**Conclusion:** Pterygium surgery using conjunctival autografts is an effective technique, with low recurrence rates and very few complications.

## RESUMO

**Objetivo:** Descrever os resultados da cirurgia de pterígio na Clínica de Cirurgia Ocular Villavicencio, Meta, Colômbia.

**Métodos:** Análise retrospectiva de cirurgias de pterígio realizadas entre janeiro de 2017 e dezembro de 2019.

**Resultados:** Aproximadamente 1.200 prontuários foram revisados e 1.200 procedimentos foram incluídos. As complicações mais frequentes foram o Dellen corneano, a recorrência do pterígio, a retração do enxerto e o piogranuloma (7,5%, 2,5%, 3% e 0,75%, respectivamente). Essas complicações foram identificadas nos primeiros 6 meses após a cirurgia.

**Conclusão:** A cirurgia de pterígio pela técnica de autoenxerto conjuntival é um procedimento eficaz, com baixos índices de recorrência e poucas complicações.

## INTRODUCTION

The term pterygium stems from the Greek word pteron (or pteryx), meaning “wing”, plus a diminutive suffix. The disease has been described by Hippocrates more than 2,000 years ago.<sup>(1)</sup>

Pterygium is a noninvolitional degenerative condition of the cornea, which is characterized by intense inflammatory and proliferative activity of the conjunctiva. Patients with pterygium may seek help for cosmetic reasons, ocular surface discomfort or visual impairment due to decreased corneal transparency and resultant reduced entrance of light in the eye or induced astigmatism. Pterygium affects primarily patients who work or spend leisure time outdoors and is more common in latitudes near the Equator.<sup>(1)</sup>

According to the Fush's theory, external agents such as exposure to ultraviolet light, dust, wind and heat are predisposing factors for pterygium development.<sup>(2)</sup> Endogenous factors such as age, genetic susceptibility, and tendon insertion closer to the sclerocorneal limbus are also implicated in the pathogenesis of pterygium.<sup>(2)</sup>

Pterygium requires surgical treatment and several techniques have been described. However, conjunctival-limbal autograft has been shown to decrease recurrence rates<sup>(3)</sup> and is the technique of choice at *Clínica de Cirugía Ocular Villavicencio*. Therefore, it will be described in this study. In this technique, the pterygium is resected and a graft harvested from the superior bulbar conjunctiva implanted and sutured using 10-0 monofilament suture material in a continuous fashion.<sup>(4)</sup>

## METHODS

This retrospective observational study was based on a review of 1,200 eye procedures performed in the same number of patients between January 2017 and December 2019. Data were extracted from the database of an organization specializing in outpatient eye surgery named *Clínica de Cirugía ocular* located in Villavicencio, Colombia, at. Records of adult patients who had been submitted to surgical correction of pterygium using the limbal-conjunctival autograft technique and followed for more than one year were selected.

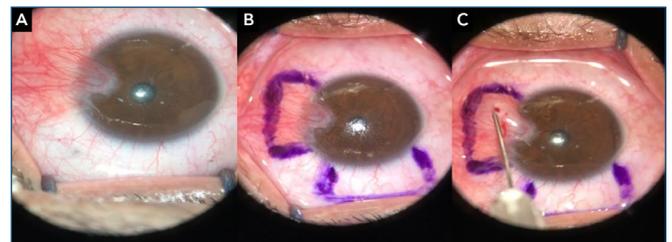
The surgical procedure consisted of pterygium resection (Figure 1A) and defect correction using a limbal-conjunctival autograft. The dependent variable were post-operative complications, particularly recurrence within six months determined by yearly follow-up telephone calls or face-to-face follow-up visits over the course of three consecutive years. Records of adult patients undergoing

pterygium resection during the experimental study period from 2014 to 2017 were included. No records were excluded.

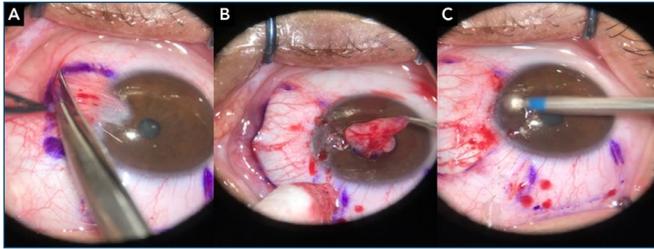
The surgical technique consisted of pterygium resection and implantation of a conjunctival-limbal autograft. In this technique, pterygium resection margins are demarcated, and a free graft harvested directly from the superior bulbar conjunctiva (Figure 1B). Anesthesia consisted of topical 0.5% proparacaine hydrochloride and infiltration of lidocaine with epinephrine into the body of the pterygium and the donor site (Figure 1C). The pterygium was dissected away from body to head and avulsed using blunt Wescott scissors (Figures 2D and 2E). Keratectomy was then completed using a round aerator (?) and a scalpel with a No.15 blade (Figures 2F, 3A and 3B). Immediately after creating the incision, minimal local hemostasis was applied to prevent excessive bleeding and the Tenon capsule resected to prevent recurrence (Figure 3B).<sup>(5)</sup> A previously demarcated graft was then harvested from the superior bulbar conjunctiva using Wescott scissors and the dissected limbus incorporated using a crescent knife (Figure 4).<sup>(6)</sup>

Finally, the autograft is secured into place using two limbal and scleral (superior and inferior) interrupted sutures followed by a continuous suture with 10-0 nylon (Figure 4C), which were removed 10 days after surgery.<sup>(7)</sup>

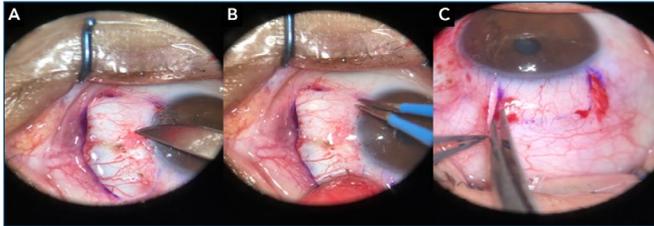
This common lesion can be resected using several surgical techniques, including topical application of antimetabolites, limbal cell transplantation, amniotic membrane grafting or resection alone. The surgical technique is selected according to surgeon preference, reported success and recurrence rates, some risk factors, and type of population. At *Clínica de Cirugía Ocular (CCO)*, the technique described is preferred due to satisfactory postoperative outcomes and low recurrence and reoperation rates.



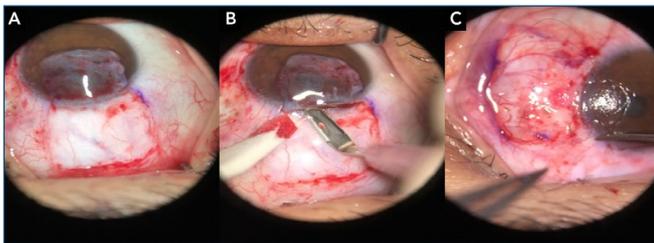
**Figure 1.** Anatomical demarcation and anesthetic procedure. (A): Visualization of pterygium anatomical location, size, and functional compromise. (B): Schematic demarcation of pterygium resection margins and free graft. (C): Topical anesthesia with 0.5% proparacaine hydrochloride and infiltration of lidocaine with epinephrine into the body of the pterygium and the graft harvesting site.



**Figure 2.** Dissection of the pterygium. (D): Resection of the previously demarcated pterygium. (E): Hemostasis. (F): keratectomy using a round aerator



**Figure 3.** Free graft resection. (A): Tenon capsule resection to prevent recurrence. (B): Wescott scissors used to harvest the graft from the superior bulbar conjunctiva. (C): Free graft harvesting.



**Figure 4.** Dissection of the limbus and fixation of the pterygium. (A): Using a crescent knife, the dissected limbus is incorporated. (B): Cleaning and free graft fixation site demarcation. (C): The autograft is secured to the limbus and the sclera (superior and inferior) with two interrupted sutures; fixation is then completed in continuous fashion with 10-0 nylon.

## Materials and instrument used for data collection

Selected records were exported into an Excel spreadsheet for initial debugging and statistical analysis.

Categorical variables were expressed as frequencies and proportions. Quantitative variables were described according to central distribution and dispersion (medians, interquartile ranges/IQR, maximum and minimum values). In initial statistical analysis, data exported into the Excel spreadsheet were tabulated and refined in its descriptive component. Prism for Mac software version 8.4.3 was used for statistical comparisons and graph design. Statistical significance was assessed using the chi-squared test (categorical variables) or the non-parametric Mann-Whitney test for data with irregular or abnormal distribution (quantitative variables). Significance was defined as  $p$ -value  $< 0.05$ .

All patients underwent comprehensive ophthalmological evaluation, including slit lamp biomicroscopy. Age, sex, and pterygium location and classification were data were extracted from records.<sup>(5)</sup>

Pterygia were classified as follows: (1) does not compromise the limbus (pinguecula); (2) compromises the limbus; (3) comprises half the distance between the limbus and the pupillary margin; (4) reaches the pupillary margin; (5) extends beyond the pupillary margin.<sup>(6)</sup>

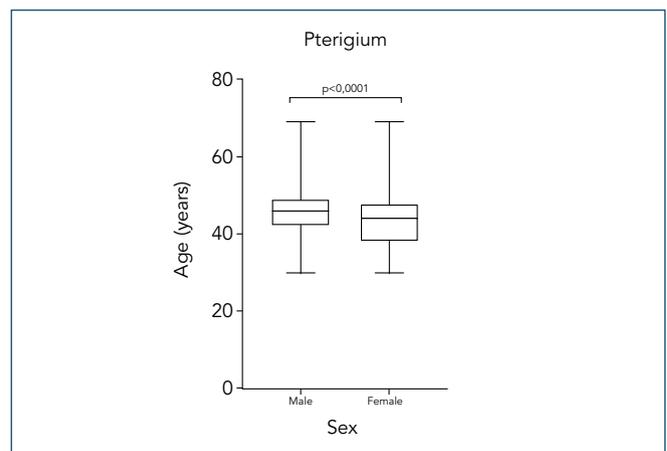
## Ethical considerations

The study consisted of a retrospective review of data extracted from a database and was therefore classified as free of risks for participants according to the 8430 Colombian directives of 1993 on human research. Patient information and identity were anonymized to avoid direct or indirect identification by data in this study.

The research project was submitted for evaluation and approval by the research committee of the participating institution.

## RESULTS

Approximately 8,215 surgical procedures were performed during the experimental period. Of these, 1,203 (14.6%) were due to pterygium. Most patients were females (66.7%). Patients were aged 45 years on average (30 to 69 years; IQR, 41-49) (Figure 5). Most patients lived in rural areas (83.6%), although the municipality or department of origin was not recorded. Most lesions affected the left eye (58 versus 42%) and the nasal location prevailed (96%). Type 2 lesions were the most common (56.7%) and complications were reported in 13.8% of cases. Recurrence was observed in 2.5% of cases.



**Figure 5.** Comparison of age by sex of patients with pterygium surgical resection at Clínica de Cirugía ocular, Villavicencio, Colombia.

Normality test for age by sex revealed a  $p$  value of  $p < 0.0001$  for both variables. Given the quantitative variable. Female patients were older than male patients (46 years; 42-49 years *versus* 44 years; 38-48 years;  $p < 0.0001$ ). Recurrence rates were also higher among female patients (3 *versus* 1.5%). However, differences were non-significant ( $p = 0.1682$ ). Recurrence rates according to side of intervention (2.58 *versus* 2.44;  $p = 0.9999$ ), in the left side. rural or urban origin (2.25 *versus* 0.25;  $p = 0.4572$ ) and pterygium location (nasal or temporal; 2.33 *versus* 0.17%;  $p = 0.3396$ ) were also similar. Recurrence was more common in lesions classified as type 2 (2.9%), although differences were non-significant ( $p = 0.3127$ ).

## DISCUSSION

The Clínica de Cirugía Ocular is an institution with more than 30 years of experience in visual health care services, which is widely recognized for its technical-scientific capabilities and quality. This organization (*Clínica de Cirugía Ocular Villavicencio*) is an ophthalmology referral center located in Colombia, which provides care for many patients due to its geographical location, in the city of Villavicencio, in the Orinoquia region, Colombia. This region is known for its livestock, agriculture and multiple agro-industrial areas and has a warm tropical climate, with rainfall most of the year and short dry periods. Widely variable humid tropical weather, with average temperatures ranging from 25°C to 34°C for the most part, encourages greater sun exposure. In CCO, around 2,500 to 3,000 eye surgeries are performed per year, 14% to 17% of which are due to pterygium.

Differences in recurrence rates and postoperative complications between pterygium surgeries have led to the investigation of new techniques aimed at mitigating these two factors.<sup>(8-12)</sup> Recurrence rates recorded in patients operated at CCO in this study (2.5%) were similar to findings reported in previous publications (recurrence rates ranging from 2% to 39%).<sup>(10)</sup> Since the 1980s, limbal-conjunctival autograft has been the surgical method of choice due to lower recurrence and complication rates, in spite of longer surgical and operative time.

Overall, recurrence rates associated with this technique range from 5% to 15%.<sup>(11)</sup> Of notice, the Colombian region of the eastern plains is characterized by a high

incidence of pterygium and the vast majority of patients (*seen at CCO?*) come from distant rural areas and have a history of high occupational exposure to ultraviolet light. Hence the need to decrease relapse and reintervention rates in these patients. As stated above, the limbal-conjunctival autograft technique is associated with considerably lower rates of pterygium recurrence.

This study has limitations, such as retrospective design, which precludes the identification of factors with potential impact on outcomes. However, it provides data extracted from a substantial number of cases and therefore support findings of similar case series. It is also the first report of this kind in the region.

Findings presented may be used to formulate hypothesis in future studies with more appropriate experimental design to determine whether low recurrence rates are associated with factors such as the surgical technique selected, and to compare outcomes between techniques.

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