Original article

An ultrasound biomicroscopy study after deep sclerectomy with supraciliary implant

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**A R T I C L E   I N F O**

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**A B S T R A C T**

Objective: To evaluate patients 24 months after deep sclerectomy (DE) with supraciliary implant, and identify any predictive success factors by examination with ultrasound biomicroscopy (UBM).

Materials and methods: This study included 26 eyes of 23 patients evaluated by UBM 24 months after a deep sclerectomy with a supraciliary hema implant.

Results: There was a significant reduction in intraocular pressure (IOP), changing from a preoperative mean of 25.6 ± 6.4 mmHg to a postoperative mean of 16.2 ± 3.4 mmHg \((p<0.001)\). The number of preoperative glaucoma medications also decreased from 2.5 ± 0.6 drugs per patient to 0.5 ± 0.5 \((p<0.001)\). No change was observed in the best-corrected visual acuity. The anatomical characteristics of the surgical area and its relationship with IOP were examined using UBM. There was no correlation between the level of IOP at the time of UBM and the horizontal \(r = -0.05; p = 0.71\) and vertical diameter \(r = -0.11; p = 0.63\), the height \(r = 0.28; p = 0.25\) and the volume of intrascleral space \(r = -0.08; p = 0.79\), the thickness \(r = -0.07; p = 0.73\) and the length \(r = 0.39; p = 0.13\) of trabeculo-Descemet’s membrane (TDM), the presence of filtering bleb \(p = 0.30\) and the hypoechoic area in the supraciliary space \(p = 0.24\).

Conclusions: The insertion of a hema implant in the supraciliary space is an effective and safe surgery for patients with open angle glaucoma (OAG). No predictive success factors for supraciliary implant were found using the UBM study.

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Palabras clave: Glaucoma
Esclerectomía profunda no perforante
Implante supraclíriar
Biomicroscopía ultrasonora

Estudio mediante biomicroscopia ultrasonora de pacientes intervenidos de esclerectomía profunda no perforante con implante supraclíriar

RESUMEN

Objetivo: Evaluar a pacientes 24 meses después de ser intervenidos mediante esclerectomía profunda no perforante (EPNP) con implante supraclíriar y determinar la existencia de factores predictivos de la eficacia de la técnica mediante la exploración biomicroscópica (BMU).

Material y métodos: Se incluyen 26 ojos de 23 pacientes explorados con UBM 24 meses después de ser intervenidos mediante EPNP con implante de hema supraclíriar.

Resultados: Se ha encontrado un descenso significativo de la presión intraocular (PIO) de 25,6 ± 6,4 mmHg a 16,2 ± 3,4 mmHg y en el número de medicaciones antiglaucomatosas de 2,5 ± 0,6 por paciente a 0,5 ± 0,5 (p < 0,001). No se evidenciaron cambios significativos en la agudeza visual. Mediante BMU no se ha podido correlacionar la PIO con el diámetro horizontal (r = −0,05; p = 0,71) ni vertical (r = −0,1; p = 0,63) del lago intraescleral, su altura (r = 0,28; p = 0,25) ni volumen (r = −0,08; p = 0,79), el grosor de la MBTD (r = −0,07; p = 0,73) ni su longitud (r = 0,39; p = 0,13), la presencia de ampolla filtrante (p = 0,3) ni de un área hipogénica en el espaciosupracorial (p = 0,2).

Conclusiones: La inserción del implante de hema en el espacio supraclíriar durante la cirugía no perforante del glaucoma es segura y efectiva en el glaucoma de ángulo abierto (GAA) pero no hemos podido establecer factores.

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Introduction

The non-perforating deep sclerectomy (NPDS) with supraclirial implant is intended to improve the trabecular pathway and the uveoscleral pathway of aqueous humour drainage for greater efficacy. Ultrasonic biomicroscopy (UBM) is a very useful tool to understand how glaucoma surgery works, and, while many studies on conventional non-perforating surgery have been reported, even with hema implants, there are no references in the literature about implants in a supraclirial location. UBM is an “in vivo” examination technique that allows us to visualize the eyeball’s anterior structures by ultrasound. Described in 1950, it was only in the early 1990s that its clinical application was disseminated with the arrival of new 35–50 MHz transducers. These transducers make good resolution and visualization of the intraocular structures possible. It is a relatively simple technique whose main advantages are its greater exploratory depth, which may get up to 6 mm, and the possibility of a dynamic interpretation. In addition to the uveoscleral flow, other UBM-detectable parameters of prognostic value have been described, such as the hypoechoic subconjunctival, supraciliar and transcleral spaces, the bleb characteristics, the size of the intracocular lake and the thickness of the trabeculos-Descemet’s membrane (TDM).

Subjects, materials and methods

Patients

The sample is composed of 26 eyes from 23 patients operated on between October 2008 and July 2010; their characteristics are shown in Table 1. As surgical history, nine patients have had cataract surgery without complications and one had a trabeculectomy three years before. The inclusion criteria were patients older than 18 years, with primary or secondary open-angle glaucoma not controlled or incapable of complying with treatment. Patients in whom the intraoperative rupture of the TDM forced a reconversion to a perforating procedure were not included and patients who denied their consent to be operated on, were incapable of being followed up on or had been operated by an ophthalmological surgery, including trabeculoplasty, in the previous six months were excluded. All the patients signed the informed consent, prepared and approved by Hospital Germans Trias i Pujol of Badalona under Law 41/2002.

Surgical technique

The surgical technique is the one proposed by Mermod and Shaarawy with small variations, such as the manoeuvres derived from Esnoper® implantation in the supraciliary space according to the technique proposed by Muñoz. All the patients were operated on by the same surgeon (JL). For six weeks they followed a decreasing schedule of prednisolone acetate (Polypred®, Allergan Pharmaceuticals, Ireland, Westport, Ireland) followed by topical, non-steroidal anti-inflammatory drugs (Diclofenaco Lepori®, Angelini Farmacéutica SA, Barcelona, Spain) for three months. Topical oxicin 0.3% (Exocin®, Alcon Cusi SA, El Masnou, Barcelona, Spain) three times a day was also prescribed in the first week of treatment. Gonipuncture was practiced in a total of 25 eyes (96.1%); it was indicated when the intraocular pressure (IOP) was greater than 12 mmHg and always before scheduling a
topical antihypertensive treatment. A sector iridoplasty with argon laser was included in the case of phakic eyes or when the iris root was close to the trabeculo-Descemet window.

**Examination by ultrasound biomicroscopy**

A UBM was performed in all the eyes 24 months after the surgery following the technique described by Pavlin and the scleral spur was the anatomical landmark for the examination. The method to determine the scleral spur is based on drawing an imaginary line on the corneal endothelium and another line on the suprachoroidal space. The intersection point between both lines corresponds to the spur location.

From the spur location, and making perpendicular and horizontal sections, we determined the remaining structures, analysing the presence of the conjunctival bleb, the suprachoroidal space, the vertical and horizontal diameters of the intrascleral lake and the TDM thickness and length (Figs. 1 and 2). The semi-ellipsoid has been considered the most similar geometric shape to determine the intrascleral lake volume (Fig. 3). All the examinations were performed under similar light conditions and the measurements were made with the device’s own software. The VuMax® 35 MHz probe (VuMax® 35/50 Sonomed® Lake Success, NY, U.S.A.) has a physical resolution of 80 μ (80 μ = 0.08 mm), but it uses algorithms that notably improve it to attain a 19 μ resolution. From the examined eyes, we selected the longest measurements and the presence or absence of the conjunctival bleb and the suprachoroidal space (Tables 2 and 3).

**Implant**

Esnoper® V-2000 (AJL Ophthalmics, Álava, Spain) is a non-resorbable scleral hema implant (hydroxyethyl methacrylate) specially designed to avoid the collapse of the intrascleral lake and to favour the aqueous humour drainage; it may be

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**Table 1 – Sample characteristics and results.**

<table>
<thead>
<tr>
<th>Age (No. = 23)</th>
<th>66.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (No. = 23) n (%)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>17 (–73.9)</td>
</tr>
<tr>
<td>Female</td>
<td>6 (26.1)</td>
</tr>
<tr>
<td>Glaucoma (No. = 26) n (%)</td>
<td></td>
</tr>
<tr>
<td>POAG</td>
<td>19 (73)</td>
</tr>
<tr>
<td>PIGMG</td>
<td>5 (19.2)</td>
</tr>
<tr>
<td>PXFG</td>
<td>7 (27.7)</td>
</tr>
<tr>
<td>Pre VA (No. = 26)</td>
<td>0.7 ± 0.2</td>
</tr>
<tr>
<td>Post VA (No. = 26)</td>
<td>0.7 ± 0.2</td>
</tr>
<tr>
<td>Mean Pachymetry (No. = 26) in μ</td>
<td>547</td>
</tr>
<tr>
<td>Pre IOP (No. = 26) in mmHg</td>
<td>25.6 ± 6.4</td>
</tr>
<tr>
<td>Post IOP (No. = 26) in mmHg</td>
<td>16.2 ± 3.4</td>
</tr>
<tr>
<td>No. of pre Tx. (No. = 26)</td>
<td>2.5 ± 0.6</td>
</tr>
<tr>
<td>No. of post Tx. (No. = 26)</td>
<td>0.5 ± 0.5</td>
</tr>
<tr>
<td>Gonipuncture (No. = 26) in %</td>
<td>96</td>
</tr>
<tr>
<td>Iridoplasty (No. = 26) in %</td>
<td>33</td>
</tr>
</tbody>
</table>

VA, visual acuity; POAG, primary open-angle glaucoma; PIGMG, pigmentary glaucoma; PXFG, pseudoexfoliation glaucoma; IOP, intraocular pressure; Post, postoperative; Pre, preoperative; Tx, treatment.

**Table 2 – Bleb and suprachoroidal space studied by ultrasound biomicroscopy.**

<table>
<thead>
<tr>
<th>Bleb</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>6</td>
<td>23.1</td>
</tr>
<tr>
<td>Yes</td>
<td>20</td>
<td>76.9</td>
</tr>
<tr>
<td>Suprachoroidal space</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>15.4</td>
</tr>
<tr>
<td>Yes</td>
<td>22</td>
<td>84.6</td>
</tr>
</tbody>
</table>

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Fig. 1 – Examples of the measurements considered for this paper. The maximum length has always been chosen for all the variables. (A) Thickness of the trabeculo-Descemet’s membrane. (B) Height and vertical diameter of the intrascleral lake. (C) Length of the trabeculo-Descemet’s membrane. (D) Horizontal diameter of the intrascleral lake.
implanted both in the intrascleral lake and in the supraciliary space.

**Statistical analysis**

All the statistical analyses have been conducted with the statistics R package version 2.13.1 (R Development Core Team, Vienna, Austria). Statistical tests results with a p-value under 0.05 were considered statistically significant.\(^{15}\) In order to quantify the linear association among the quantitative variables, the Pearson correlation coefficient (\(r\)) has been estimated and mixed linear models have been used taking into account the correlation between the values of the same patient to estimate the corresponding p-values.

**Results**

The results from this technique are shown in Table 1. Fourteen eyes (53.8\%) had controlled IOP without treatment and 12 (46.2\%) required topical medication to control their pressure.

**Study by ultrasound biomicroscopy**

It was not possible to establish a linear relation between the IOP and the thickness and length of the TDM, height, vertical and horizontal diameters of the intrascleral lake and its volume, or to establish a statistically significant relation. The eyes with a conjunctival bleb detectable by UBM had a mean IOP of 15.8 mmHg, whereas the eyes without a detectable bleb had a mean IOP of 17.8 mmHg, but this difference was not statistically significant (\(p = 0.30\)). The eyes with a supraciliary empty space had a mean IOP of 16.8 mmHg versus 14 mmHg in the eyes where it was not detected, and this difference was not statistically significant (\(p = 0.24\)) (Tables 2–4).

**Discussion**

At the time of comparing results, it should be taken into account that the referenced series\(^{2,3,8,9,11}\) use the Humphrey UBM 840 50 MHz probe, except for Cabrejas\(^{12}\) who uses the OTI-Scan HF 35-50-OPC\(^{®}\). One limitation of this study is that a serial examination has not been conducted throughout the two-year period, in order to assess the progress of all the analyzed variables over time. Another limitation is the sample size and, even though we cannot draw statistically significant conclusions, the descriptive analysis
Table 4 – Numerical variables studied by ultrasound biomicroscopy and their correlation with intraocular pressure.

<table>
<thead>
<tr>
<th></th>
<th>Correlation with the IOP r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDM thickness</td>
<td>-0.07</td>
<td>0.73</td>
</tr>
<tr>
<td>TDM length</td>
<td>0.39</td>
<td>0.13</td>
</tr>
<tr>
<td>Intrascleral lake height</td>
<td>0.28</td>
<td>0.25</td>
</tr>
<tr>
<td>Vertical diameter</td>
<td>-0.1</td>
<td>0.63</td>
</tr>
<tr>
<td>Horizontal diameter</td>
<td>0.05</td>
<td>0.71</td>
</tr>
<tr>
<td>Intrascleral lake volume</td>
<td>0.08</td>
<td>0.79</td>
</tr>
</tbody>
</table>

TDM, trabeculo-Descemet’s membrane; IOP, intraocular pressure; r, Pearson’s correlation coefficient.

does provide us with information that should be taken into account (Table 5).

The suprachiliary space is defined as a hypoechoic shade above the ciliary body and is interpreted as the presence of uveoscleral flow at that level. In our series, the eyes with suprachiliary space had a mean IOP of 16.8 mmHg versus 14 mmHg in the eyes where it was not detected, although this difference was not statistically significant (p = 0.24) (Tables 2–4). It may appear occasionally in normal eyes in relation to the relaxation or contraction of the ciliary muscle. Marchini described its occurrence in patients receiving latanoprost and stated that it is explained by the mechanism of action of the prostaglandin analogues and by the fact that the aqueous humour travels through the extracellular spaces of the ciliary muscle, increasing the uveoscleral flow. Age also decreases the uveoscleral flow by 7–10% per decade.

Our results may be affected by both assumptions. On the one hand, our patients had an elevated mean age (66.1 years) and, on the other hand, a percentage of the eyes studied in our series (37.5%) were being treated with topical prostaglandin analogues. It is considered a good-prognosis factor and its presence is highly variable: it may be found from 7% to 90% of cases according to different authors, although the series are hardly comparable since they use different implants with different follow-up periods. Marchini, with the SK-Gel implant, described a favourable association between the pressure result, the presence of intrascleral space, the conjunctival bleb and the suprachiliary space, which are found in 60% of cases; however, he was not able to establish a statistically significant relation between the IOP in patients with and without suprachiliary space. Chiou detected suprachiliary space one month after the surgery in four eyes from a series of nine eyes (44%) using an intrascleral collagen implant (Aquaflow®). In another longer series, also published by the same author with the same implant, the suprachiliary space is found in 53% of the patients at 3 months and this went down to 24% at 18 months. Kazakova, and with a collagen implant, observed suprachiliary space in 45.2% of the cases one year after the surgery. However, Khairy, without the use of implants or anti-metabolites, did not find a suprachiliary hypoechoic area in any case, whereas Gutiérrez-Ortiz, also without implants but with 5-FU, found it in 92.3%. Cabrejas, with an Esnoper® intrascleral implant, correlated it with success and found it in 94.4%, 88.9% and 83.3% of the cases at one month, three months and six months, respectively. There are no references about the presence of uveoscleral flow with a suprachiliary implant that we have found in 84.6% of the eyes from our series. Failure to detect it may be due to an anterior migration of the implant or to the scleral floor being so thinned that it ends up straightened when in contact with the implant. This second assumption would be supported by the fact that one of the eyes, in which no suprachiliary space was detected, had an intrascleral uveal prolapse. The results of the modifications to the conventional technique proposed by different authors, in an attempt to enhance the uveoscleral flow even more by leaving the choroid exposed on the floor of the intrascleral lake, do not correspond to a higher presence of suprachiliary space, and Mansouri’s series would be the only reference that finds it only in one eye from a series of eight.

The NPDS creates a space of intrascleral decompression, also called intrascleral lake or bleb, whose size and survival are related to the success of the intervention. In our series, we were not able to establish a linear correlation with the IOP, the intrascleral vertical and horizontal diameters and its volume or to establish a statistically significant relation, although we did see that the untreated eyes had a greater vertical diameter than those eyes requiring treatment, 2.93 versus 2.38 as well as a greater horizontal diameter, 3.21 versus 2.96 mm. The permanent maintenance of this space is one of

Table 5 – Relation between the numerical variables studied by ultrasound biomicroscopy and the patients with/without treatment.

<table>
<thead>
<tr>
<th>Tx</th>
<th>No.</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrascleral lake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>height</td>
<td>w/o</td>
<td>14</td>
<td>0.52</td>
<td>0.15</td>
<td>0.51</td>
<td>0.27</td>
</tr>
<tr>
<td>TDM thickness</td>
<td>w/o</td>
<td>14</td>
<td>0.13</td>
<td>0.02</td>
<td>0.13</td>
<td>0.10</td>
</tr>
<tr>
<td>TDM length</td>
<td>w/</td>
<td>12</td>
<td>0.55</td>
<td>0.24</td>
<td>0.52</td>
<td>0.21</td>
</tr>
<tr>
<td>TDM volume</td>
<td>w/o</td>
<td>14</td>
<td>0.51</td>
<td>0.15</td>
<td>0.48</td>
<td>0.27</td>
</tr>
<tr>
<td>Intrascleral lake</td>
<td>w/o</td>
<td>14</td>
<td>2.75</td>
<td>1.36</td>
<td>2.64</td>
<td>0.58</td>
</tr>
<tr>
<td>Volume</td>
<td>w/</td>
<td>12</td>
<td>2.38</td>
<td>1.33</td>
<td>1.81</td>
<td>0.91</td>
</tr>
<tr>
<td>Vertical diameter</td>
<td>w/</td>
<td>14</td>
<td>2.93</td>
<td>0.93</td>
<td>2.88</td>
<td>1.39</td>
</tr>
<tr>
<td>Horizontal diameter</td>
<td>w/</td>
<td>14</td>
<td>3.21</td>
<td>0.84</td>
<td>3.01</td>
<td>2.28</td>
</tr>
</tbody>
</table>

SD, standard deviation; TDM, trabeculo-Descemet’s membrane; Tx, treatment.
the theoretical advantages of non-resorbable implants versus resorbable implants. In a series of 30 patients operated with a hyaluronic acid implant (SK-Ge®, Marchini® found that, 6 months after the surgery, the intrascleral space was partially replaced by fibrous tissue in 27% of the cases, and even disappeared completely at 1 year of follow-up in 7% of the cases. He studied the vertical diameter of the intrascleral lake, which was progressively reduced from 3.53 mm in the first month up to 2.41 mm at 12 months, although this difference was not considered significant, and with some lake height values ranging from 0.55 mm in the first month up to 0.44 mm at 12 months. Although collagen implants dissolve after 6–9 months, Chiu® does not report any intrascleral collapse when that happened in a series with 18 months of follow-up. Cabrejas® found that the vertical size of the intrascleral lake relates to a lower IOP at three months, but not at one or six months. He determined a mean vertical diameter of 2.6 at one month, 3.2 at three months and 2.7 mm at six months. Using the same surgical measurements for the superficial and deep scleral flap, our series obtained a mean height of 0.53 mm, a horizontal diameter of 3.09 mm and a vertical diameter of 2.68 mm. Even though the height of the intrascleral lake is also considered a positive factor, given that it provides greater volume to the intrascleral lake, we have not been able to see a statistically significant relation with the IOP or differences between untreated patients and patients requiring treatment, with values of 0.52 versus 0.55 mm, respectively. Khairi; without the use of implants, also does not find a statistically significant relation between height and the blood pressure attainment and determines a mean length of 1.62 mm with a mean height of 0.2 mm. He even reports a patient without patent intrascleral lake or blood pressure success.

We have not been able to establish a correlation between the volume of the intrascleral lake and the IOP, although we believe that this volume is essential since it implies a larger space for reabsorption and drainage. Untreated patients have a larger volume compared to those requiring treatment: 2.75 versus 2.38 mm³. Many series do not explain the way the volume was calculated; therefore, such different values lead us to think of a lack of common criteria, which are hardly comparable. Kazakov® finds out that volume is less decisive than the conjunctival bleb, the supraciliary space or the transcleral filtration; he does not relate volume to the IOP and he found mean values of 1.8 mm³ in a series of 43 eyes. Cabrejas® may relate volume to success and his values range from 5.6 in the first month to 5.2 at six months. Using a series that compares different types of implants, he indicates that the Esnoper® may represent an added advantage versus other resorbable implants because it provides permanent maintenance. Khairi; not using implants or anti-metabolites, cannot establish any relation between both variables but Gutierrez-Ortiz, also without implants but with anti-metabolites, finds a significant correlation between the IOP, the vertical and horizontal diameters and the volume of the intrascleral lake.

The TDM thickness is also a factor related to the surgery outcomes. In our two-year series, we have found a mean value of 0.13 mm, but we have not been able to establish a statistically significant relation with the IOP. If we compare eyes requiring treatment to eyes not requiring treatment, there are thickness-related differences (0.13 versus 0.14). Marchini®, with an intrascleral SK-Ge®, finds values of 0.1 mm that do not undergo significant changes over 12 months. Using an intrascleral Esnoper®, Cabrejas® correlates it to a lower IOP at one month, but not at three or six months. Chiu® and with a collagen implant (Aquaflow®), finds values from 0.12 mm at 1 month up to 0.13 mm at 18 months. Kahiry® finds mean values of 0.26 mm at one year but no relation between the IOP and the thickness.

No studies were conducted on the TDM length, most likely due to the difficulty and controversy around its exact location. With the caution required to interpret such borderline measurements, we determined mean values of 0.52 mm and we could not establish any relation to the IOP. Analysing eyes without and with treatment separately, no significant differences between them (0.51 versus 0.53) were observed. Despite the widely accepted notion that a broad trabeculodescemetic window is a positive factor for success, the filtration through such window is conditioned by its thickness. We cannot rule out the possibility that our inability to find a relation may be due to a problem related to our technique or to the implant. As the implant is not sutured, it tends to shift towards the anterior part and that may favour late fibrotic phenomena on the TDM and it may even partially block the flow through TDM. The new Esnoper® V-2000 model incorporates some lateral notches designed to avoid an anterior shifting when it is implanted in the supraciliary space. This would not happen in Chiu’s series because collagen implants are resorbable and their cylindrical shape prevents them from positioning entirely over the TDM, or in Marchini’s series because the SKGe® is resorbable. According to Ravinet’s opinion, T-Flux® could limit the flow travelling through the TDM when leaking against it. This hypothesis is reinforced by his finding that gonipuncture is less effective when it is performed on the implant instead of on the implant’s central orifice.

The presence and characteristics of the conjunctival bleb are decisive for trabeculectomy success but not so much for non-perforating surgeries. Typically, most series make reference to Yamamoto’s classification, which divides blebs into L-type (low reflectivity), in which subconjunctival filtration is clearly seen; H-type (high reflectivity), in which hyperreflective fibrous material is seen; E-type (encapsulated), in which there is a hyperreflective fibrous capsule surrounding an aqueous humour cyst; and F-type (absence of bleb). Each type is associated with a certain functioning so that well-controlled eyes have an L- and H-type bleb while the E- and F-types usually require additional medication. In non-perforating surgeries, blebs are usually scarcely elevated and hard to be assessed, so we limited ourselves exclusively to confirm or rule out their presence by ultrasound examination; we determined its presence in 20 (76.9%) cases corresponding to L- and H-types, while the remaining 6 (33.1%) cases were F-type. The follow-up times were different: in Chiu’s series, the bleb is present in 86.4%; in Kazakov’s series, in 93%; Marchini® finds it in 100% of the eyes, while Gutierrez-Ortiz® also finds it in 92.3% and 63.6%, respectively. The last two authors did not use implants. Our results overlap with the rest of the series, particularly considering that our follow-up time is 24 months, whereas the follow-up in the other series is 18 and 12 months. Cabrejas® does relate success to hyporeflective blebs, the presence of hypoechoic supraciliary space and...
the scleral space around the bleb; he found that, at six months, the joint presence of these three signs is related to lower IOPs than with two signs combined or one isolated sign. One of the limitations at the time of comparing these results is that the scleral space around the bleb has not been studied; we understand, like other authors,\textsuperscript{4} that its determination may be very subjective. Marchini,\textsuperscript{2} despite considering that it is influenced by the exploratory technique and the implant characteristics, finds a bleb in 47% of his cases and gives it a positive prognostic value inasmuch as it involves the communication between the intrascleral lake and the subconjunctival bleb.

Although the uveoscleral flow can only be explored in all cases by UBM, the arrival of the anterior segment optical coherence tomography (AS-OCT) has overcome some of the limitations for the examination of the surgical area thanks to its higher resolution; it has been possible to establish positive inverse relations between the IOP and the height of the intrascleral lake.\textsuperscript{24–26} With the development of new models, it will surely be possible to make more accurate determinations about the relation between the surgical area measurements and the IOP, and the absence or presence of transcleral filtration, the interpretation of which is more subjective by UBM. We believe that its presence is what most probably implies the addition of the different variables, and such variables would give the surgery a higher success rate. The supraciliary implantation of the Esnoper\textsuperscript{R} V-2000 has been shown to be safe and could involve an added factor for the success of non-perforating surgeries. A larger sample size and the performance of time-matched UBMs would most probably have allowed us to draw more definitive conclusions about the benefits of this technique and the role of the uveoscleral flow in a non-perforating surgery with supraciliary implant.

**Conflicts of interest**

The authors declare that they do not have any conflicts of interest.

**REFERENCES**
