

COMBINED TOPICAL PLUS SUBCONJUNCTIVAL ANESTHESIA VERSUS RETROBULBAR ANESTHESIA IN NON-PENETRATING SCLERECTOMY

ANESTESIA TÓPICA MÁS SUBCONJUNTIVAL VERSUS RETROBULBAR EN LA ESCLERECTOMÍA PROFUNDA NO PENETRANTE

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ABSTRACT

Purpose: To compare the safety and efficacy of topical plus subconjunctival versus retrobulbar anesthesia for primary non-penetrating sclerectomy supplemented with adjunctive 5-FU.

Methods: A prospective study of 30 consecutive patients who were randomized to receive subconjunctival (n = 14) or retrobulbar (n = 16) anesthesia was performed. Operating conditions, patient comfort, postoperative pain, total pain and surgical outcomes were evaluated.

Results: There were no differences in the operating conditions. The retrobulbar group reported significantly more pain during administration of the anesthetic agent than the subconjunctival group (P= 0.00). The subconjunctival group reported more discomfort during surgery than the retrobulbar group (P= 0.00); however, this feature was not a problem for the surgeon. No statistically significant differences were found in regard to the total pain experienced, the postoperative pain, nor the success rates of the operative procedure in either group.

RESUMEN

Objetivo: Comparar la eficacia y seguridad de la anestesia tópica-subconjuntival con la retrobulbar en la esclerectomía profunda no penetrante suplementada con 5-FU.

Método: Se realizó un estudio prospectivo y aleatorizado de 30 pacientes consecutivos a los que se les practicó anestesia tópica-subconjuntival (n=14) o retrobulbar (n=16). Se evaluaron las condiciones operatorias, el confort del paciente, el dolor postoperatorio, el dolor total y el resultado quirúrgico en cuanto a bajada de presión intraocular.

Resultados: No hubo diferencias en las condiciones quirúrgicas entre ambos grupos. El grupo con anestesia retrobulbar refirió más dolor durante la aplicación del anestésico (P= 0,00). El grupo con anestesia tópica-subconjuntival refirió más discomfort intraoperatoriamente (P=0,00). Sin embargo, esto no representó un problema para el cirujano. No hubo diferencias en el dolor postoperatorio entre ambos grupos. No hubo diferencias estadísticamente significativas en cuanto al dolor total. No hubo

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Conclusion: Topical/subconjunctival anesthesia is a safe and effective alternative to retrobulbar anesthesia for non penetrating sclerectomy supplemented with 5-FU (*Arch Soc Esp Oftalmol* 2007; 82: 285-290).

Key words: Anesthesia, non-penetrating sclerectomy, glaucoma surgery, topical, retrobulbar, subconjunctival.

diferencia en cuanto al éxito quirúrgico entre ambos grupos.

Conclusiones: La anestesia tópica-subconjuntival es una alternativa segura y efectiva para la esclerectomía no penetrante suplementada con 5-FU.

Palabras clave: Anestesia, esclerectomía profunda no penetrante, cirugía glaucoma, tópica, retrobulbar, subconjuntival.

INTRODUCTION

Non-penetrating sclerectomy (NPS) is one of the most frequently used techniques for the surgical treatment of glaucoma (1). It may be performed by using several kinds of anesthesia: from general anesthesia to retrobulbar anesthesia and less invasive techniques such as subconjunctival or external anesthesia. Nevertheless, there are some controversial aspects referring to the ideal anesthesia for subjects to undergo glaucoma surgery.

On the one hand, the reported rate of surgical success in trabeculectomy is lower when using subconjunctival anesthesia compared to retrobulbar anesthesia (2); on the other hand, retrobulbar anesthesia has caused a greater reduction in flow speed along retrobulbar vessels compared with subconjunctival anesthesia. Therefore, it could be said that the subconjunctival technique is the preferred option in subjects with issues of ocular perfusion and patients suffering from glaucoma (3) since, theoretically, it would not decrease the flow along these vessels.

In addition, external-subconjunctival anesthesia would avoid complications such as eye perforation or respiratory depression (4).

Since there is no known study assessing prospectively the efficacy and safety of external-subconjunctival anesthesia compared to retrobulbar anesthesia in NPSs, the purpose of the present study is to analyze the level of comfort in patients and surgeons with these anesthetic techniques, as well as their efficacy in terms of pressure control.

SUBJECTS, MATERIAL AND METHODS

This prospective and randomized study was performed on 30 eyes belonging to 30 consecutive patients diagnosed with open-angle primary glaucoma, subsequently undergoing NPS with external-subconjunctival or retrobulbar anesthesia without sedation between January 2004 and January 2006 in our hospital. One single surgeon (C.G.O.) performed all procedures. The demographic features of patients are illustrated in Table I.

Indications to perform surgery were an insufficient control of intraocular pressure (IOP) according to the degree of severity of the patient's glaucoma, following the criteria set by the Advanced

Table I. Demographic features for the study's patients

| Parameter | External-subconjunctival Anesthesia Group | Retrobulbar Anesthesia Group | P |
|-----------------------------|---|---------------------------------|-----|
| Number of eyes | 14 | 16 | |
| Age (years) | 60.85 SD 7.93 (range: 46-72) | 63 SD 10.4 (range: 48-78) | .33 |
| Gender | | | |
| Females | 6 | 9 | .71 |
| Males | 8 | 7 | |
| Open-angle primary glaucoma | 14 | 16 | |
| Pre-surgery visual acuity | 0.7 SD 0.22 (range: .2-1) | 0.63 SD 0.34 (range: cd-1) | .11 |
| Pre-surgical IOP (mmHg) | 21.1 SD: 2.6 (range: 16-24) | 23.19 SD: 4.4 (range: 16-34) | .11 |

Glaucoma Intervention Study (5), after maximum medical treatment (≤ 21 mm Hg in slight defects, ≤ 17 mm Hg in moderate defects, ≤ 15 mm Hg in severe defects), progression of the defect despite the maximum medical treatment, patients not complying or intolerance to hypertension treatments. Corneal thickness was measured to be taken into account as a risk factor.

Exclusion criteria were: previous glaucoma surgery, a history of allergy to anesthetics, excessive anxiety, dementia, hypoacusia or little ability in terms of fixation due to strabismus or nystagmus.

After being informed of the procedure, all patients signed the corresponding consent form approved by the hospital's Ethics Committee. The study complied with the criteria set by the Declaration of Helsinki.

The patients were randomly assigned an external anesthesia more subconjunctival or retrobulbar by means of a computer-generated table.

The patients belonging to the external-subconjunctival group were administered a drop of 5% lidocaine 5 and 10 minutes prior to surgery. Patients in the retrobulbar anesthesia group were administered a 5 ml injection with a mix of 50% bupivacaine and mepivacaine.

No sedation was used in either group. Before beginning surgery, the external-subconjunctival anesthesia group was administered 0.5 ml injections of 1% lidocaine at 12 hours already under the surgical microscopy.

The surgical technique used was the same for both groups. A corneal traction suture was performed with a vycril 7/0 to achieve good visualization of the area. A conjunctival flap was performed with a

Fornix base. The selected area was cauterized with a bipolar diathermy, applying then a surgical sponge soaked in 5-Fluorouracil 50 mg/ml during 5 minutes under the conjunctiva. Later on, the first 5x5 mm scleral flap was cut, followed by the 4x4 mm deep flap.

Upon reaching the trabecular-descemetic membrane, the floor of the Schlemm canal was peeled and a cut was performed on the deep flat. No implant was applied. The scleral flap was sown with two loose 10/0 nylon stitches on the extremes and the conjunctiva.

One hour after completing surgery, patients were asked by an independent observer about their degree of pain during anesthesia, during and after

surgery on a 10-point scale, 0 standing for no pain and 10 for extreme pain.

The surgeon also filled out two questionnaires about their comfort during surgery on a scale from 0 to 5, 0 equaling no problems and 5 serious problems, and the degree of cooperation on the part of the patient on a scale from 0 to 5, where 0 means no cooperation and 5 excellent cooperation.

Only those patients who were subjected to follow up during at least 3 months were included in this study.

Surgical success was defined by the decrease of intraocular pressure after surgery by 30 percent with respect to pre-surgical IOP with treatment and whether IOP did not drop below 6 mmHg.

Patients were checked up one day, one week, 1, 3, 6, 9 and 12 months following surgery. Additional check-ups were prescribed by the surgeon upon his/her request.

The statistical analysis was performed with the SPSS 12.0 software for Windows (SPSS Inc, Chicago, Illinois, USA). Mann-Whitney and Chi-squared test or Fisher's exact test. Statistical significance was set at $P < .05$.

RESULTS

The study included 30 eyes belonging to 30 patients; 14 underwent surgery with external-subconjunctival anesthesia and 16 with retrobulbar anesthesia. The mean time for follow-up was 8 SD: 0.65 months (range: 3-12 months). Table I shows demographic data for both groups.

The external-subconjunctival anesthesia group and the retrobulbar anesthesia group showed no statistically significant differences in terms of pre-surgical IOP, post-surgical IOP, surgery conditions or degree of cooperation. Statistically significant differences were found instead in terms of degree of pain during anesthesia and during surgery (Table II and Fig. 1). In all the cases included in the external anesthesia group, surgery was performed without changing the type of anesthesia initially prescribed. Three patients belonging to the retrobulbar anesthesia group required the administration of an external supplement with 5% lidocaine.

No complications were recorded in either group. No subconjunctival hemorrhage was observed during the procedure in the external anesthesia group. One patient belonging to the retrobulbar anesthesia

Table II. Intraocular pressure, surgical success, pain and degree of cooperation for both groups under study

| Parameter | External Subconjunctival Anesthesia Group | Retrolubar Anesthesia Group | P |
|---|---|-------------------------------|-----|
| Post-surgical IOP upon follow-up completion (mm Hg) | 15.22 SD 3.89 (range: 6-21) | 14 SD 4.16 (range: 6-24) | .18 |
| Success | 12 | 13 | .68 |
| Number of pre-surgical drugs | 1.71 SD 0.6 (range 1-3) | 1.88 SD 0.95 (range 1-4) | .11 |
| Number of drugs upon follow-up completion | 0.12 SD 0.35 (range : 0-1) | 0.06 SD 0.25 (range: 0-1) | .56 |
| Surgery conditions (0-5) | 4.9 SD 0.3 (range: 4-5) | 5 SD 0.00 range (5-5) | .52 |
| Patient's degree of cooperation (0-5) | 4.9 SD 0.3 (range: 4-5) | 4.93 SD 0.25 (range: 4-5) | .78 |
| Patient's subjective pain during anesthesia (0-10) | 0.54 SD 0.93 (range: 0-3) | 4.25 SD 2.1 (range: 3-10) | .00 |
| Patient's subjective pain during surgery (0-10) | 2.27 SD 1.4 (range: 0-5) | .43 SD 0.62 (range: 0-2) | .00 |
| Patient's subjective pain after surgery (0-10) | 0.27 SD 0.46 (range: 0-1) | .27 SD 0.46 (range: 0-1) | .99 |
| Total pain (0-10) | 3.09 SD 1.75 (range: 1-7) | 5.12 SD 2.91 (range: 3-13) | .20 |

group suffered hemorrhagic conjunctival chemosis which did not hinder surgery. Unnoticed movements were more frequent among patients in the external-subconjunctival anesthesia group ($P=.003$). Nevertheless, these movements did not entail any issues when performing surgery and brought about no complications.

Regarding the efficacy of procedures, surgical success was achieved in 12 (81.25 percent) patients in the external-subconjunctival anesthesia group and 13 (85.71 percent) of patients in the retrobulbar anesthesia group. No statistically significant differences were observed in either group under study as far as surgical success is concerned ($P= .68$). Intraocular pressure upon follow-up completion stood at 15.22 SD: 3.89 for the external anesthesia group and 14 SD: 4.16 for the retrobulbar anesthesia group (Fig. 2).

Such differences were not statistically significant

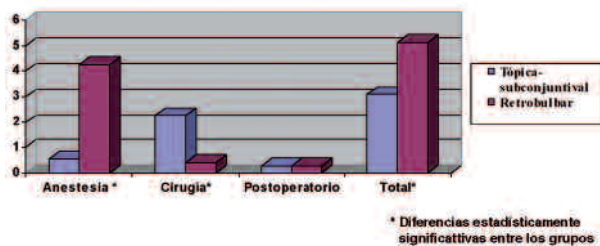


Fig. 1: Perioperative pain.

($P= .18$) between both groups.

The number of drugs administered after surgery in the external-subconjunctival anesthesia group was .12 SD: .35 and .06 SD: .25 for the retrobulbar anesthesia group. These differences did not reach a statistical significance ($P= .56$) in either group.

DISCUSSION

The study reveals that NPS performed under external-subconjunctival anesthesia is a comfortable technique both for the patient and the surgeon and equally effective if performed under retrobulbar anesthesia.

First, the degree of pain felt during the administration of anesthetics is significantly smaller than the pain felt during the administration of retrobul-

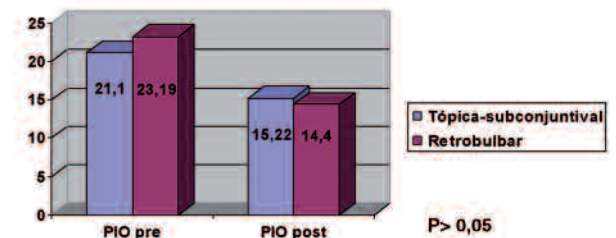


Fig. 2: Intraocular pressures in both groups before and after surgery.

bar anesthesia.

On the other hand, the retrobulbar anesthesia group reported a statistically significant lower pain during surgery. Nevertheless, both groups reported the same pain after surgery. When analyzing total pain, it was slightly lower for the external anesthesia group, although differences were not statistically significant. This is the reason why this technique is deemed comfortable for patients. No statistically significant differences were registered in terms of comfort for the surgeon and the degree of cooperation on the part of patients. Under external-subconjunctival anesthesia, eye movements remain the same, which in some instances leads to an improvement of conditions and optimization of surgical access. Nonetheless, the higher discomfort felt by patients may decrease slightly these conditions due to involuntary movements or to the need of supplementing with external anesthetics, although it might take place also under retrobulbar anesthesia. Our findings are confirmed by other studies (6).

Trabeculectomies were performed under different anesthetics techniques, subconjunctival among others.

In 2004, Edmunds reported that subconjunctival anesthesia yields negative results as far as pressure reduction is concerned, since it may cause hemorrhage and injury to the tissues and thus stimulate fibroblast (2). Nevertheless, his findings are not consistent with ours nor with those reported by other authors (7,8). In the present study, no subconjunctival hemorrhage occurred during the administration of subconjunctival anesthesia; instead, hemorrhagic chemosis did take place in one case where the retrobulbar technique was implemented. Edmunds' study is observational and included surgeons without trabeculectomy experience, so that his findings may be biased. On the other hand, Edmunds analyzes trabeculectomy and the present study analyzes non-penetrating sclerectomies supplemented with 5-FU where subconjunctival scarring processes do not evolve in the same fashion. On the other hand, our study is consistent with the findings reported by Azuara-Blanco et al (7), who found that subconjunctival anesthesia was an effective alternative to retrobulbar anesthesia. On the other hand, the present study's findings are consistent with those published by Noureddin and colleagues, who found that patients undergoing surgery with subconjunctival lidocaine recorded a lower post-surgical IOP than those who were

administered general anesthesia (8).

The present study has not revealed statistically significant differences in terms of IOP reduction in either group, which could be due to the small size of the sample. Therefore, prospective studies are needed involving a greater number of patients in order to support the results obtained in the present study.

On the other hand, retrobulbar techniques have been shown to cause greater flow speed reduction along retrobulbar vessels in contrast with subconjunctival anesthesia. Thus, subconjunctival techniques are preferred in patients suffering from ocular perfusion and glaucoma patients (3) who could suffer a negative impact in visual terms due to the additional reduction in flow speed along those vessels.

The studies carried out by Naor suggest that external-subconjunctival anesthesia avoids complications such as retrobulbar hemorrhage or intravascular or intratecal injection, together with globe perforation and respiratory depression (4).

Asides from the subconjunctival anesthesia being administered at the spot planned for the sclerectomy, other additional advantages compared to retrobulbar anesthesia would include a blunt dissection of tissues. On the other hand, in patients with limited visual fields or poor visual acuity, eliminating the need to occlude the eye after surgery could be an added advantage for patients.

External-subconjunctival anesthesia for NPS supplemented with 5-FU is a safe and comfortable technique for both patients and surgeons experienced with non-penetrating glaucoma surgery. On the other hand, similar pressure controls are achieved in the medium term under retrobulbar anesthesia and may be especially useful in patients with very limited visual fields or poor visual acuity. Nevertheless, it would only be advisable for surgeons experienced in this surgical technique in order to avoid subconjunctival bleeding which could lead to an increase in scarring or complications resulting from the patient's unnoticed movements.

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