

# Phacoemulsification under topical anesthesia: series of cases

## *Facoemulsificação sob anestesia tópica: série de casos*

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### ABSTRACT

**Purpose:** To evaluate the outcome and safety of phacoemulsification performed under topical anesthesia in cases with several complexities. **Methods:** Cases performed under topical anesthesia from January 2009 to April 2011 were analyzed. Variables analyzed included patients age, sex, race, systemic diseases, eyes comorbidities, type of cataract, visual acuity before and after the surgery, complications, number of conversions to peribulbar anesthesia and IOL power. Patients with uncompleted data were excluded from analysis. **Results:** A total of 111 eyes were analyzed; only cases with ocular comorbidities were statistically significant ( $p=0,004$ ). **Conclusion:** the data analysis suggests that phacoemulsification performed under topical anesthesia is safe and effective in cases of different complexities.

**Keywords:** Phacoemulsification; Anesthesia, topical; Anesthesia/methods; Comorbidity  
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### RESUMO

**Objetivo:** Avaliar a eficácia e a segurança da facoemulsificação sob anestesia tópica em casos com complexidade diversa. **Métodos:** Os prontuários dos pacientes submetidos à facoemulsificação sob anestesia tópica no período de janeiro de 2009 a abril de 2011 foram revisados. Os dados pré-operatórios avaliados foram: sexo, idade, cor, a presença de doenças sistêmicas, comorbidades oculares, o tipo da catarata e a acuidade visual pré-operatória. As informações intra e pós-operatórias colhidas foram: acuidade pós-operatória, complicações intra e pós-operatórias, a necessidade de conversão anestésica e o poder da LIO utilizada. Foram excluídos pacientes com prontuários incompletos. **Resultados:** Cento e onze (111) casos foram avaliados. Apenas comorbidades oculares mostraram significância estatística na acuidade visual pós-operatória ( $p=0,004$ ). **Conclusão:** A análise indica que a facoemulsificação realizada sob anestesia tópica em casos com complexidades variadas é eficaz e segura.

**Descritores:** Facoemulsificação; Anestesia tópica; Anestesia/métodos, Comorbidades  
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## INTRODUCTION

Topical anaesthesia is increasingly used in cataract surgery as a safe and inexpensive alternative. It is widely accepted, especially in the U.S., where it is used by 61 % of surgeons according to Ezra and Allan<sup>(1)</sup>.

It can be supplemented with intracameral anaesthesia and sedation. Even though both produce an analgesic effect, available studies do not show any statistically significant differences favouring supplemental anaesthesia<sup>(1,2)</sup>.

The advantages of topical anaesthesia include avoiding the risks associated with orbital injections and a much faster functional recovery. It also eliminates the risk of postoperative diplopia, reduces the time and cost of surgery<sup>(3)</sup>, avoids the use of an occluder, and minimises the risk of nausea and malaise. Furthermore, the transcorneal route can be used in patients with coagulation disorders<sup>(4)</sup>.

Studies show that, although potentially more likely to produce pain, topical anaesthesia results in satisfaction levels comparable to traditional anaesthetic techniques<sup>(5-7)</sup>.

However, topical anaesthesia should be used on selected patients and by an experienced surgeon. As it does not produce akinesia, it can be hazardous in uncooperative patients<sup>(8,9)</sup>. The surgeon should be prepared to use ocular immobilisation if necessary<sup>(10)</sup>. The patient should be informed preoperatively that he/she will continue to see during surgery, which may cause anxiety<sup>(11,12)</sup>. The oculocardiac reflex may occur with this type of anaesthesia<sup>(13)</sup>.

The anaesthetic agent may also cause irritation resulting in tear film instability, corneal toxicity and allergic reactions<sup>(4)</sup>.

Few studies in the literature examine the correlation between topical anaesthesia and intra- or postoperative complications. Thus, the aim of this study was to analyse the use of this technique in a case series.

## METHODS

Retrospective chart review of patients undergoing surgery at the cataract unit of our institution from January 2009 to April 2011. Inclusion criteria were patients with or without

comorbidities submitted to phacoemulsification with 1 % tetracaine hydrochloride eye drops (Anestésico™) through the transcorneal route, without supplemental intracameral anaesthesia. All patients were operated by the same surgeon, who was experienced with the technique, using Universal II and Infinity (Alcon) equipment.

The following data were collected preoperatively: sex, age, race, presence of systemic diseases, ocular comorbidities and preoperative visual acuity. The following data were collected intra- and postoperatively: postoperative visual acuity, intra- and postoperative complications, need of conversion to another anaesthetic technique and IOL power.

Patients whose medical records were incomplete and those undergoing phacoemulsification associated with trabeculectomy were excluded.

Variables were analysed with STATA 11.0 software, using Student's t-test, the chi-square test and logistic regression. Two outcomes were assessed: the need of conversion and postoperative visual acuity. p values under .05 were considered significant.

## RESULTS

All patients operated during the study period had complete medical records and were included in the study (no losses).

The average age was 72 years (range 36-91 years, SD=12), and 56.4% of patients were female.

In total, 59.5% of patients had systemic diseases, mainly cardiovascular conditions and diabetes.

Also, 35% of patients had ocular comorbidities, mainly glaucoma (11 cases) and age-related macular degeneration (AMD) (9 cases). Six patients with prior retinal detachment were operated, of which 3 had silicone oil tamponades. Three patients with proliferative diabetic retinopathy and 2 cases with macular hole underwent cataract surgery and were included in the study.

Average visual acuity before surgery was 0.3 (0.4-0.7) (Figure 1). Average postoperative visual acuity was 0.8 (0.4-1.0) ( $p < 0.001$ , t-test) (Figure 2).

Five patients (4.5%) had intraoperative complications: 3 had capsule rupture and 2 had vitreous loss. No cases required conversion of anaesthesia.

Figure 1

Preoperative visual acuity

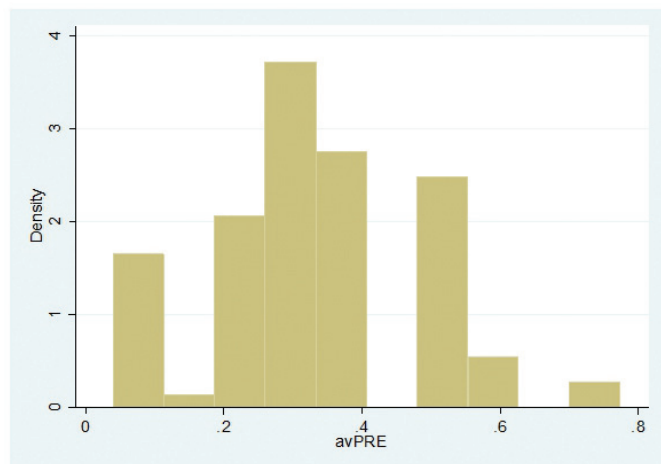
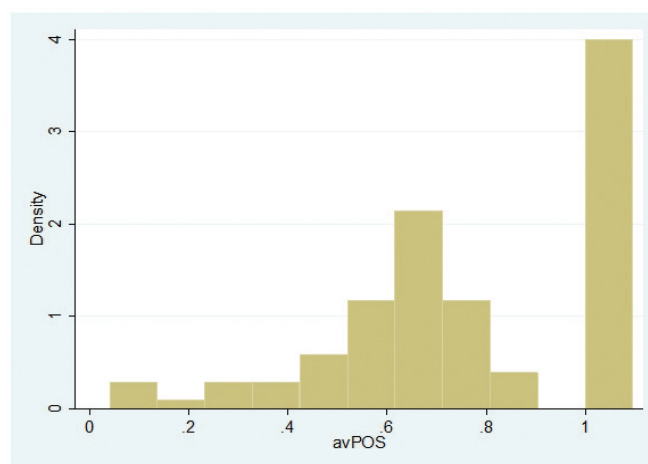


Figure 2

Postoperative visual acuity



There were no significant postoperative complications.

Only one patient required sedation (<1%). Suture was necessary in 2 patients (1.8%).

In logistic regression, only one factor (ocular comorbidities) was correlated with postoperative visual acuity ( $p=0.004$ ). The others (sex, age, race, systemic comorbidities, type of cataract, preoperative visual acuity, need for suture, and type of implant) showed no correlation.

## DISCUSSION

Despite the increased use of topical anaesthesia, there are few comparative studies of adequate sample size.

In 1996, Rao and Bernardes made a study on topical anaesthesia for temporal transcorneal phacoemulsification with 50 subjects. The technique proved to be effective and safe, providing comfort and rapid visual recovery<sup>(14)</sup>.

In a series of 476 operations, Jacobi et al. found no difference between topical and retrobulbar anaesthesia in the rates of intra- and postoperative complications in eyes considered to be at higher risk<sup>(15)</sup>. In another study, the same authors found no higher risk of complications using topical anaesthesia in glaucomatous patients<sup>(16)</sup>.

Menapace studied the use of topical anaesthesia in primary posterior capsulotomy in a series of 500 cases, showing it is a safe method<sup>(17)</sup>.

Zhao et al., in a meta-analysis of 15 studies, showed that despite increased pain perception by patients, topical anaesthesia was preferred over traditional techniques<sup>(6)</sup>. In a series of 40 operations, Roman et al. reported complaints of pain in 10% of cases<sup>(18)</sup>. Weller et al. operated 281 eyes and reported pain in 16% of cases<sup>(19)</sup>.

Fichman assessed the blood pressure and heart and respiratory rate of patients submitted to topical and other types of anaesthesia and found no differences in these measures<sup>(20)</sup>. There are also no significant differences in the levels of cortisol during surgery, indicating that the procedure is well tolerated and does not cause additional stress to the patient<sup>(20)</sup>.

In our study, after testing all variables, a correlation was found between ocular comorbidities and low visual acuity; this was the only correlation that achieved statistical significance ( $p=0.004$ , chi-square). All other variables had no statistically-significant correlation to low visual acuity or to the need of conversion.

Considering the study sample, we can conclude that experienced surgeons can safely use topical anaesthesia in cases of different complexities. Our series included eyes with glaucoma, vitrectomised eyes, eyes with and without silicone oil, and eyes with capsular rupture.

The rate of complications was 4.5%, which is consistent with the literature and is comparable to the complication rates of other surgical techniques.<sup>(21)</sup> The management of complications was done without the need of anaesthetic conversion.

Topical anaesthesia is an interesting, low-cost, safe, and comfortable alternative, even in more complex cases.

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