

Visual Experience During Phacoemulsification with Anterior Chamber Maintainer Under Topical Anesthesia

Topikal Anestezi ile Ön Kamara Koruyuculu Fakoemülsifikasyonda Görsel Deneyim

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ABSTARCT

Purpose: To assess the visual experiences of cases who underwent cataract surgery by the clear corneal phacoemulsification technique with anterior chamber maintainer under topical anesthesia.

Materials and Methods: Clear corneal phacoemulsification surgery under topical anesthesia was performed in 120 eyes of 120 randomly selected patients who had undergone no previous eye surgery. Continuous irrigation of the anterior chamber was provided by an anterior chamber maintainer in all cases during surgery. Problems such as discomfort and panic that would require use of a different type of anesthesia and sedatives were not encountered in patients during surgery. All the operations were concluded without any problem.

Results: The study included 66 male (55%) and 54 (45%) female patients. The mean age was 65.5±15 (min: 40, max: 80) years. The patients were interviewed in the 24-hour period following the operation. All the patients reported that they could see some light during the surgery. The colors included red (70 cases, 58%), yellow (40 cases, 34%), blue (6 cases, 5%), and green (4 cases, 3%). Thirty patients (25%) reported that they had seen bright white lights in addition to other colors and 4 (3%) stated that they had seen the movements of the surgeon. None of the patients developed a complication postoperatively regarding ACM use.

Conclusions: This study revealed the similarity between the visual experiences of patients who underwent clear corneal phacoemulsification under topical anesthesia with anterior chamber maintainer and the patients who underwent surgery with the use of a viscoelastic substance.

Key Words: Phacoemulsification, visual experience.

ÖZ

Amaç: Topikal anestezi ile ön kamara koruyucusu kullanılarak saydam korneal kesili fakoemülsifikasyon cerrahisi geçiren olguların görsel deneyimlerini değerlendirmek.

Gereç ve Yöntem: Daha önce göz cerrahisi geçirmemiş rastgele seçilen 120 hastanın 120 gözüne topikal anestezi altında saydam korneal kesili fakoemülsifikasyon cerrahisi uygulandı. Cerrahi sırasında her olguda ön kamara koruyucusu ile ön kamaranın devamlı irigasyonu sağlandı. Cerrahi boyunca, olgularda farklı bir anestezi tipi veya sedatif kullanımı gerektirecek derecede rahatsızlık ya da panik izlenmedi. Tüm ameliyatlar sorunsuz bitirildi.

Bulgular: Çalışma 66 erkek (%55) ve 54 kadını (%45) içerdi. Ortalama yaş 65.5±15 (40-60) idi. Olgularla ameliyatı takiben 24 saat içinde görüşme yapıldı. Bütün olgular cerrahi sırasında ışık görebildiklerini bildirdiler. Görülen renkler kırmızı (70 olgu, %58), sarı (40 olgu, %34), mavi (6 olgu, %5) ve yeşildi (4 olgu, %3). Otuz olgu (%25) diğer renklere ilave olarak parlak beyaz ışık gördüklerini bildirdi. Dört olgu (%3) cerrahin hareketlerini görebildiklerini ifade etti. Hiçbir hastada ön kamara koruyucusu kullanıma bağlı ameliyat sonrası komplikasyon gelişmedi.

Tartışma: Bu çalışma, topikal anestezi ile ön kamara koruyucusu kullanılarak saydam korneal kesili fakoemülsifikasyon uygulanan olguların görsel deneyimlerinin viskoelastik madde kullanılarak cerrahi uygulanan hastalarla benzerlik gösterdiğini doğrulamıştır.

Anahtar Kelimeler: Fakoemülsifikasyon, görsel deneyim.

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INTRODUCTION

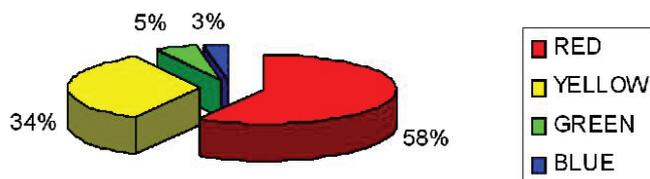
Topical anesthesia in cataract surgery is a method initiated by Fichman in 1991.¹ This method has recently been supported and performed to a greater extent in order to prevent the potential side effects of both systemic and local anesthetic agents. As topical anesthesia has no known effect on anesthesia of the optic nerve, the visual abilities of the patients continue.²⁻⁴

The stimuli which the patient is able to see during the surgery are the light, the instruments and the phacoemulsification probe. The excitation of retina during the intraocular pressure changes and the shifts in retinal blood flow are the other important factors leading to formation of visual experiences of the patients.

Besides the use of a viscoelastic substance, continuous irrigation during phacoemulsification surgery has been shown to be beneficial to patients.^{5,6} In this study, we investigated whether the continuous irrigation with ACM makes any difference on visual perceptions of patients during surgery.

MATERIAL AND METHODS

Clear corneal phacoemulsification surgery was performed in 120 eyes of 120 randomly selected patients without any ocular pathology except senile cataract who had undergone no previous eye surgery. Anesthesia was established by placing a sponge with lidocaine 2% into the upper fornix. Additional systemic or local anesthesia were not introduced preoperatively and intraoperatively. A temporal clear corneal incision was preferred for phacoemulsification surgery. Afterwards, an ACM was placed through the inferior temporal quadrant and kept open throughout the surgery. Continuous curvilinear capsulorrhexis (CCC) was performed using a capsulorrhexis forceps. Following the hydrodissection and hydrodelineation with balanced salt solution (BSS Plus®, Alcon), phacoemulsification was performed by bimanual phaco chop techniques. Phaco parameters during the surgery (with 20 gauge, bent tip) were as follows: bottle height 45 cm, vacuum (max) 50, aspiration flow rate linear 20 cc/min, phaco power 40% WhiteStar® burst continuous.



Graphic: Percents of colors perceived during phacoemulsification surgery. Seventy patients (58%) reported to see red, 40 (34%) reported to see yellow, 6 (5%) reported to see blue and 4 (3%) reported to see green.

Parameters during the chopping and segmental removing were as follows: bottle height 65 cm, vacuum (max) 400 mmHg, aspiration flow rate linear 30 cc/min, phaco power 40% WhiteStar® single burst mode. After the bimanual aspiration of cortical remnants (bottle height 65 cm, vacuum (max) 400, aspiration flow rate linear 30 cc/min) the capsular bag was refilled with regular (1% Na hyaluronate) viscoelastic substance and the hydrophilic acrylic intraocular lens was placed into the capsular bag with the aid of a lens forceps. Following the removal of the viscoelastic substance, the corneal sideports were sealed by hydration. The visual experiences and comfort of the patients during surgery was inquired and recorded by the surgeon (MB) who had performed the operations.

RESULTS

There were 66 male (55%) and 54 (45%) female patients. The mean age was 65.5 ± 15 (min: 40, max: 80) years. Seventy patients (58%) had their right eye operated and 50 (42%) had their left eye operated. The mean axial length was 24.14 mm (range: 22.45-24.87). All the patients reported that they had seen some light during the surgery.

The mainly perceived colours during the phacoemulsification and cortex aspiration period included red (70 cases, 58%), yellow (40 cases, 34%), blue (6 cases, 5%), and green (4 cases, 3%). Thirty patients (25%) reported that they had seen bright white lights in addition to other colors and 4 (3%) stated that they had seen the movements of the surgeon (Graphic).

One of the patients was a painter and voluntarily drew the picture of what he had seen during the surgery (Figure). None of the patients had any complication postoperatively due to ACM use.



Figure: The picture drawn by one of the patients who is a painter illustrating his visual experiences during phacoemulsification with anterior chamber maintainer under topical anesthesia.

When the patients were asked whether they would prefer same method for the fellow eye, 110 (91%) reported they would and 10 patients (8.3%) had no idea.

CONCLUSIONS

Some patients who have undergone cataract surgery under retrobulbar or peribulbar anesthesia have reported that visual sensations occurred during surgery.⁷⁻¹² This was attributed to the inadequate anesthesia of the optic nerve.⁹ As the optic nerve is not anesthetized under topical anesthesia, visual perceptions can be obtained in every patient.^{2,3} Basically, 2 mechanisms are considered to be responsible for the formation of these perceptions:

1. The external factors (stimuli) such as surgical instruments, light source, the movement of the lens particles during the surgery.
2. The cortical processing as well as the movement of the vitreous causing entoptic phenomenon, the adherence between the vitreous and the retina, vascular blood flow such as blue light phenomenon, pressure-dependent light formations such as phosphenes, and Purkinje images and branches caused by the anterior and posterior surface reflections of the cornea and lens^{4,7,10,13}

Besides these factors, the psychological mood of the patients at the beginning of the surgery has also been shown to contribute to visual experiences. In classical phacoemulsification surgery, visual experiences are obtained through all these factors. Figure 2 depicts a picture drawn by one of the patients who was a painter. This picture reveals clearly that the patients may perceive different colours during the surgery and some of the colours may be perceived at different extents due to some ocular and surgical factors. It has been reported that ACM as used in the 'mini nucleus' technique as a closed system surgery defined by M Blumenthal can also be used in other anterior segment surgeries like phacoemulsification.¹⁴

It has been shown in some studies that the use of ACM can control the intraocular pressure changes during the surgery and thus the operation can be completed with protection of the form of the eye.^{5,6} Viscoelastic substances are used classically in phacoemulsification surgeries. The visual perceptions of our patient group during the surgery are similar to those of cases who underwent extracapsular extraction surgery regarding light perception rates, colours and objects seen.^{2,4,7} We did not encounter any complications postoperatively related to ACM use.

In summary, the visual symptoms of the patients are closely related to ocular factors (axial length, structure of the retina and optic nerve) and the pressure changing with the intraocular fluid dynamics.

However, the intraocular pressure changes during the surgery were not directly assessed in this study. The similarity between our findings and those in the literature⁷⁻¹² regarding the visual experiences in phacoemulsification surgery suggests that the use of ACM does not significantly alter the anterior chamber and intraocular fluid dynamics that may induce a change in the visual experience as they fluctuate. Thus we think that the use of ACM during intraocular surgery at least has no adverse effect on the fluid dynamics.

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