

# Comparison of Intensity of Pain Induced by Peribulbar and Topical Anaesthesia after Cataract Surgery

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## Abstract

*Introduction:* It is difficult to compare the pain induced by different surgical modalities because pain is a subjective sensation that is highly dependent on the patient's emotional state and cultural background. In the present study, we compared the pain between patients who had phacoemulsification with topical anaesthesia and patients who had phacoemulsification with peribulbar anesthetic infiltration. *Materials & Methods:* Total of 50 patients who were planned to undergo cataract surgery were included in the study. They were divided into two groups 25 in group A and 25 in group B. Group A patients received Peribulbar anaesthesia while patients in group B received topical anaesthesia. *Results:* Five patients in the topical anaesthesia group required additional eyedrops during surgery for discomfort. No patient in the topical anaesthesia group required conversion to peribulbar anaesthesia. Patients in the Peribulbar anaesthesia group reported significantly greater pain than patients in the topical anaesthesia group ( $P = 0.0056$ , Mann-Whitney). *Discussion & Conclusion:* Topical anaesthesia is a simple, safe, atraumatic technique. Its benefits are numerous. The speed and ease of administering topical anaesthesia coupled with the rapid visual recovery after surgery makes this method a suitable and safe choice. It can be proposed as a good alternative to peribulbar or retrobulbar anaesthesia and is likely to become the preferred type of anaesthesia.

**Keywords:** Anaesthesia; Cataract Surgery; Local; Topical.

## Introduction

Local anaesthesia is the preferred anaesthetic technique for this procedure as is revealed in a survey conducted by the Royal College of Ophthalmologists [1]. There are several local anaesthetic techniques available for cataract surgery including retrobulbar (intraconal), peribulbar (extraconal), sub-tenon's, subconjunctival and topical anaesthesia [2].

For many years, retrobulbar anaesthesia was the only method used in ophthalmologic surgeries. In 1986, surgeons began using peribulbar anaesthesia after it was reported to be a safe, effective alternative to retrobulbar injections [3].

Although retrobulbar and peribulbar anaesthesia is sufficient for nerve blockage during cataract

surgery complications related to the anaesthesia can be sight threatening or even life threatening. These complications can be prevented by the use of topical anaesthesia with or without intracameral lidocaine injection and the trend is to adopt this technique as a standard procedure [4].

Fichman first described a novel technique, topical anaesthesia, which is not only free from all of the above complications but is also well tolerated by the patients [5]. Since its introduction, topical anaesthesia has become increasingly popular, as indicated by the annual survey of the practice styles and preferences of members of the American Society of Cataract and Refractive Surgery [6].

The three most common methods of applying topical anaesthesia are by eye drops, by eye drops with intracameral lidocaine injection, and in gel

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form. Topical anaesthesia by eye drops is a noninvasive method, but in some cases it may provide insufficient analgesia and require an additional intracameral lidocaine injection [7].

It is difficult to compare the pain induced by different surgical modalities because pain is a subjective sensation that is highly dependent on the patient's emotional state and cultural background. In the present study, we compared the pain between patients who had phacoemulsification with topical anaesthesia and patients who had phacoemulsification with peribulbar anesthetic infiltration.

### Materials & Methods

Total of 50 patients who were planned to undergo cataract surgery were included in the study. They were divided into two groups 25 in group A and 25 in group B. Patients with total cataract, unstable fixation, intense photophobia, or poor mydriasis and those who had difficulty keeping their eyes open during tonometry were excluded from the study. The patients were informed about the type of anaesthesia they would receive. No patient received sedation. An informed consent and ethical committee clearance was taken prior to the conduct of the study.

Group A patients received Peribulbar anaesthesia were as patients in group B received topical anaesthesia. The topical anaesthesia consisted of 5 or 6 drops of proximetacaine hydrochloride 0.5% eyedrops at 8-minute intervals before surgery. The peribulbar anaesthesia consisted of 5 mL of a mixture of equal parts of lidocaine 2% without adrenaline and bupivacaine 0.5%. The anesthetic solution was prepared 20 minutes before surgery and administered in the inferotemporal quadrant.

In all cases, mydriasis was obtained with 3 drops phenylephrine and tropicamide before surgery.

Barophthalmos to reduce intraocular pressure was done only in the peribulbar anaesthesia group. Patients were monitored with a cardioscope and venous access maintained with Ringer's lactate solution in both groups. All surgeries were performed by the same surgeon using an identical procedure.

Approximately 15 minutes after surgery, patients in the topical anaesthesia group were asked to estimate the sensation of pain during the phacoemulsification procedure and patients in the peribulbar anaesthesia group, the pain during infiltration of the anesthetic solution. Both groups scored their pain using a 10-point visual analog scale on which 0 was the absence of pain and 10, unbearable pain. 9 Patients unable to see the scale verbally rated their pain sensation. The pain scores in the 2 groups were compared using the nonparametric Mann-Whitney U test for the medians of independent samples.

### Results

The mean age was 65 years in the topical anaesthesia group and 69 years in peribulbar anaesthesia group. There was no significant difference between the groups in age or in the male:female ratio. The mean surgical time was average 25 minutes in the topical anaesthesia group and nearly to 23 minutes in the peribulbar anaesthesia group. Five patients in the topical anaesthesia group required additional eyedrops during surgery for discomfort. No patient in the topical anaesthesia group required conversion to peribulbar anaesthesia. Table 1 & 2 shows the distribution of the pain scores in the 2 groups. Patients in the Peribulbar anaesthesia group reported significantly greater pain than patients in the topical anaesthesia group ( $P = 0.0056$ , Mann-Whitney).

**Table 1:** Distribution of the pain scores (10-point scale) in the peribulbar anaesthesia group

Pain score	No. of Patient
0	2
1	4
2	15
3	4
4	0
5	0
6	0
7	0
8	0
9	0
10	0
Total	25

**Table 2:** Distribution of the pain scores (10-point scale) scale in the topical anaesthesia group

Pain Score	No. of Patient
0	1
1	3
2	5
3	7
4	3
5	3
6	2
7	1
8	0
9	0
10	0
Total	25

## Discussion

The current trend in anaesthetic techniques for cataract surgery is towards increasingly less aggressive methods that allow safe performance of the surgical procedure and rapid recovery of the patient. More than 61% of cataract surgeries in the USA are now done under topical anaesthesia, largely as a result of the great advances in surgical techniques [8].

The main advantages of cataract surgery without retrobulbar or peribulbar anaesthesia are the rapid recovery of vision and the elimination of complications associated with the introduction of a needle into the orbit, such as retrobulbar hemorrhage, palpebral hematoma, optic nerve lesions, ocular perforation, diplopia, and respiratory arrest [3,9].

However, phacoemulsification with topical anaesthesia also has disadvantages including the need for greater patient cooperation and limitation of ocular and palpebral mobility during surgery. Poor cooperation can be reduced by careful patient selection. Inadvertent ocular movement and pressure for palpebral closure can be assessed during the tonometry and biometry examinations [3,10].

Pain is more than the final product of a system of linear sensory transmission resulting from real or potential tissue damage. It is a dynamic process involving continuous interactions between complex neuronal systems. The patient's past cognitive experiences, cultural background, and degree of anxiety affect this process. Thus, pain differs from person to person and a stimulus that produces intolerable pain in 1 individual is easily tolerated by another individual [11].

Although the pain induced by phacoemulsification with topical anaesthesia is more difficult to

characterize qualitatively, patients who had topical anaesthesia reported significantly less pain during surgery than patients in the peribulbar anaesthesia group reported during the peribulbar injection. Thus, with proper patient selection and good cooperation, phacoemulsification with topical anaesthesia and no sedation involves fewer risks and a higher level of comfort than surgery with peribulbar anaesthesia [12].

The topical anaesthesia in our study was very effective; 78% of the patients reported no pain during surgery, 18% reported slight sensation to mild discomfort and only 4% reported mild to moderate pain which was relieved with supplemental subconjunctival anaesthesia without resorting to peribulbar anaesthesia. The low level of discomfort in our patients receiving topical anaesthesia is also explained by the speed with which phacoemulsification was performed and the caution we exercised during intraocular manipulation [12].

High or prolonged doses of local anesthetic agents are toxic to the corneal epithelium, and this prolongs wound healing and causes corneal erosion. Also, repeated administration of drops can cause clouding of the cornea, rendering surgery more difficult [13]. Tetracaine (an ester-type anesthetic agent) is the most irritating of the eye drops listed above and should be avoided in patients allergic to this particular family of anesthetic agents. An alternative to eye drops for topical application is the use of viscous lidocaine gel. The gel is often mixed with dilating medications and antibiotic and non-steroidal anti-inflammatory agents. It is reported that 5 mL of lidocaine gel 2% mixed with 4 drops tropicamide, 4 drops cyclopentolate 1%, 4 drops phenylephrine 10%, 10 drops moxifloxacin, and 4 drops ketorolac and applied to the operative eye twice before the surgery typically achieves excellent

dilation and anaesthesia. However, drug absorption and corneal epithelial safety of this mixture have not been fully investigated.

### Conclusion

Topical anaesthesia is a simple, safe, atraumatic technique. Its benefits are numerous. The speed and ease of administering topical anaesthesia coupled with the rapid visual recovery after surgery makes this method a suitable and safe choice. It can be proposed as a good alternative to peribulbar or retrobulbar anaesthesia and is likely to become the preferred type of anaesthesia.

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### Conflict of Interest

None declared.

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