

# Comparison of Peribulbar Vs Topical Anaesthesia for Phacoemulsification

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## Abstract

**Background:** To compare the efficacy of topical anaesthesia with peribulbar anaesthesia in phacoemulsification.

**Method:** This comparative analytical study was conducted in the Department of Ophthalmology, Fauji Foundation Hospital, Rawalpindi, from February 2006 to January 2007. A total of 200 patients who underwent phacoemulsification with intraocular lens (IOL) implantation were included in this study. Patients were randomly assigned to peribulbar group (group 1, n=100) who received 4-5 ml of local anaesthetic (equal quantities of 2% xylocaine and 0.5% bupivacaine) in peribulbar region and topical group (group 2, n=100) using 0.5% proparacaine in conjunctival sac every 5 minutes for half an hour before surgery. Patients refusing informed consent, having communication problem and nystagmus were excluded from the study. All surgeries were performed by the same surgeon.

**Results:** The difference between two groups regarding analgesia was found to be statistically insignificant. Periocular group provided significant akinesia.

**Conclusion:** Topical anaesthesia is an effective alternative to peribulbar anaesthesia for phacoemulsification reducing the risks associated with peribulbar injection.

**Key Words:** Phacoemulsification, anaesthesia, analgesia, akinesia.

## Introduction

Retrobulbar block remained popular for ages. But each time with a needle introduced into the orbit there is definite risk of complications<sup>1</sup>. Since 1986, peribulbar anaesthesia has replaced retrobulbar as a safe and effective method of block<sup>2</sup>. However injection related complications such as orbital bleeding, ocular perforation, optic nerve trauma, intra vascular injection of anaesthetic agent and extra ocular muscle dysfunction have been reported<sup>3</sup>. Although these blocks provide excellent anaesthesia but risk of vision threatening and even life threatening complications is always there<sup>4</sup>. These complications can be avoided by using topical anaesthesia<sup>5</sup>.

Topical anaesthesia is not new. In 1984, Knapp described the use of cocaine eye drops<sup>6</sup>. Advances in the techniques of phacoemulsification, self sealing incisions and foldable IOLs renewed interest in topical anaesthesia. Fichman reported the use of topical anaesthesia for the first time for modern cataract extraction in 1927. Since then the use of this technique has increased tremendously. Our goal was to study the difference between peribulbar and topical anaesthesia for cataract surgery.

## Patients and Methods

A total of 200 patients were included in this study. They were conveniently assigned to either the peribulbar group (group 1, n=100) or topical group (group 2, n=100). The patients in group 1 received 4-5 ml of local anaesthetic (equal quantities of 2% xylocaine and 0.5% bupivacaine) into the peribulbar space with 1 inch 25 gauge needle. In group 2, 0.5% proparacaine eye drops were instilled every 5 minutes half an hour before surgery. No sedation was given. All of the patients under went phacoemulsification with IOL implantation. A four point verbal pain scale was used for analgesia. Patients were asked to grade the pain during different stages of surgery. Akinesia

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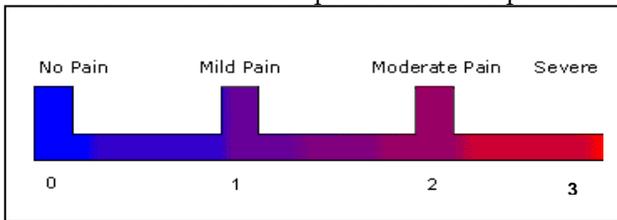
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was also assessed on four point scale as depicted:



**Inclusion Criteria**

- Patients with senile cataract

**Exclusion Criteria**

- Patients refusing informed consent
- Patients with communication difficulty
- Patients suffering from dementia
- Patients with nystagmus
- Patients unable to understand pain scale
- Patients with hazy cornea

All surgeries were done by same surgeon to avoid inter-observer bias. Convenient sampling of patients was done in order to avoid bias in selection. The data was analyzed by SPSS version 10. Standard errors and standard deviation for all variables were calculated, where necessary. Data of anaesthesia and akinesia was compared between two groups using chi square test.

**Table 1: Descriptive Statistics for Group 1 (Peribulbar) and Group 2 (Topical) (n=200)**

Means and Standard Deviation								
	Group 1				Group 2			
	Min	Max	Mean	SD	Min	Max	Mean	SD
Age	40	86	62.32	12.67	42	87	62.08	13.48
Akinesia	0	3	0.69	0.84	0	3	2.21	0.70
Analgesia	0	3	0.56	0.64	0	3	0.78	0.85

**Results**

The descriptive data for akinesia and analgesia for all subjects is given in Table 1. The relationship of akinesia with peribulbar and topical anaesthesia is given in Table 2 whereas relationship of analgesia between two groups is shown in Table 3. In Group 1, there were 26 % males and 74%

females while Group 2 comprised 21% males and 79% females.

**Table 2: Relationship of Akinesia between Group 1 (Peribulbar) and Group 2 (Topical) Anaesthesia (n=200)**

	Akinesia Values		
	Group 1	Group 2	Cumulative
No Movement (0)	51	2	53
Slight Movement (1)	34	14	48
Moderate Movement (2)	14	47	61
Full Movement (3)	1	37	38
Total	100	100	200

Chi Square Value = 1432.63 p < 0.005

**Table 3: Relationship of Analgesia between Group 1 (Peribulbar) and Group 2 (Topical) Anaesthesia (n=200)**

	Analgesia Values		
	Group 1	Group 2	Cumulative
No Pain (0)	52	46	98
Slight Pain (1)	40	45	85
Moderate Pain (2)	6	5	11
Severe Pain (3)	2	4	6
Total	100	100	200

Chi Square Value = 3.484 p = 0.323

In group 1, 51% of patients had no movements whereas only 2% patients had no movements in group 2. 34 % patients with peribulbar anaesthesia exhibited slight movements whereas 14% patients of topical anaesthesia had slight movements. 14% patients had moderate and only 1% had full movements in peribulbar group. 47% of patients in topical group showed moderate movements and 37% exhibited full movements. Mean value for akinesia in group 1 was 0.69 with SD 0.84, and the mean for akinesia in group 2 was 2.21 with SD 0.78. The chi-square value came out to be 1432.63 with p value of less than 0.005 which is statistically significant.

52% of patients in group 1 and 46% in group 2 did not feel any pain. Mild pain was felt by 40% patients in group 1 and 45% of group 2. 6% patients of peribulbar and 5% patients of topical anaesthesia

group had moderate pain. Severe pain was felt by only 2% patients of group 1 and 4% of group 2. Mean for analgesia in periocular group was 0.56 with SD 0.64, whereas mean value for analgesia in topical group was 0.78 with SD 0.85. The chi-square value was 3.484 with p value of 0.323 which is statistically insignificant.

## Discussion

Complications of retrobulbar and peribulbar anaesthesia are numerous. Ptosis, conjunctival or eyelid bruising, orbital hemorrhage, globe perforation, optic nerve damage, CRVO, CRAO, brain stem anaesthesia and even death have been reported<sup>8-12</sup>. Topical anaesthesia eliminates these risks and has several other benefits like:

- The return of vision is more rapid.
- It is less costly.
- Patients can have surgery without discontinuation of systemic anticoagulants or aspirin.
- There is more patient satisfaction<sup>13</sup>.

The main disadvantage of topical anaesthesia is lack of akinesia which can make surgery technically difficult. But with good patient selection, proper counseling and patient cooperation this problem can be avoided. During capsulorrhexis, the patient should be asked to particularly keep the eyes still. However during phacoemulsification and irrigation and aspiration, the instruments placed in the main tunnel and side port incisions immobilize the eye. It is best to slightly lower the bottle height while inserting the phaco tip because this can cause less stretch on zonules due to posterior lens migration. This might cause pain as ciliary body is not anesthetized. The surgeon should avoid touching iris, especially during IOL implantation. This can be achieved by having widely dilated pupil. As patients with topical anaesthesia are more sensitive to IOP elevation after surgery, we recommend careful and complete viscoelastic removal. Pain killers and acetazolamide tablet after surgery would minimise pain and maintain IOP. Up till now we have mostly been able to achieve these goals with good patient satisfaction.

The key to successful cataract surgery with topical anaesthesia is surgeon-patient communication. Patients with hearing or language problems or dementia are poor candidates.

In our study there was no statistically significant difference in pain between the two groups. No significant difference in duration of surgery was

noted. The ocular movements were quite marked in topical group and the difference was statistically significant, but mobility, is not a problem for experienced surgeons especially if the patients are also cooperative.

Our study confirms the results of Agarwal, who has evaluated topical anaesthesia and found it a technique of choice in small incision cataract surgery<sup>14</sup>. Similarly, Saunder and Jonas did not find significant difference between two techniques in terms of subjective pain experienced by 140 patients<sup>15</sup>. They recommended more frequent use of topical anaesthesia. Similar equality between two techniques has been observed by many other investigators<sup>16,17</sup>.

Jacobi PC and Dietlein have gone a step ahead in evaluating the efficacy and usefulness of topical anaesthesia in complicated cataract surgery<sup>18</sup>. They recommend the use of topical anaesthesia even in coexisting ophthalmic diseases like glaucoma, uveitis and patients with previous intraocular surgeries. Topical anaesthesia is justified as a means of improving safety without causing discomfort to the patients even in complicated cases.

Roman and Auckin have demonstrated that overall, 62.2% patients preferred topical over peribulbar anaesthesia, citing lack of periocular injection as a reason<sup>18</sup>. Similar superiority of topical anaesthesia over peribulbar anaesthesia has been demonstrated in many other studies<sup>19</sup>.

Our results are contrary to the findings of Lindely, who found that patients experience more pain with topical anaesthesia as compared to peribulbar anaesthesia<sup>20</sup>. Many authors report the same findings<sup>21</sup>.

For a trained surgeon, complications of topical anaesthesia are neither more frequent nor more difficult to manage. If topical anaesthesia proves to be inadequate in any case, the self sealing incision allows safe intra operative conversion to peribulbar or subtenon anaesthesia. In our study supplemental paraocular anaesthesia was required in four cases of topical anaesthesia group.

## Conclusion

Topical anaesthesia is an effective and reliable method for phacoemulsification. It has many benefits over retrobulbar and peribulbar anaesthesia and a high level of patient satisfaction. The technical difficulty as a result of eye mobility is not a problem for the surgeons experienced

in this technique. As trend of less invasive cataract surgery is rapidly growing, topical anaesthesia should replace the other methods of anaesthesia in most cases.

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