

# Peribulbar Versus Topical Anesthesia for Cataract Surgery; Patient's Satisfaction

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**Purpose:** To compare the level of satisfaction in patients undergoing phacoemulsification and implantation of foldable intraocular lens under topical anesthesia in one eye and peribulbar block in the other eye.

**Material and Methods:** Fifty patients (100 eyes) planned for bilateral phacoemulsification with foldable intraocular lens implantation in the eye department Combined Military Hospital Multan were included in this cohort study. All patients underwent clear corneal incision. One eye of each patient was operated under topical anesthesia and the other eye with peribulbar block. Parameters like pain, discomfort and feeling of pressure during administration of anesthesia, during surgery and 4 hours after the procedure were assessed using visual analogue scale.

**Results:** Level of pain ( $p = 0.003$ ), discomfort ( $p = 0.001$ ) and feeling of pressure ( $p = 0.00$ ) was very low during instillation of topical anesthesia as compared to administration of peribulbar block. Whereas intra-operatively feeling of pain ( $p = 0.020$ ), discomfort ( $p = 0.010$ ) and feeling of pressure ( $p = 0.005$ ) was significantly high with topical anesthesia as compared to peribulbar block. However 4 hours post operatively pain ( $p = 0.000$ ), discomfort ( $p = 0.000$ ) and pressure ( $p = 0.000$ ) was significantly lower in peribulbar group than topical group.

**Conclusion:** In patient's undergoing phacoemulsification with foldable intraocular lens implantation, peribulbar block gives better patient comfort and satisfaction than topical anesthesia.

In recent years, advances in cataract surgery have led to greater levels of refractive precision, faster visual rehabilitation, improved comfort and safety. Refinements in phacoemulsification techniques and intraocular lens (IOL) technology deserve much of the credit for these advances, but innovations in anesthesia, especially topical anesthesia, have also played an important role in improving outcomes and visual recovery<sup>1</sup>. Peribulbar injection of anesthetic agent has been used for cataract surgery for more than a century, but it was associated with a high risk of injury to the orbital contents. For the last two decades a number of modifications have been devised to reduce the risks of injury to intra-orbital structures during administration of peribulbar injection<sup>2</sup>. In 1884

Koller for the first time used cocaine for Topical anesthesia<sup>3</sup>. After about a century Fichman successfully introduced a new method of injecting a local anesthetic agent for cataract surgery which resulted in high patient satisfaction and faster visual recovery<sup>4</sup>. Topical anesthesia increased from 8% in 1995 to 63% in 1998 for high volume cataract surgeries<sup>5</sup>.

A number of studies have been conducted to assess patient's satisfaction with topical versus peribulbar anesthesia but these studies have conflicting results<sup>6,7</sup>.

Our study assesses level of patient satisfaction in individuals who had bilateral phacoemulsification with topical anesthesia in one eye and peribulbar block in the other eye.

## MATERIAL AND METHODS

The study was conducted in Combined Military Hospital Multan from November 2012 to July 2013. 50 patients, 17 (34%) females, 33 (66%) males with the ages between 59 to 74 years (mean age 66.5 years) having bilateral cataract was included in this study. One eye was operated under topical anesthesia and the other eye of the same patient with peribulbar block (50 eyes operated under topical anesthesia and 50 eyes under peribulbar block). Eyes were randomly selected for topical or peribulbar anesthesia. Uncooperative patients, patients with allergy to lidocaine, poor pupillary dilatation (less than 3 mm), anterior segment pathology, anxiety, dementia, deafness, nuclear sclerosis grade 4 and ocular movement disorders were excluded from the study. During their visit to the ophthalmology department, patients were informed about the details of study well before the procedure. Consent was obtained from patients and relatives for possible topical or peribulbar anesthesia, according to the policy of our ethical committee.

Patient's level of pain and discomfort was judged by the same anesthesiologist in all cases to reduce bias.

All our patients were day care cases. All surgical procedures were performed by the same surgeon. Since all patients had to undergo bilateral surgery the gap between bilateral surgeries was 30 days. Stabilization of the globe was achieved by reducing the operating microscope light to the minimum and asking the patient to look to the operating microscope light<sup>8</sup>. Surgeon had continuous verbal communication with the patient and patient was informed before performing certain steps like instillation of drops, making incision, inserting phaco probe and implantation of intraocular lens. Standardized 3 steps clear corneal incision was made using 2.8mm keratome, supero-temporal for right eye and supero-nasal for left eye. One side port paracentesis, was performed on left side of the main port. Viscoelastic injection, continuous curvilinear capsulorhexis, hydro-dissection, hydro delineation, phacoemulsification, aspiration of the residual cortical lens matter, and implantation of foldable intra ocular lens in the bag was performed<sup>9</sup>. At the end of surgery viscoelastic substance was removed, pupil was constricted with intra-cameral 0.01% carbachol (Miochol)<sup>10</sup>, intra cameral 0.1 ml 0.5% Moxifloxacin eye drops was given in all cases. Wound margins were hydrated, the self-sealing wound was checked for leakage by gentle compression with a sponge. Postoperative treatments were similar in both groups; Antibiotics and steroids

combination eye drops were used at 6 hourly interval slowly tapered off.

Anesthesia (topical and peribulbar) was administered by the same anesthesiologist who also recorded temperature, heart rate, blood pressure, chest auscultation, and blood sugar level on anesthesia sheet. No patients received any oral sedation before injection or operation. Patients used their routine drugs for treatment if any. On the table, patients were connected to monitors for recording blood pressure, ECG, respiratory rate and nasal / oral catheter for continuous supply of oxygen at a rate of 3 - 5 liter per minute. In addition, 22 gauge intra venous cannula was also inserted for any emergency.

Patients in the peribulbar anesthesia group received one injection each, 4 ml mixed solution of 0.5% bupivacaine hydrochloride (1.5 ml) and 2% lidocaine (2.5 ml) into the lower peribulbar space of the eye<sup>9</sup>. Manual ocular compression for 10 minutes was given to facilitate drug absorption. For all patients the quality of peribulbar block was assessed after 10 minutes which is the maximum fixation time for the local anesthetic solution<sup>10</sup>. Block was considered acceptable if there was no movement or slight flicker. Prior to the surgery, the surgeon also assessed the effectiveness of block by eye movements in four directions of gaze.

Eleven doses (approximately 40 µl per dose) of proparacaine hydrochloride 0.5% were used in total (two drops on the cornea, and one each in the superior and inferior conjunctival cul de sac) 15 and 10 min before surgery. Five minutes before surgery 2 more drops were instilled on the cornea. One drop was instilled on the cornea before eye was padded. The pain during surgery was controlled with additional 2 doses of 0.5% proparacaine drops if required.

Pain was scored using visual analogue scale. Each patient was shown a visual analogue scale with numerical and descriptive ratings from 0 (no pain), 1 - 2 (slight stinging), 3 - 4 (mild pain), 5 - 8 (moderate pain) and 9 - 10 (severe pain). Patients were briefed about the use of this pain scale to rate the level of pain felt Pre-operatively (during administration of anesthesia topical / peribulbar), intra-operatively i.e. phacoemulsification with intra ocular lens implantation (immediately after surgery) and 4 hours post operatively. Discomfort and feeling of pressure in the eye during administration of injection, during surgery and 4 hours post operatively were assessed as No = 0 or Yes = 1. Patients who were unable to read the printed scale were helped by the same colleague

anesthesiologist who also performed the pain score recording in all the patients. The difficulties encountered by the surgeon during the surgeries were also graded as not difficult (grade 0), slightly difficult (Patient uneasy = grade 1), moderately difficult (Patient repeatedly squeeze eyes = grade 2) and extremely difficult requiring additional analgesia (Unbearable pain = grade 3). Operating surgeon also completed the form immediately after surgery.

Chi-square test was used for categorical data. Numerical data was analyzed using unpaired two tailed *t*-test. Nominal data and proportions were compared with Chi-squared analysis. A *p* < 0.05 was considered statistically significant.

**RESULTS**

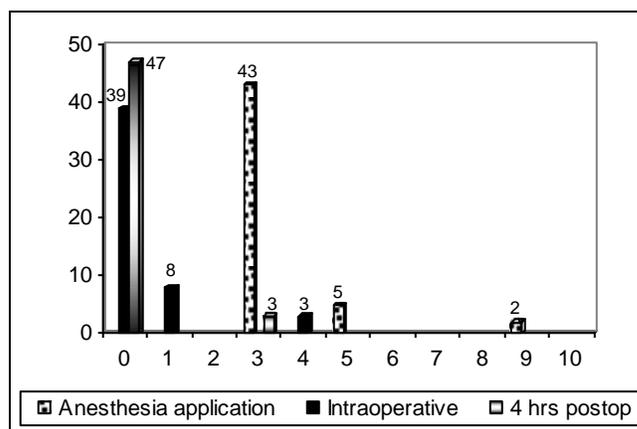
Fifty patients with bilateral cataract (100 eyes) were included in the study. 50 eyes were operated with peribulbar block and 50 eyes with topical anesthesia. During administration of anesthesia feeling of pain (*p* = 0.003), discomfort (*p* = 0.001) and feeling of pressure (*p* = 0.00) were significantly lower with topical anesthesia as compared to peribulbar block (Fig 1 - 3).

Intraoperative pain (*p* = 0.020), discomfort (*p* = 0.010) and feeling of pressure (*p* = 0.005) were higher in the topical anesthesia group as compared to peribulbar block. Fig 1-3.

Four hours post operatively pain (*p* = 0.000), discomfort (*p* = 0.000) and feeling of pressure (*p* = 0.000) was significantly lower in peribulbar group than topical group. Fig 1-3.

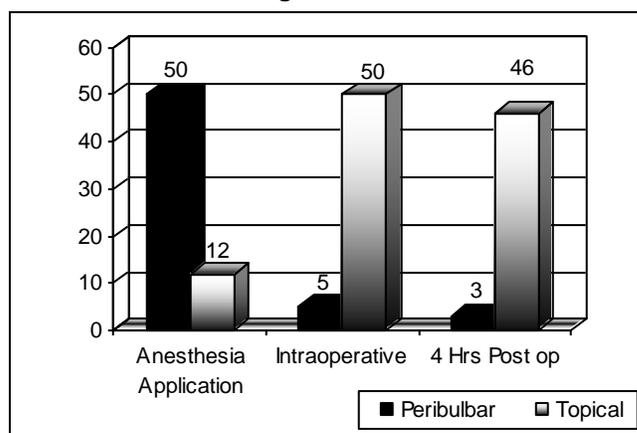
**Pain with peribulbar block**

y-axis no of patients x-axis pain scale



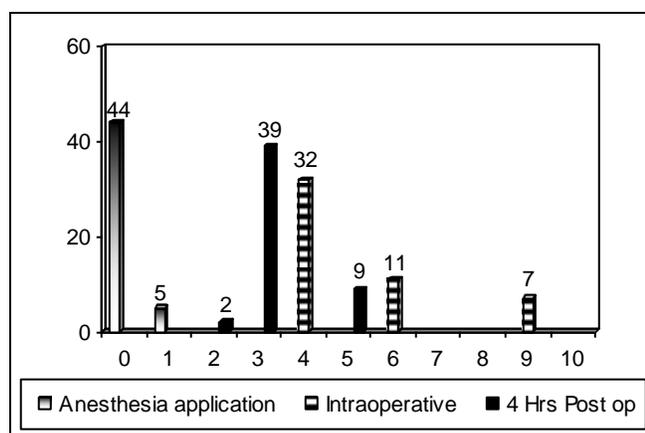
**Fig. 1b:** Pain Score with Peribulbar block:

**Feeling of Discomfort**



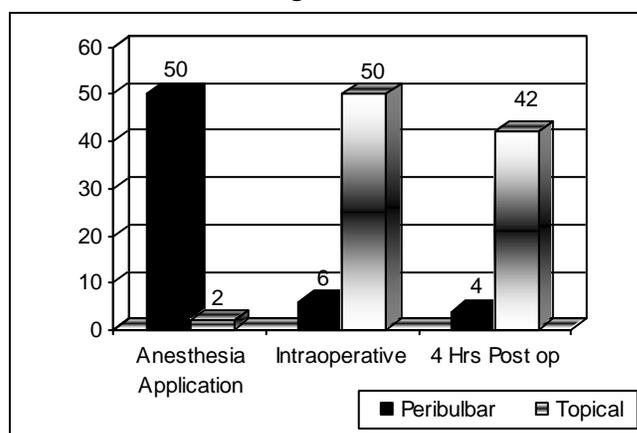
**Fig. 2:** Feeling of Discomfort:

**Pain with Topical Anesthesia**  
y-axis no of patients x-axis pain scale



**Fig. 1a:** Pain Score during topical anesthesia:

**Feeling of Pressure**



**Fig. 3:** Feeling of Pressure:

**Table 1:** Difficulty Encountered by Surgeon:

Level of Difficulty	Peribulbar 50 Cases n (%)	Topical 50 Cases n (%)
Not difficult	46 (92)	33 (66)
Mildly difficult	3 (6)	9 (18)
Moderately difficult	1 (2)	6 (12)
Extremely difficult	0	2 (4)

## DISCUSSION

Our study reveals that patients were more anxious, felt more pain and discomfort in the eye that was operated under topical anesthesia, however patients were more satisfied and calm during surgery with the other eye that had phacoemulsification under peribulbar block. Our results were similar to that of Boezaart et al<sup>11</sup> who reported that patient who have never experienced needle block may be satisfied with topical anesthesia while those who have experienced both techniques preferred the peribulbar injection. Roman et al<sup>22</sup> also reported that the level of satisfaction of patient undergoing cataract surgery with peribulbar block is much higher than topical anesthesia.

In our study feeling of pain, discomfort and pressure were higher with topical anesthesia. In contrast, surgery under peribulbar anesthesia was painless despite the fact that patients felt comparatively more pain, discomfort and pressure during the administration of injection. Others have found no difference in pain perception when comparing topical with peribulbar or retro-bulbar anesthesia<sup>12</sup>.

Fukasaku and Marror<sup>13</sup>, comparing topical and peribulbar anesthesia, also reported more intraoperative pain in patients receiving topical anesthesia for cataract surgery.

In recent years, topical anesthesia for cataract surgery has gained popularity as safe and atraumatic technique<sup>14,15</sup>. However, conflicting results have been presented regarding pain, anxiety, patient discomfort and patient satisfaction postoperatively with Topical anesthesia<sup>16</sup>.

The benefits of topical anesthesia over peribulbar or retro-bulbar anesthesia are: no risks of the needle techniques, the analgesia is immediate, no rise in

intraocular pressure<sup>16</sup>, no need for globe compression and no preoperative sedation.

Different methods have been tried to improve the pain scores i.e. reduce pain in topical anesthesia. Lignocaine gel, instead of drops gives low pain score due to prolonged contact time and better penetration<sup>17</sup>. Although many surgeons used intra-cameral anesthetic along with topical anesthesia, however no significant benefit is documented<sup>18</sup>.

The lack of akinesia is another drawback of the topical anesthesia. Some surgeons find it difficult to work without akinesia; however, as reported by many authors<sup>19</sup> lack of akinesia does not cause intra-operative difficulties to experienced surgeons.

A study conducted by Maclean H, Burton T in 1997 revealed that most patients who received topical anesthesia do not feel major pain, similar to patients who underwent surgery with peribulbar or retrobulbar anesthesia,<sup>21</sup> however, other studies have documented that patients under topical anesthesia alone were more likely to experience discomfort during manipulation of iris and zonular stretching<sup>21</sup>.

Roman et al have reported that there is increased surgical difficulty with and a distinct learning curve for topical anesthesia<sup>22</sup>.

Jenkins et al revealed that once the patient is cured there could be a bias from satisfaction score<sup>23</sup>, however in our study this bias was minimized by the fact that anesthesia (topical and peribulbar) was administered by and response of all patients was recorded by the same anesthesiologist.

Patient satisfaction is one of the important healthcare outcome measures. Results from several studies have shown that there is higher patient satisfaction if postoperative pain is well controlled<sup>24</sup>.

Despite of pain and discomfort during administration of injection, both patients and surgeons are more satisfied with the peribulbar block for cataract surgery due to overall comfort.

## CONCLUSION

Peribulbar anesthesia provides significantly better patient satisfaction as compared to topical anesthesia during cataract surgery. From surgeon's perspective operating conditions with the peribulbar block is also superior then topical anesthesia.

Topical anesthesia is a safe and an effective alternative to peribulbar anesthesia in cataract

surgery. However for effective and patient friendly topical anesthesia surgical training, selection of cases, good preparation and education of patient, measures to further minimize pain and discomfort are required.

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