

## COMPARISON OF OUTCOMES OF TOPICAL ANESTHESIA WITH PERIBULBAR ANESTHESIA IN VITRECTOMY FOR UNRESOLVING VITREOUS HEMORRHAGE

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### **ABSTRACT:**

#### **OBJECTIVES:**

*To compare the Surgeon's ease level and duration of surgery in topical anesthesia with peribulbar anesthesia for vitrectomy without sedation in patients with unresolving vitreous hemorrhage of duration greater than 3 months.*

#### **METHODOLOGY:**

*A randomized controlled trial was carried out at the Department of Ophthalmology, Lahore General Hospital, Postgraduate Medical Institute, Lahore from October 2017 to September 2018. A total of 110 patients were equally divided (n=55) in group A (topical anesthesia) and group B (peribulbar anesthesia) by lottery method. In group A, 0.5% proparacaine hydrochloride eye drops were instilled into the conjunctival sac every 3 minutes preoperatively 5 times before surgery. For group B patients, 5cc injection consisting of 2.5ml of 0.5% bupivacaine and 2.5ml of 1% lidocaine was injected thirty minutes before surgery. Surgical time was noted from first incision to enter the eye for vitrectomy till application of last closing suture. Surgeon ease was recorded with a 4 Grade scale. All data was recorded, entered, and analyzed by SPSS version 25.0. Continuous variables were presented as mean, standard deviation and independent t-test was applied. RCT Registration Number was UHS/Education/126-19/2330.*

#### **RESULTS:**

*The mean age of the patient was 43.83±9.76 years. Male cases were 78 (70.9%) and female cases were 32 (29.1%). Mean duration of surgery was 30.32±7.07 minutes and the surgeon's ease was 2.30±0.98. There was a significant difference (P<0.05) with respect to mean duration of surgery and surgeon's ease level in patients who were given topical anesthesia (28.12±6.57 minutes and 3.11±0.90) versus peribulbar anesthesia (32.52±6.92 minutes and 2.67±0.90).*

#### **CONCLUSION:**

*Topical anesthesia without sedation is better than peribulbar anesthesia for vitrectomy without sedation in patients with unresolving vitreous hemorrhage of duration greater than 3 months.*

**KEYWORDS:** Anesthesia, Bupivacaine, Vitreous Hemorrhage

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**INTRODUCTION:**

Local anesthesia used for vitreoretinal surgery includes retrobulbar anesthesia, peribulbar anesthesia, subtenon anesthesia and even topical anesthesia<sup>1</sup>. Many complications have been reported with anesthetic injections however; all of them are possible but rare<sup>2</sup>. Topical anesthesia in ocular surgery has many advantages over other forms of local anesthesia involving needle injection. The advantages of topical anesthesia are quicker visual recovery, easier and cost-effective administration, and avoidance of needle related complications of local anesthesia<sup>3</sup>. Topical anesthesia is routinely used for phacoemulsification cataract surgery<sup>4</sup>, and has been proven effective for trabeculectomy<sup>5</sup>. Selected cases of pterygium excision<sup>6</sup>, and penetrating keratoplasty<sup>7</sup>. There are reports of conventional 20-Gauge, 23-Gauge and 25-Gauge sutureless vitrectomy surgeries being performed under topical anesthesia and their comparison with retrobulbar and peribulbar anesthesia<sup>8,9</sup>. Studies have shown that topical anesthesia combined with sedation was a safe and effective alternative to peribulbar or retrobulbar anesthesia in vitrectomy<sup>10</sup>. There has been a study showing the comparison of safety and efficacy of topical versus peribulbar anesthesia without the use of additional sedation in 23-Gauge pars plana posterior vitrectomy which reported that topical anesthesia without sedation was a viable option, comparable to peribulbar block, for performing vitrectomy in selected group of patients and avoided complications of injection anesthesia and offered quicker post-operative recovery<sup>11</sup>. The rationale of the study is to determine which technique among topical anesthesia and peribulbar anesthesia for 23-G vitrectomy without sedation is better regarding surgeon's ease level using 4 grade scale and duration of surgery recorded in minutes from start of surgery to end of surgery. A detailed literature

search but could find only scant literature on this topic from our country. So, we intended to conduct this study to generate local data that would help us better manage our patients subsequently. The objective of this study was to compare the Surgeon's ease level and duration of surgery in topical anesthesia versus peribulbar anesthesia for vitrectomy without sedation in patients with non-resolving vitreous hemorrhage of duration greater than 3 months.

**METHODOLOGY:**

The study was conducted in the Department of Ophthalmology, Lahore General Hospital/Postgraduate Medical Institute, Lahore from October 2017 to September 2018. After taking approval from the Ethical Review committee, written informed consent was taken from all patients. Personal profile of each patient (including name, age, gender, patient registration number and address) was noted. Every patient underwent detailed preoperative work-up including best-corrected visual acuity, intraocular pressure measurements, using applanation tonometer, anterior chamber, and vitreous examination by slit lamp biomicroscope. A total of 110 patients were equally divided in-group A, topical anesthesia (55 patients) and group B, peribulbar anesthesia (55 patients). In group A, 0.5% proparacaine hydrochloride eye drops were instilled into the conjunctival sac every 3 minutes preoperatively 5 times before surgery. For group B patients, 5cc injection consisting of 2.5 ml of 0.5% bupivacaine and 2.5 ml of 1% lidocaine was injected thirty minutes before surgery. The eye as well as surrounding area was cleaned and painted with povidone iodine 5%. After draping, a speculum was inserted, and surgical procedure started. Surgical time was noted from first incision to enter the eye for vitrectomy till application of last closing suture. The same surgeon did all the surgeries. Surgeon's ease level was measured, with 4 Grade scale, at the end of surgery and duration of surgery was recorded in minutes from start of surgery to end of surgery. After the assessment of inclusion criteria, simple random sampling was done. Patients of age between 20 to 65 years of both genders, with unresolving vitreous hemorrhage of duration greater than 3 months were included in this study. Patients with nystagmus (examined clinically), claustrophobia, serious impairment of coagulation; shown by deranged PT/APTT (PT greater than 15 seconds and APTT greater than 50 seconds), patients who were unable to cooperate in maintaining a relatively motionless

supine position, patients having language barrier and mentally handicapped were not included in this study. Sample size of 110 patients (55 in each group) was calculated with 95% confidence level, 80% power of study and taking magnitude of mean surgical time: 33.7±7.1 minutes with topical anesthesia and 30.1±6.2 minutes with peribulbar anesthesia (12). Data was collected and recorded through a well-defined proforma. The data was entered and analyzed by SPSS version 25.0. Quantitative variables like age and duration of surgery were presented as mean and SD, whereas qualitative data like gender and surgeon's ease level were presented in frequencies and percentages. Post stratification independent T-test was applied-value  $\leq 0.05$  was considered significant.

## RESULTS:

A total of 110 cases were enrolled in this study after fulfilling inclusion criteria. The mean age of the patient was 43.83±9.76 years. Male cases were 78 (70.9%) and female cases were 32 (29.1%). Mean duration of surgery was 30.32±7.07 minutes and the surgeon's ease was 2.30±0.98. There was a significant difference ( $P < 0.05$ ) with respect to mean duration of surgery and surgeon's ease level in patients who were given topical anesthesia (28.12±6.57 minutes and 3.11±0.90) versus peribulbar anesthesia (32.52±6.92 minutes and 2.67±0.90).

**Table 1: Comparison of Surgical Procedure with Parameters**

Parameters	Peribulbar Anesthesia (N=55)	Topical Anesthesia (N=55)	P-Value
Duration of Surgery	32.52±6.92	28.12±6.57	<0.001*
Ease Score	2.67±0.90	3.11±0.90	0.012*

Continuous variables were presented as mean±standard deviation and independent t-test was applied. \*P-value <0.05 was considered as significant.

## DISCUSSION:

Topical anesthesia regained popularity, this time without cocaine, since it removed complications from regional anesthesia, increasing confidence and patient safety owing to improvements in monitored anesthesia care and short-acting anesthetic use<sup>12</sup>. It can be performed using local anesthetic drops, gels or sponges that are applied to the conjunctival sac and gentle pressure applied to prevent loss from the nasolacrimal duct<sup>13</sup>. Benoxinate, amethocaine, lignocaine, and

bupivacaine are examples of commercially available local anesthetics. The duration of the anesthesia is brief and usually requires repeat drops after 0.5 hours. Toxic potential is questioned during long-term use. Topical anesthesia is increasingly used, as it is convenient. However, pain during the surgery is frequently encountered and therefore opioid administration may be required in these patients. It requires close cooperation with the patient during the operation<sup>14</sup>. The peribulbar technique is another widely employed block that has been introduced innocular anesthetic practice more recently<sup>15</sup>. This technique involves the injection of local anesthetic mixture externally to the muscle cone—hence it is also called the „extraconal“ block. The needle entry point is the same as that of the retrobulbar block, which is from two-thirds lateral to the inferior rim of the lower conjunctiva. The needle may be advanced from the lower lid with a skin wheel or through the conjunctiva after topical anesthetic drops have been applied<sup>16</sup>. The needle is introduced directly and is shorter than in the former technique. It is advised to use 26 G 25 mm needles and a modified technique is the use of 23 G needle that has resulted in improvement in the outcome. Postoperative ocular inflammation was minimal and none of the patients complained of pain in the immediate postoperative period. 23-Gauge suture less vitrectomy under topical anesthesia is safe and effective in selected cases only<sup>17</sup>. The expansion of day-case facilities has encouraged its use, and the development of less invasive surgical techniques has rendered general anesthesia largely unnecessary. Retrobulbar and peribulbar blocks are commonly practiced<sup>18</sup>. While providing excellent conditions for operating on the eye, these techniques are associated with serious but uncommon side-effects. The most dangerous is respiratory arrest because of brain stem anesthesia; others include ptosis, conjunctival chemosis, increased IOP, cranial nerve palsies, diplopia, retinal vascular occlusion and optic nerve damage<sup>19</sup>. Lid edema and bruising due to peribulbar block is also cosmetically unacceptable in certain postoperative cases<sup>20</sup>. Less invasive techniques for providing local anesthesia, such as subconjunctival or topical application of local anesthetic are devoid of such risks but fail to provide adequate immobility of the eye and postoperative analgesia. In this study, no such complications were noted in patients having peribulbar anesthesia. As 23 G pars plana vitrectomy technique was used, so no conjunctival incision or cautery was administered. In this study, group A patients experienced pain during trocar

insertion and removal of cannula, while group B patients experienced pain during peribulbar injection and endo laser; the same trend was demonstrated by Hande Celiker et al<sup>21</sup>. In both groups, supplemental IV medications were not administered showing the efficacy of topical and peribulbar anesthesia, which is compatible for pars plana vitrectomy. Topical anesthesia obviously eliminates the risk of globe perforation, retrobulbar hemorrhage, damage to the optic nerve, and significant conjunctival chemosis. The topical anesthesia technique appears to provide acceptable analgesia during surgery, wears off rapidly after surgery, and does not interfere with the patient's ability to blink, see, or move the eye<sup>22</sup>. In the present study, these observations were confirmed. Patients were able to follow commands, and movement of the eyeball was controlled by the surgeon through the surgery with the use of intraocular instruments.

#### CONCLUSION:

Topical anesthesia is better in terms of Surgeon's ease level and duration of surgery as compared to peribulbar anesthesia for 23-G pars plana vitrectomy without sedation in patients with unresolving vitreous hemorrhage.

**CONFLICT OF INTEREST:** None

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#### CONTRIBUTION

1. **Muhammad Munir** - Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval
2. **Hussain Ahmed Khaqan** - Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval
3. **Fahd Kamal Akhtar**- Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval
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6. **Raheela Naz** – Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval
7. **Mehreen Afzal** - Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval