

# Comparison of postoperative best corrected visual acuity following topical versus peribulbar anaesthesia for phacoemulsification with foldable intraocular lens implantation

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## Abstract

**Background:** Cataract surgery has become one of the most commonly performed surgical procedures. Peribulbar block, regional anesthesia technique, is used for providing anesthesia and akinesia in ophthalmic surgery. It is frequently preferred for its low rate of complications before ophthalmic surgery despite its disadvantages. **Aim:** To compare postoperative best corrected visual acuity following topical versus peribulbar anaesthesia for phacoemulsification with foldable intraocular lens implantation. **Material and Methods:** A total of 100 patients of either sex undergoing Phacoemulsification with foldable IOL implantation were divided into two equal groups: 50 cases were assigned to peribulbar anesthesia group and 50 cases to topical anesthesia group. Visual acuity was assessed on post-operative day-1, post-operative day 7 and on post-operative day 40 using Snellen's chart. On day 1 and 7 uncorrected visual acuity was noted. **Results:** In Group-A 10(20%) patients and Group-B 11(22%) patients had 6/6 best corrected visual acuity (BCVA) at 6 weeks, 29(58%) patients in Group-A and 25 (50%) patients in Group-B had BCVA 6/9 at 6 weeks, 10(20%) patients in Group-A and 11(22%) patients in Group-B had BCVA 6/12 at 6 weeks. There was no statistical significance in best corrected visual acuity in both the groups ( $p=0.56$ ). **Conclusion:** Best corrected visual acuity 6 weeks post operatively showed no statistically significant difference in both the groups.

**Key Word:** Cataract, topical anaesthesia, peribulbar anaesthesia, best corrected visual acuity

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## INTRODUCTION

Cataract is the most common treatable cause of blindness in elderly population.<sup>1</sup>Cataract surgery has become one of the most commonly performed surgical procedures. It has evolved from the days of couching to the present day small incision surgery and phacoemulsification. Newer

techniques like small corneal or limbal incisions, phacoemulsification of the lens nucleus and implantation of foldable intraocular lenses have made it possible to switch from general anesthesia to local anesthesia including retrobulbar or peribulbar injections of local anesthetics.<sup>1</sup> Peribulbar block is one of the regional anesthesia techniques that is used for providing anesthesia and akinesia in ophthalmic surgery. With a local anesthetic agent administered into the extraconal compartment of the eye, risk of optic nerve damage is avoided. Therefore, more anesthetic agent is needed. Peribulbar block is frequently preferred for its low rate of complications before ophthalmic surgery despite its disadvantages such as requiring more than one injection and a larger volume of local anesthetic agent.<sup>2</sup>The present study was conducted to compare postoperative best corrected visual acuity following topical versus

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peribulbar anesthesia for phacoemulsification with foldable IOL implantation.

## MATERIAL AND METHODS

This randomized controlled study was conducted on patients admitted for cataract surgery to Department of Ophthalmology in Tertiary Care Hospital in Maharashtra. A total of 100 patients of either sex undergoing Phacoemulsification with foldable IOL implantation were included. Approval from Institutional Ethics Committee was taken before starting study. Informed written consent of all patients included in the study was taken after explaining the procedure and purpose of the study to the patients.

### Inclusion criteria

- Patients with uncomplicated senile cataracts admitted for cataract surgery.
- Both male and female patients
- Age between 40 years to 75 years
- Without a history of previous ocular co-morbidities, injury or surgery.
- Patients willing to participate and willing to give informed consent

### Exclusion criteria

- Age < 40 years or > 75 years
- Sensitivity to Lignocaine
- History of convulsions, epilepsy
- Previous intra ocular injury, inflammation or surgery
- Pupil < 5 mm diameter
- Presence of other ocular co-morbidities such as pseudoexfoliation syndrome, uveitis, myopia with axial length >26 mm, hyperopia <21 mm, posterior synechia, phacodonesis, poor fixation due to nystagmus.
- Patient unwilling to give written informed consent, un-cooperative, anxious, deaf, dumb patients.

**Procedure:** A total of 100 cases were taken for the study in which 50 cases were assigned to peribulbar anesthesia group and 50 cases to topical anesthesia group. A complete history was taken which included complaints of diminution of vision, its onset, duration and progress, past history of ocular injury, any systemic illness and previous ocular surgery. All patients selected for the study were subjected to following detailed ocular examination: Visual acuity, IOP measurement, slit lamp biomicroscopy, direct ophthalmoscopic examination, keratometry and A-scan to calculate IOL power, Lacrimal sac syringing. All routine investigations were done. Patients were assigned into two groups to be operated

under Topical anesthesia or peribulbar anesthesia by a single surgeon.

- Group A (Peribulbar Anesthesia): 50 patients were assigned to group to be operated under peribulbar anesthesia
- Group B (Topical Anesthesia): 50 patients were assigned to group to be operated under topical anesthesia

**Group-A (Peribulbar Anesthesia):** Preparation of anesthetic mixture: Lignocaine 2% with adrenaline 1 in 2,00,000 (30ml) solution was used. Hyaluronidase 1500 IU was reconstituted with 3ml of anesthetic solution. 1 ml of solution was added to 30 ml vial of the anesthetic solution resulting in 15 IU of hyaluronidase / ml anesthetic mixture.

**Technique of peribulbar block:** Patients in peribulbar anesthesia group (Group-A) received one injection each containing 5 ml mixed solution of 2% lignocaine with adrenaline 1 in 2,00,000 with hyaluronidase 15 IU/ml (3.5 ml) and 0.5% bupivacaine hydrochloride (1.5ml), 3 ml of injection was given with 24 G needle at the junction of medial 2/3rd and lateral 1/3rd of inferior orbital margin with patient looking in primary position, needle directed parallel to orbital floor, just prior to injecting the solution aspiration was done to rule out entry of needle in any blood vessel. Anesthetic solution without Bupivacaine hydrochloride was given in patients with Hypertension and cardiac diseases. Remaining 2 ml of injection was injected at superonasal quadrant near the supraorbital notch with needle directed along the orbital roof. Digital pressure was applied for 10 minutes. Akinesia was assessed after 10 minutes which is maximum fixation time for the local anesthetic solution. Block was considered acceptable if there was no movement of eyeball or slight flicker. Prior to surgery the surgeon also assessed effectiveness of block by checking eye movements in four directions of gaze. Any complications during administration of anesthesia were noted both local and systemic.

**Group-B (Topical anaesthesia):** Technique of Topical Anaesthesia: Patients in Topical anesthesia group (Group-B) received Proparacaine Hydrochloride 0.5%, it was instilled 6 times (approximately 40 µl per dose) starting 30 minutes before surgery, soon after dilating the pupil. Five minutes before surgery one-more time topical anesthetic was instilled on the cornea. Pain during surgery was controlled with additional 2 doses of topical anesthetic if required. Patients were instructed to keep their eyes closed after instillation of topical anesthetic. The patients were in the supine position on the operating table with their eyes open and requested to minimize movement of eyeball. Post-operatively, on the first day, eye pad was removed and eye was cleaned. Topical

antibiotic steroid eye drops were started every 2 hourly and tapered for next 6 weeks.

**Post-operative visual acuity assessment:** Visual acuity was assessed on post-operative day-1, post-operative day 7 and on post-operative day 40 using Snellen's chart. On day 1 and 7 uncorrected visual acuity was noted. On post-operative day 40, uncorrected visual acuity, visual improvement with pin hole were noted and best possible subjective refractive correction was given.

**Statistical analysis:** Data was collected by using a structure proforma. Data entered in MS excel sheet and analyzed by using SPSS 19.0 version IBM USA. Qualitative data was expressed in terms of proportions. Quantitative data was expressed in terms of Mean and Standard deviation. Association between two qualitative variables was found out by using Fischers exact test. A p value of <0.05 was considered as statistically significant

whereas a p value <0.001 was considered as highly significant.

## RESULTS

In the present study, 50% In topical anesthesia and 54% in peribulbar anesthesia group patients belonged to age group 60-69 years, 24% in Topical anesthesia group and 20 % in peribulbar anesthesia group belonged to age group 50-59 years, 20% in Topical anesthesia and 16% in Peribulbar anesthesia group belonged to age group 70-75 years, mean age in Topical Anesthesia group was 61.26 years and in Peribulbar anesthesia group was 61 years. Overall mean age was 61.13 years. Out of total 100 patients 38 were male and 62 were female patients. In Group-A 21 (42.0%) were male and 29 (58.0%) were female patients. In Group-B 17 (34%) were male and 33 (66%) were female patients.

**Table 1:** Distribution of type of cataract

Diagnosis in operative eye	Group-A(Peribulbar)		Group-B (Topical)	
	Frequency	Percent (%)	Frequency	Percent (%)
Nuclear sclerosis grade I	1	2.0	0	0
Nuclear sclerosis grade II	13	26.0	15	30.0
Nuclear sclerosis grade III	2	4.0	3	6.0
Nuclear sclerosis grade IV	2	4.0	0	0
Posterior subcapsular cataract	12	24.0	10	20.0
Posterior polar cataract	1	2.0	1	2.0
Mixed (combination of above)	17	34.0	21	42.0
Mature cataract	1	2.0	0	0
Anterior subcapsular cataract	1	2.0	0	0
Total	50	100.0	50	100.0

Out of total 100 patients 38 patients had mixed variety, 22 patients had posterior subcapsular cataract, 28 patients had nuclear sclerosis grade II. In Group A, 13 (26%) patients had nuclear sclerosis grade II, 12(24%) patients had posterior subcapsular cataract, 17 (34%) patients had mixed variety of cataract, 2 (4%) had nuclear sclerosis grade III, 2 (4%) had nuclear sclerosis grade IV, 1 (2%) had nuclear sclerosis grade I, 1 (2%) had posterior polar cataract, 1 (2%) had mature cataract, 1 (2%) had anterior subcapsular cataract. In Group B, 15 (30%) patients had nuclear sclerosis grade II, 10 (20%) patients had posterior subcapsular cataract, 21 (42%) had cataract of mixed variety, 3 (6%) patients had nuclear sclerosis grade III, only 1 (2%) patient had posterior polar cataract.

**Table 2:** Best corrected visual acuity at 6 weeks

		Group-A (Peribulbar)		Group-B (Topical)	
		Frequency	Percent	Frequency	Percent
Best corrected visual acuity at 6 weeks(BCVA)	6/6	10	20.0	11	22.0
	6/9	29	58.0	25	50.0
	6/12	10	20.0	11	22.0
	6/18	1	2.0	1	2.0
	6/24	0	0.0	2	4.0
	Total	50	100.0	50	100.0

In Group-A 10(20%) patients and Group-B 11(22%) patients had 6/6 best corrected visual acuity (BCVA) at 6 weeks, 29(58%) patients in Group-A and 25 (50%) patients in Group-B had BCVA 6/9 at 6 weeks, 10(20%) patients in Group-A and 11(22%) patients in Group-B had BCVA 6/12 at 6 weeks. 1(2%) patient in both the groups had BCVA 6/18, 2(4%) patients in Group-B and none (0%) patients in Group-A had BCVA 6/24 at 6 weeks, there was no statistical significance in best corrected visual acuity in both the groups (p=0.56). No major vision or life threatening complications occurred in both the groups while administration of anesthesia. Minor complications such as chemosis (44%) and subconjunctival hemorrhage (22%) were exclusively seen in peribulbar group. Needle related complications were completely eliminated in topical group.

## DISCUSSION

Most of the patients belonged to age group of 60 to 69 years in Group-A (54%) and in Group-B (50%) with mean age of 61 years in Group-A and 61.26 years in Group-B. In a study by Khandekar *et al*, mean age in Topical anesthesia group was 60 years and in peribulbar anaesthesia group- was 59.5 years.<sup>3</sup> Out of total 100 patients 38 were males and 62 were females. There were 42% males in Group-A and 34% males in Group-B. There were 58% females in Group-A and 66% females in Group-B. In a study by, Khandekar *et al*, there were no statistically significant differences in the patient profile between groups.<sup>3</sup> According to morphology, mixed variety of cataract was the highest in both the groups (76%) followed by Nuclear sclerosis grade – II (56%), Posterior subcapsular cataract (44%), Nuclear sclerosis grade –III (10%), Nuclear sclerosis grade-IV (4%), Posterior polar cataract (4%), Nuclear sclerosis grade-I (2%), Mature cataract (2%), Anterior subcapsular cataract (2%). In our study all types of cataract were included and there was no significant difference between two groups. There is a growing trend towards shifting from peribulbar anesthesia to topical anaesthesia. Still, the choice of anesthesia to be used for providing best visual outcome has been debatable with conflicting reports in several studies.<sup>4-7</sup> Most of patients in both the groups had best corrected visual acuity of 6/9 at end of 6 weeks. 25(50%) patients in Group-B and 29(58%) patients in Group-A had visual acuity 6/9. There was no significant difference in both the groups with regards to visual acuity ( $p=0.56$ ) which correlates well with study by Narayan S *et al*.<sup>1</sup> In another study, the difference in visual acuity following 4-6 weeks after surgery was not statistically significant ( $\chi^2 = 2.13$ ,  $df = 4$ ,  $P = 0.14$ ).<sup>3</sup> Although, the study by Mehta *et al* shown that visual outcome was better with peribulbar anesthesia as compared to topical anaesthesia.<sup>8</sup>

## CONCLUSION

The cataract surgery can be performed with topical anesthesia without compromising safety of procedure and definitely a beneficial procedure. Best corrected visual acuity 6 weeks post operatively showed no statistically significant difference in both the groups.

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