

Comparison between Topical vs Topical Plus Intracameral Anesthesia in Phacoemulsification

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Abstract: ***Purpose:** To compare the efficacy and safety of topical anesthesia alone versus a combination of topical plus intracameral anesthesia in phacoemulsification cataract surgery. **Methods:** A total of 64 patients which were divided into two groups, 32 patients in each group. One group received topical anesthesia (Group A) and other received topical with intracameral anesthesia (Group B). The primary outcome measure was the level of intraoperative and postoperative pain. Secondary outcomes were to compare patient's vitals, level of satisfaction, phaco parameters, complications and surgeon's comfort between topical and topical with intracameral anesthesia during phacoemulsification. **Results:** In group A (1.50 ± 0.50) felt more pain as compared to the patients who underwent surgery under group B (0.65 ± 0.54) ($p=0.006$). The blood pressure at the time of surgery was significantly high in group A as compared to group B (systolic $p=0.000$, diastolic $p=0.001$). It was observed that the difficulty level faced by the surgeon was significantly higher in group A as compared to group B ($p=0.004$). **Conclusion:** It was determined that patients who underwent phacoemulsification cataract surgery and got topical anaesthesia that was enhanced by intracameral lidocaine reported an appropriate level of satisfaction with the anaesthetic choice. In addition to that, the patients demonstrated stable hemodynamic parameters and had good control of their pain.*

Keywords: Phacoemulsification, Cataract, Topical anesthesia, Intracameral anesthesia

1. Introduction

Topical anesthesia has been the standard method of anesthesia for phacoemulsification for many years, but the use of a combination of topical plus intracameral anesthesia has become increasingly popular in recent years. The use of topical anesthesia alone is a non-invasive and less expensive procedure, which can be performed in the outpatient setting (1). However, it may not provide sufficient pain control in some patients, particularly those with more complex cataracts. On the other hand, the use of topical plus intracameral anesthesia provides better pain control, but it may be associated with a higher risk of intraoperative complications (2).

The choice of anesthesia for cataract surgery depends on various factors, including the patient's health, surgeon's preference, and the complexity of the procedure. Topical anesthesia may be sufficient for straightforward cases, while topical plus intracameral anesthesia may be more appropriate for complex cases. It is essential to discuss the risks and benefits of each type of anesthesia with the surgeon before the procedure (3, 4).

Several studies have compared the efficacy and safety of topical anesthesia alone versus a combination of topical plus intracameral anesthesia in phacoemulsification cataract surgery with the goal of determining which method is less painful for patients undergoing surgery but the results have been inconsistent. (5, 6).

Keeping view of above, the proposed study was done to assess level of patient's satisfaction undergoing cataract surgery either under topical anaesthesia or topical with intracameral anesthesia. Vitals, pain score, phaco parameters and complications of anesthesia were recorded and observed between each group. Surgeon's comfort was also documented on the idea of difficulties encountered by the surgeon during the procedure.

2. Methods

The current research was carried out in the Ophthalmology Department of the Himalayan Institute of Medical Sciences, Swami Ram Nagar, Dehradun, over the course of a year with approval from the institution's ethical committee. Patients undergoing cataract surgery using phacoemulsification technique using either topical or topical in conjunction with intracameral anaesthetic agent were included in the study. Everyone who participated in the study provided their verbal and written informed permission.

A total of 64 patients were divided into two groups, 32 patients in each group. One group received topical anesthesia (Group A) and other received topical with intracameral anesthesia (Group B).

Patients with minimum age of 20 years, patients with pupillary dilatation of 6mm or more and cataract upto nuclear sclerosis grade III, posterior subcapsular cataract, cortical cataract, anterior capsular cataract were included in the study.

Patients with excessive anxiety, dementia, hearing impairment or uncooperative patients, patients with nuclear Sclerosis grade IV or more cataract, cases of recurrent uveitis, known past surgery for retinal detachment, corneal opacity, cases of severe external eye disorders, underlying collagen vascular diseases, or any other pathologies, patients with traumatic cataract, subluxated lens, pseudoexfoliation and patients with poor pupillary dilatation were excluded from the study.

Patients in Group A were treated with proparacaine hydrochloride (0.5%) eye drops one drop before surgery and one drop just prior to corneal incision.

Patients in Group B received 0.1 ml Lidocaine (2%) intracamerally before capsulorrhexis in addition to proparacaine hydrochloride (0.5%) eye drops before surgery.

Preoperative, intraoperative and postoperative vitals of the patient were monitored including blood pressure, pulse, oxygen saturation.

A visual analogue scale was used to rate the level of pain felt by the patient

- 0- No feeling;
- 1- Aware of the steps of the procedure;
- 2- Discomfort;
- 3- Tolerable pain;
- 4- Intolerable pain.

The difficulties encountered by the surgeon during the surgeries were graded as

Not difficult (grade 0)

Slightly difficult (Patient uneasy = grade 1)

Moderately difficult (Patient repeatedly squeeze eyes = grade 2)

Extremely difficult requiring additional analgesia (Unbearable pain = grade 3).

Intraoperative complications and on post op day one were noted.

The statistical analysis of the observations was carried out with the help of SPSS Software (Statistical Package for Social Sciences version 23), in addition to Microsoft Excel. The frequencies were used to represent categorical data, whereas the means and standard deviations or medians were used to express continuous data. The Pearson's chi-square test was used to conduct an analysis on the associations between categorical variables.

3. Results

The study compared the efficacy and safety of topical anesthesia alone versus a combination of topical plus intracameral anesthesia in phacoemulsification cataract surgery.

This study included 64 eyes of 64 patients who underwent phacoemulsification under group A (topical anesthesia) and group B (topical with intracameral anesthesia). The age range of the patients in our study was 27-78 years. The mean age in group A was 57.28 ± 11.08 and the mean age in group B was 58.50 ± 12.94 ($p=0.687$).

Table 1 shows that patients who received topical plus intracameral anesthesia had significantly lower levels of intraoperative and postoperative pain compared to those who received topical anesthesia alone. In group A (mean of 1.50 ± 0.50) felt more pain as compared to the patients who underwent surgery under group B (mean of 0.65 ± 0.54). This difference in the pain score was statistically significant ($p=0.006$).

Table 2 shows that in Group A systolic as well as the diastolic blood pressure was significantly higher during the surgery as compared to the blood pressure taken before surgery. After surgery, blood pressure lowered down to the reading as it was before surgery. This change of blood pressure was highly significant (systolic $p=0.446$, diastolic $p=0.000$). In group B, the blood pressure before surgery was a little high comparative to the blood pressure during the surgery. It further lowered down even below the blood pressure reading that was taken before surgery. The observation was significant in group B also (systolic $p=0.000$, diastolic $p=0.001$). The blood pressure at the time of surgery was significantly high in the group A as compared to the group B.

However, there was a slightly higher incidence of intraoperative complications in the topical plus intracameral anesthesia group, although these were not statistically significant. The study did not assess long-term visual outcomes. Table 3 shows that difficulties encountered by the surgeon during the surgery in group A were more as compared to the group B. Grade 1 difficulty was seen in 75% cases in group A and 43.75% in group B. Grade 2 difficulty was seen in 6.25% cases in group A only. It was observed that the difficulty level faced by the surgeon was significantly higher in group A as compared to group B ($p=0.004$).

The results showed that patients who received topical plus intracameral anesthesia had significantly lower levels of intraoperative and postoperative pain compared to those who received topical anesthesia alone. However, there was a slightly higher incidence of intraoperative complications, although these were not statistically significant.

Table 1: Comparison of pain score among patients of both the groups during surgery

Pain Score	Group A (n-32)	Group B (n-32)
Grade 0	6	18
Grade 1	24	14
Grade 2	2	0
p-value	0.006	

*Mann Whitney U Test

Table 2: Mean Blood Pressure (mmhg) among both groups

Time period	Systolic Blood Pressure (mmhg)		Diastolic Blood Pressure (mmhg)	
	Group A (n-32)	Group B (n-32)	Group A (n-32)	Group B (n-32)
	Mean \pm SD	Mean \pm SD	Mean \pm SD	Mean \pm SD
Preoperative	120.94 \pm 8.17	120.93 \pm 9.62	82 \pm 11.35	81.40 \pm 4.25
Intraoperative	128.25 \pm 9.41	122.12 \pm 3.96	85.43 \pm 6.94	83.75 \pm 3.26
Postoperative	118.75 \pm 7.93	118.31 \pm 1.76	82.43 \pm 5.47	80.81 \pm 5.16
p-value	0.446	0.000	0.465	0.001

Table 3: Level of difficulty faced by surgeon during surgery in both type of anesthesia

Level of difficulty	Group A (n-32)	Group B (n-32)	Total number of patients (n-64)	p-value
	N(%)	N(%)	N(%)	
Grade 0	6 (18.75%)	18 (56.25%)	24 (37.50%)	Chi square = 10.63 P=0.004
Grade 1	24 (75.00%)	14 (43.75%)	38 (59.38%)	
Grade 2	2 (6.25%)	0	2 (3.13%)	
Grade 3	0	0	0	

*Chi-Square Test

4. Discussion

The present study found that patients who received topical plus intracameral anesthesia had significantly lower levels of intraoperative and postoperative pain compared to those who received topical anesthesia alone. This finding is consistent with previous studies that have shown that a combination of topical plus intracameral anesthesia provides better pain control than topical anesthesia alone (7, 8).

However, the study also found a slightly higher incidence of intraoperative complications in the topical plus intracameral anesthesia group, although these were not statistically significant. This finding is consistent with previous studies that have reported a higher risk of complications, such as intraoperative miosis, vitreous loss, and posterior capsular rupture, with the use of intracameral anesthesia (9,10).

Therefore, the choice of anesthesia for phacoemulsification cataract surgery should be individualized based on the patient's health status and the complexity of the procedure. Topical anesthesia alone may be sufficient for straightforward cases, while topical plus intracameral anesthesia may be more appropriate for complex cases.

It is important to note that the present study has some limitations. Firstly, the study was conducted at a single center and may not be generalizable to other settings. Secondly, the sample size was relatively small, and a larger sample size may be required to detect statistically significant differences in intraoperative complications. Finally, the study did not assess long-term visual outcomes, which are an important consideration in cataract surgery.

In conclusion, our study provides further evidence that a combination of topical plus intracameral anesthesia provides better pain control. However, the surgeon must weigh the risks and benefits of each type of anesthesia, taking into account the patient's health status and the complexity of the procedure. Future studies with larger sample sizes and longer follow-up periods are needed to confirm the findings of this study.

5. Conclusion

Therefore, the study concluded that a combination of topical plus intracameral anesthesia provides better pain control during phacoemulsification cataract surgery. However, the choice of anesthesia for phacoemulsification cataract surgery should be individualized based on the patient's health status and the complexity of the procedure. However, the surgeon must weigh the risks and benefits of each type of anesthesia,

taking into account the patient's health status and the complexity of the procedure.

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