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Indian Journal of Clinical and Experimental Ophthalmology

Journal homepage: www.ijceo.org

Original Research Article

A study to compare efficacy of subconjunctival anesthesia with lignocaine vs topical paracaine with intracameral lignocaine in small incision cataract surgery in terms of patients cooperation score and surgeon's comfort

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ARTICLE INFO

Article history:
Received 01-08-2024
Accepted 17-08-2024
Available online 21-02-2025

Keywords:
Topical anesthesia
Cataract surgery
Intracameral anesthesia
Patients cooperation score

ABSTRACT

Aim: To compare patient cooperation score and surgeon's comfort between subconjunctival anesthesia vs topical anesthesia with intracameral lignocaine.

Materials and Methods: This is cross sectional observational study involving 72 patients who have been diagnosed to have cataracts in either of the eyes with no underlying complication undergoing small incision cataract surgery in our study, 36 cases were assigned randomly for subconjunctival anesthesia and 36 for topical paracaine with intracameral lignocaine. Small incision Cataract Surgery was done for all the patients. Patients cooperation during the surgery was scored into excellent, good and sufficient cooperation based on patients cooperation score. The two groups were compared in terms of baselined clinical examination variables.

Results: In our cross sectional observational study of 72 cases with 36 in each group, the mean age was 62.83 ± 7.74 years (p=0.085). There were no significant differences between groups in terms of age, sex, operating eye, and complications. The mean patient cooperation score was significantly higher in Group 2 (1.16 ± 0.37) compared to Group 1 (1.77 ± 0.41), with a p-value of 0.00001. In Group 1, 34% showed good cooperation and 66% showed sufficient cooperation, whereas in Group 2, 72% showed good cooperation and 28% showed sufficient cooperation ($p < 0.005$). The mean surgeon's comfort score was significantly better in Group 2 (1.02 ± 0.55) compared to Group 1 (1.38 ± 0.71), with a p-value of 0.015.The mean duration of surgery was 25.55 ± 7.35 minutes in Group 1 and 24.02 ± 6.05 minutes in Group 2, with no significant difference (p=0.172).

Conclusion: This study showed that patient cooperation score and surgeon's comfort score was observed to be better in topical with intracameral lignocaine group to subconjunctival anesthesia.

1. Introduction

Cataract is defined as clouding of the crystalline lens of the eye which contributes to the refractive power of the eye hence obstructing the light ray's projection on retina. The defining feature is progressive diminution of vision of the effected eye. Cataracts are the primary cause of preventable blindness worldwide.[1] Small incision cataract surgery (SICS) is the mostly employed surgical technique in developing countries like India where the volume of surgeries are huge in number.[2]

An ideal anesthetic would be one that would make the surgical procedure painless, would not cause any difficulties to the eyes or the body, and would also be comfortable for both the patient and the surgeon operating on them. This commonly used peribulbar block

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https://doi.org/10.18231/j.ijceo.2025.011

(PB) technique was replaced by topical anesthesia (TA) which uses paracaine 0.5% eyedrops and subconjunctival anesthesia using lignocaine 2%. And mostly we adjunct the topical anesthesia with intracameral lignocaine.[3,4] Review of literature showed limited published studies about the potential factors that can predict the success of TA during SICS when compared to subconjunctival anesthesia in terms of patient's cooperation, analgesia and discomfort. The purpose of this study was to evaluate the patient cooperation and surgeon's comfort undergoing SICS and its related factors.

2. Materials and Methods

2.1. Study population

This is cross sectional observational study involved 72 patients, diagnosed with cataracts in either of the eyes with no underlying complication undergoing small incision cataract surgery. This study was conducted in Dept. of ophthalmology Shri Sathya Sai Medical College and Research Institute, Ammapettai for a duration of 18 months. The diagnostic criteria for the cataract were according to slit-lamp examination of the patients and the presence of significant lens opacity in their examination according to LOCS III classification. The subjects who were candidate for cataract surgery were selected sequentially. The inclusion criteria includes patients with senile cataract (50-80 years), willing to undergo SICS surgery and giving consent and exclusion criteria were poorly dilating pupils, hard cataracts, systemic connective tissue disorders, secondary causes like trauma or uveitis or glaucoma, allergic to lignocaine, people suffering with psychiatric disorders, patients who are uncooperative and not willing for the study

2.2. Anesthesia and surgical technique

Preoperatively the patients were on Ciprofloxacin 0.3% eye drops hourly and Flurbiprofen 0.03% eye drops were continued and Tropicamide plus (Tropicamide 0.8% + phenylephrine 5%)eye drops every15 minutes and one tab. Diamox (Acetazolamide 250mg) was given before shifting patient to the surgery.

Group 1 patients received anterior subconjunctival anesthesia (ASCA). 0.2 mL of lignocaine 2% with adrenaline 1:200,000 (Lox 2%, Neon Laboratories, India) was injected under the temporal anterior bulbar conjunctiva 2 mm behind the limbus, and after a gap of 10–15 s, a further 0.2 mL of the solution was injected, taking care to avoid injecting into a blood vessel. This method of 0.4 mL given in two separate doses was done to ensure minimal pain perception for the patient.

Group 2 received topical paracaine with intracameral lignocaine. A preservative-free aqueous 0.5% proparacaine eyedrops was instilled on the ocular surface in the preoperative room 10 min before surgery, A preservative-free (to prevent corneal toxicity) 2% lignocaine (0.5 ml) diluted with 0.5 ml of ringers lactate was instilled intracamerally after entry into the anterior chamber and allowed for 2 min. surgeries were performed by the same surgeon.

2.3. Clinical assessment

Patient's details were filled in a proforma including IP no., name, age, gender, occupation, history of medications, general examinations & local examinations. Pre operative ocular and systemic assessments along with routine investigations were carried out and visual acuity of all the patients was noted using snellen's chart. Patients were randomized by block randomization method into two groups 36 in each group, using a computer-generated randomization program.

Upon completion of the surgery, the operating surgeon graded for "Discomfort" felt during surgery as 0 - No discomfort; 1 - mild discomfort; 2 - moderate discomfort; 3 - severe discomfort; 4 - surgery not possible to continue without additional anesthesia administration. Discomfort referred to the surgeon perception of difficulty in performing surgery for any reason, including excess movements of patient's eye, increased pain perception by the patient, or undue inconvenience perceived by the surgeon.

Following the surgery, the surgeon was asked to grade patient's cooperation score which was graded from 0 to 3. The grade was classified as follows: 0 – excellent cooperation (no events); 1- good cooperation (eyelid squeezing); 2-sufficient cooperation (globe movement and eyelid squeezing); 3-poor cooperation (head movement, globe movement, and eyelid squeezing).

2.3.1. Statistical analysis

Data was entered in MS_ EXCEL and statistical analysis was done by SPSS23 software. Results were presented in descriptive statistics and appropriate test of significance was applied and 95% confidence interval was given.

3. Results

Seventy two patients were enrolled in the study which were randomized into two groups of 36 each. The mean age of patients is 62.83±7.74 with p value of 0.085 which is statistically not significant.there were 18 male and 18 female patients in each group. Age, sex, cataract grading, operating time and post operative(surgical) complications are listed in the Table 1.

When we compared the duration of surgery in both the groups the mean duration of surgery in group 1 was noted to be 25.55±7.35 mins and in group 2 was 24.02±6.05 minutes. The mean duration of surgery was observed to be lesser in the topical with intracameral anesthesia group

Table 1: The participants' baseline characteristics and complications

	Subconjunctival group(n = 36) Group 1	Topical with intracameral lignocaine group (n = 36) Group 2	P
Sex, n (%)			
Male	18	18	1
Female	18	18	1
Age (years), mean ± SD	62.83±7.74	60.16±8.36	0.085
Operating eye			0.477
Right	18	21	
Left	18	15	
Cataract grade, n (%)			0.0008
Nuclear sclerotic	10	29	
Senile matured cortical cataract	22	7	
Immature senile cortical cataract	4	0	
Operative time (min), mean ± SD	25.55±7.35	24.0±6.05	0.172
Complications, n (%)			0.878
Surgical complications			
- Chemosis	3	1	
- Corneal edema	1	1	
- Subconjunctival hemorrhage	2	2	

than subconjunctival group, though it is statistically not significant (p value = 0.172). Comparison of the duration of surgery between the groups is statistically not significant which is shown in Table 2 .

Table 2: Duration of surgery of the patients among the group

Duration of Surgery	Group 1	Group 2
Mean	25.55	24.02
SD	7.35	6.05
P value	0.172	

Patient cooperation score in subconjunctival anaesthesia group was 1.77 ±0.41 and in topical paracaine with intracameral lignocaine group was 1.16 ±0.37. According to the scale, surgeon felt that patient cooperation was better in group 2. Surgeon's comfort score in subconjunctival anesthesia group was 1.38 ±0.71 and in topical paracaine with intracameral lignocaine group was 1.02 ±0.55. Comparison of the mean patient cooperation score of the patients between the groups is statistically significant which is shown in Table 3 ; the higher mean patient cooperation score is observed in group 1.

Table 3: Mean patient cooperation score of the patients among the group

Patient Cooperation Score	Group 1	Group 2
Mean	1.77	1.16
SD	0.41	0.37
P Value	0.00001	

The cooperation assessment revealed that only 34% showed good cooperation and 24% showed sufficient cooperation in subconjunctival group whereas in the topical group 72% exhibited good cooperation and 28% exhibited sufficient cooperation which showed significant difference among the groups (p<0.005).

The results of the patient cooperation score assessment was listed on Table 4.

Surgeon's comfort score in subconjunctival anesthesia group was 1.38 ±0.71 and in topical paracaine with intracameral lignocaine group was 1.02 ±0.55. According to the scale, surgeon's comfort score was good in topical paracaine with intracameral lignocaine group interpreting the surgeon is more comfortable with group 2. The comparison of the mean surgeon's comfort score of the patients between the groups is statistically significant (p=0.015) which is shown in Table 5. The result presents that the surgeon felt more comfortable performing surgery in group 2.

4. Discussion

In developing and underdeveloped countries, manual small incision cataract surgery is the most widely practiced surgical procedure for their high volume cataract centers. The smaller incision and lesser invasiveness in maneuvers are generally the trend in SICS as surgical technique improves.[5] Over the past year, topical anesthetic treatments have gained popularity, which has coincided with an improvement in patient comfort and a reduction in the hazards and complications associated following other methods of anesthesia as retrobulbar and peribulbar anesthesia. Topical anesthesia presents some challenges, as in complete absence of akinesia of the globe and pain

Table 4: Patient cooperation scores

Groups		Cooperation during small incision cataract surgery				
		0	1	2	3	P value
Subconjunctival anesthesia	36	0	8 (34%)	24 (66%)	0	0.00001
Topical with intracameral anesthesia	36	0	26(72%)	6 (28%)	0	

Table 5: Mean surgeon's comfort score of the patients among the group

Surgeon's Comfort Score	Group 1	Group 2
Mean	1.38	1.02
SD	0.71	0.55
P Value	0.015	

associated with ciliary nerve irritation, but it also has the potential to be a straightforward, safe, and inexpensive treatment for SICS. Topical anesthesia is frequently combined with intracameral lignocaine.[6]

Our study aimed to evaluate patient cooperation and surgeon's comfort under small incision cataract surgery (SICS) using two different anesthetic techniques: anterior subconjunctival anesthesia (ASCA) and topical with intracameral lignocaine anesthesia. The findings indicate that the latter method results in significantly better patient cooperation.[7]

The mean patient cooperation score in the topical with intracameral lignocaine group was 1.16 compared to 1.77 in the ASCA group ($p = 0.00001$). Additionally, 72% of patients in the topical group exhibited good cooperation, significantly higher than the 34% in the ASCA group ($p < 0.005$). This suggests that topical with intracameral lignocaine anesthesia provides a more favourable surgical this finding is consistent with previous studies. Similarly, Patel et al. demonstrated that patients undergoing cataract surgery with topical anesthesia experienced less anxiety and discomfort, leading to better cooperation experience for patients, possibly due to reduced discomfort and better pain management.[8]

The mean surgeon's comfort score was significantly better in the topical with intracameral lignocaine group (1.02 ± 0.55) compared to the subconjunctival group (1.38 ± 0.71), with a p-value of 0.015. This suggests that the use of topical anesthesia enhances surgeon comfort by reducing intraoperative difficulties.

Jacobi et al. reported that surgeons preferred topical anesthesia due to reduced intraoperative complications and better patient cooperation.[9] Similarly, Hosoda et al. found that surgeons felt more at ease and encountered fewer challenges when using topical anesthesia compared to regional anesthesia.[10]

Although the mean duration of surgery was shorter in the topical with intracameral lignocaine group (24.02 ± 6.05 minutes) compared to the subconjunctival group (25.55 ± 7.35 minutes), the difference was not statistically significant ($p=0.172$). This suggests that both anesthesia methods are comparable in terms of the time required to perform the surgery.

However, Zafirakis et al. reported significantly shorter operative times with topical anesthesia due to fewer intraoperative complications.[11] The discrepancy in our study could be due to differences in surgical techniques, patient populations, or the experience levels of the surgeons.

Krishnankutty et al. conducted a study comparing the effectiveness of topical anesthesia with intracameral lignocaine versus peribulbar block in cataract surgery.[12] They reported that topical anesthesia was associated with quicker visual recovery and fewer complications, echoing our findings that topical anesthesia is both safe and effective for cataract surgery.

Sauder et al. compared topical anesthesia with peribulbar block and found similar results, with patients in the topical anesthesia group experiencing less discomfort and shorter operative times.[13] Our study aligns with these findings, as the topical group had a shorter, albeit statistically insignificant, mean operative time than the ASCA group (24.0 ± 6.05 min vs. 25.55 ± 7.35 min, $p = 0.172$).

Erdurmus et al. evaluated patient satisfaction and cooperation during cataract surgery under topical anesthesia with intracameral lignocaine versus subconjunctival anesthesia.[14] They concluded that patients in the topical group reported higher satisfaction and cooperation levels, consistent with our observations.

Minakaran et al. reviewed the use of intracameral anesthesia in cataract surgery and found it to be highly effective in achieving good analgesia and patient cooperation.[6] This review supports our study's conclusion that intracameral lignocaine enhances patient cooperation during SICS.

Gogate et al. investigated the outcomes of cataract surgeries performed under different anesthesia techniques.[15] They highlighted the benefits of intracameral lignocaine in reducing intraoperative pain and improving patient cooperation, which mirrors the results of our study.

Our study underscores the importance of selecting an appropriate anesthetic technique to ensure patient comfort and cooperation during SICS. Given the significant

differences in patient cooperation scores, surgeons in high-volume settings, particularly in developing countries, might consider preferring topical with intracameral lignocaine anesthesia over ASCA. This choice could lead to smoother surgical procedures and potentially better postoperative outcomes.

One limitation of our study is the relatively small sample size, which may limit the generalizability of the findings. Future studies with larger populations could provide more robust data. Additionally, long-term follow-up on postoperative outcomes and patient satisfaction would be valuable to further validate the benefits of topical with intracameral lignocaine anesthesia.

5. Conclusion

In conclusion, our study demonstrates that topical with intracameral lignocaine anesthesia results in significantly better patient cooperation and surgeon comfort level in patients undergoing SICS compared to subconjunctival anesthesia. These findings are in line with previous studies, reinforcing the advantages of this anesthetic approach. Adoption of this technique could enhance patient experience and surgical efficiency in cataract procedures.

6. Source of Funding

Nil.

7. Conflicts of Interest

Nil.

8. Acknowledgement

Study planning and conception was done by Dr. Syed Ali Nasar Waris and Dr. Rubina Huda. Acquisition of data and reporting was done by Dr Reshma Tadala and Dr Mohan Ram Kumar. Data analysis and interpretation was done by Dr Rubina Huda and Dr. R Deborah Rinita. Manuscript editing was done by Dr Neelakantharao Nandini and final approval was done by all the authors.

References

1. Khairallah M, Kahloun R, Bourne R, Limburg H, Flaxman SR, Jonas JB, et al. Number of People Blind or Visually Impaired by Cataract Worldwide and in World Regions, 1990 to 2010. *Invest Ophthalmol Vis Sci*. 1990;56(11):6762–9.
2. Venkatesh R, Chang DF, Muralikrishnan R, Hemal K, Gogate P, Sengupta S. Manual Small Incision Cataract Surgery: A Review. *Asia Pac J Ophthalmol*. 2012;1(2):113–9.
3. Alboim C, Kliemann RB, Soares LE, Ferreira MM, Polanczyk CA, Biolo A, et al. The impact of preoperative evaluation on perioperative events in patients undergoing cataract surgery: a cohort study. *Eye (Lond)*. 2016;30(12):1614–22.
4. Zhao LQ, Zhu H, Zhao PQ, Wu QR, Hu YQ. Topical anesthesia versus regional anesthesia for cataract surgery: a meta-analysis of randomized controlled trials. *Ophthalmology*. 2012;119(4):659–67.
5. Singh K, Misbah A, Saluja P, Singh AK. Review of manual small-incision cataract surgery. *Indian J Ophthalmol*. 2017;65(12):1281–8.
6. Minakaran N, Ezra DG, Allan BDS. Topical anaesthesia plus intracameral lidocaine versus topical anaesthesia alone for phacoemulsification cataract surgery in adults. *Cochrane Database Syst Rev*. 2020;2020(7):CD005276.
7. Kumar C, Dowd T. Ophthalmic regional anaesthesia. *Curr Opin Anesthesiol*. 2008;21(5):632–7.
8. Patel BC, Burns TA, Crandall A, Shomaker ST, Pace NL, Eerd AV, et al. A comparison of topical and retrobulbar anesthesia for cataract surgery. *Ophthalmology*. 1996;103(8):1196–203.
9. Jacobi PC, Dietlein TS, Jacobi FK. A comparative study of topical vs retrobulbar anesthesia in complicated cataract surgery. *Arch Ophthalmol*. 2000;118(8):1037–43.
10. Hosoda Y, Kuriyama S, Jingami Y, Hattori H, Hayashi H, Matsumoto M. A comparison of patient pain and visual outcome using topical anesthesia versus regional anesthesia during cataract surgery. *Clin Ophthalmol*. 2016;10:1139–44.
11. Zafirakis P, Voudouri A, Rowe S, Livir-Rallatos G, Livir-Rallatos C, Canakis C, et al. Topical versus sub-Tenon's anesthesia without sedation in cataract surgery. *J Cataract Refract Surg*. 2001;27(3):873–9.
12. Krishnankutty SV, Narayani V. A comparative study of effectiveness of topical with supplemental intracameral lignocaine versus peribulbar anaesthesia for phacoemulsification with foldable intraocular lens implantation. *Indian J Clin Exp Ophthalmol*. 2020;6(2):235–9.
13. Sauder G, Jonas JB. Topical versus peribulbar anaesthesia for cataract surgery. *Acta Ophthalmol Scand*. 2003;81(6):596–9.
14. Erdurmus M, Aydin B, Usta B, Yagci R, Gozdemir M, Totan Y. Patient comfort and surgeon satisfaction during cataract surgery using topical anesthesia with or without dexmedetomidine sedation. *Eur J Ophthalmol*. 2008;18(3):361–7.
15. Gogate P. Comparison of various techniques for cataract surgery, their efficacy, safety, and cost. *Oman J Ophthalmol*. 2010;3(3):105–6.

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Cite this article: Tadala RS, Rinita RD, Waris SAN, Huda R, Ramkumar M, Nandini N. A study to compare efficacy of subconjunctival anesthesia with lignocaine vs topical paracaine with intracameral lignocaine in small incision cataract surgery in terms of patients cooperation score and surgeon's comfort. *Indian J Clin Exp Ophthalmol* 2025;11(1):58-62.