

Original Article

COMPARISON OF TOPICAL AND PERIBULBAR ANAESTHESIA IN THE OUTCOME OF CLEAR CORNEAL PHACOEMULSIFICATION IN A TERTIARY CARE INSTITUTE

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Abstract

Ophthalmology boasts of cataract extraction as the most commonly performed surgery worldwide.¹ Last fifty years have witnessed the rapid advancements in the cataract surgery. This was a prospective, randomized, interventional and comparative study, done in department of Ophthalmology of a tertiary care hospital. After taking due consent from the patients, 100 eyes were divided into two groups.

Recent times have ushered topical anaesthesia as the most common employed anesthetic agent in phacoemulsification, as compared to the peribulbar block. Though topical anaesthesia gives pain and discomfort to the patient, yet it eliminates the risk of injection related complications. The use of supplementary medication to reduce pain as well as good counselling of the patient can enable technique of topical phacoemulsification to scale great heights.

While it should also be noted that peribulbar block is quite reliable in complicated cataract, cataract associated with corneal opacity, cataract associated with glaucoma and uncooperative patients who cannot comprehend the commands of the operating surgeon.

Thus choice of anaesthesia should be tailored by the operating surgeon, depending upon the parameters like age, educational status, comprehension level, comorbid ocular and systemic conditions.

INTRODUCTION:

Ophthalmology boasts of cataract extraction as the most commonly performed surgery worldwide.¹ Last fifty years have witnessed the rapid advancements in the cataract surgery. The Phacoemulsification and the highly advanced

foldable intraocular lens have ushered new changes in type of anaesthesia as well. The manual cataract surgeries dependent heavily on Peribulbar and Retrobulbar anesthesia that took care of anaesthesia as well as akinesia. Retrobulbar anaesthesia took a back seat in comparison to Peribulbar block, due to the high chances of sight threatening complications.^{2,3} Topical anaesthesia for Phacoemulsification was first reported by Kershner in 1993.^{4,5} And nowadays safer and painless topical anesthesia has replaced the blocks, providing optimum analgesia without akinesia.^{6,7,8} The topical anesthesia fares well in terms of patient satisfaction as well as surgeons acceptance.^{9,10,11}

MATERIAL AND METHOD:

This was a prospective, randomized, interventional and comparative study, done in department of Ophthalmology of a tertiary care hospital. After taking due consent from the patients, 100 eyes were divided into two groups.

Group A: Patients undergoing phacoemulsification under Topical anaesthesia.

Group B: Patients undergoing phacoemulsification under Peribulbar anaesthesia.

The basic information about the demographic details of the patient, awareness about anaesthesia techniques for cataract surgery and types of anaesthesia if received during previous cataract surgery were noted down. Demographic details consisted of age, gender, residential address (urban/rural), education level (illiterate, below secondary and above secondary) and vocation or profession. A baseline standard ophthalmic examination was done including best-corrected visual acuity (BCVA), refraction, IOP by noncontact tonometer (NCT), anterior segment evaluation with slit lamp biomicroscopy, keratometry, axial length and posterior segment evaluation by 90 D lens on a slit lamp. Postoperatively, the patients were reviewed at day 1, week 1 and week 4 for the same parameters.

The cataract was classified based on slit-lamp examination into cortical, nuclear, posterior capsular/polar and mixed types.¹² Mixed type had co-existing morphological characteristics of more than one type, e.g. nuclear sclerosis and posterior subcapsular changes. Patients were explained about the technique of anaesthesia, need for supplementing anesthesia, surgical procedure and surgery evaluation score system. In Group A, surgeries were performed under topical anaesthesia. Topical anesthesia was achieved by instilling proparacaine 0.5% eye drop. One drop was put every five minute, three times, starting 15 minutes before taking the patient to operative table. The group B patients underwent phacoemulsification under peribulbar anaesthesia comprising of 3ml of 0.5% lignocaine and 3ml of 0.5% bupivacaine into the peribulbar space followed by massage.

Phacoemulsification was done through Temporal clear corneal incision and foldable intraocular lens (IOL) was implanted. Protective eye glasses were given to the patients after the surgery. The time duration between insertion and removal of speculum was calculated using digital second unit clock by an independent observer and considered as the surgical time.

The surgeon's and patient's experience were noted immediately after surgery using a pre-validated score system. Patients were made aware about the score system before surgery. The patients experience of surgical procedure, mainly in terms of pain and/or discomfort was used to calculate comfort score (Table 1). The cooperation score was derived from the surgeon's experience of patient's cooperation during surgery (Table 2).

On completion of the study, whole data was entered into Excel® spreadsheet (Microsoft Corp., Redmond, WA, USA). The descriptive and analytic statistics were done using SPSS software (SPSS Version 20.0; IBM Corp.,

Chicago, USA). The significance level was taken as $p < 0.05$ for comparison of average and 0.01 for Pearson's correlation coefficient.

Table 1 Patient satisfaction score

DESCRIPTION	SATISFACTION	SCORE
Discomfort/Pain all the time	Not at all Happy	1
Discomfort/Pain many times	Ok Ok	2
Occasional Pain but tolerable	Fine	3
Occasional Discomfort but no pain	Happy	4
No pain/Discomfort	Very happy	5

Table 2 Surgeon satisfaction score

DESCRIPTION	CO OPERATION	SCORE
Had to give repeated instructions >5	Poor	1
Needed 3-5 instructions	Average	2
Few instructions needed (2)	Good	3
Only once instruction required(1)	Very good	4
No instruction needed	Excellent	5

RESULTS:

50 patients underwent phacoemulsification under topical anaesthesia, while 50 were operated under peribulbar anaesthesia. The mean age of the patients in group A was 52.76 years, while the mean age in group B was 62.94 years, accentuating the fact that relatively young patients were willing to get operated under topical anaesthesia (Table 3). The male to female ratio in group A and B was 4:1 and 1:1 respectively (Table 4). The urban population enrolled themselves for topical anaesthesia as compared to the patients coming from the rural places and the association between the two groups was statistically significant (Table 5). The association of vocation in the two groups also showed significance (Table 6). The difference of mean between the two groups in terms of patient satisfaction score was found to be very significant with a p value of 0.00112 (Table 7). The difference of mean between the two groups was calculated to be extremely statistically significant with the p value of 0.0001 (Table 8). This elucidated that the surgeon was more comfortable operating the blocked eye. The duration of surgery and final visual outcome was not found to be statistically significant between the two groups. The intraoperative complications were found to be more in group A, while the anesthesia related complications were found to be more in group B.

Table 3 Comparison of Age between the two groups

AGE	GROUP A	GROUP B
MEAN AGE (years)	52.76	62.94
STANDARD DEVIATION	6.99	10.02
NUMBER	50	50
P VALUE	0.0001	

Table 4 Comparison of Gender between the two groups

GENDER	MALE	FEMALE
GROUP A	40	10
GROUP B	25	25
TOTAL NUMBER	65	35
P VALUE	0.0017	

Table 5 Comparison of Residences between the two groups

RESIDENCES	URBAN	RURAL
GROUP A	41	9
GROUP B	15	35
TOTAL NUMBER	56	44
P VALUE	0.0001	

Table 6 comparison of Vocation between the two groups

VOCATION	NON WORKING	WORKING
GROUP A	22	28
GROUP B	40	10
TOTAL NUMBER	62	38
P VALUE	0.0002	

Table 7 Comparison of Satisfaction level of the patient in both the groups

PATIENT SATISFACTION SCORE	GROUP A	GROUP B
1	2	1
2	3	0
3	19	8
4	12	14
5	14	27
P VALUE	0.00112	

Table 8 Comparison of Satisfaction level of the surgeon in both the groups

SURGEON SATISFACTION SCORE	GROUP A	GROUP B
1	9	0
2	20	0
3	8	1
4	6	8
5	7	41
P VALUE	0.001	

Table 9 Comparison of intra operative complications

INTRAOPERATIVE COMPLICATIONS (%)	GROUP A	GROUP B
Posterior capsule rupture	14 %	2 %
Iris prolapse	12 %	4 %
Others	No	No

Table 10 Comparison of postoperative complications

POSTOPERATIVE COMPLICATIONS (%)	GROUP A	GROUP B
Chemosis / Ecchymosis	No	8 %
Ptosis	No	4 %
Pain	2 %	18 %

Table 11 Comparison of anaesthesia related complications

ANAESTHESIA RELATED COMPLICATION (%)	GROUP A	GROUP B
SCH	No	14 %
CHEMOSIS	No	16 %

Table 12 Comparison of ocular morbidities in both the groups

OCULAR CONDITIONS (%)	GROUP A	GROUP B
DRP	2 %	28 %
ARMD	No	4 %

Table 13 Comparison of comorbid conditions in both the groups

COMORBID CONDITIONS (%)	GROUP A	GROUP B
DM	10 %	72 %
HTN	24 %	10 %
DM AND HTN	6 %	4 %
Others	No	No

DISCUSSION

The Anaesthesia purports to provide a painfree, comfortable and satisfactory surgical experience to the patient as well as garner acceptance and contentment of the operating surgeon.

The feedback of the patient portrayed that the peribulbar anaesthesia (Group B) though resulted in pain, discomfort and heaviness during the initial phase of the injection procedure, yet it lead to the painless and comfortable surgery during rest of the procedure.^{13,14} Infact the surgeon could easily perform the surgery in a blocked eye due to akinesia and anaesthesia, leading to less of intraoperative complications like posterior capsular tear or rupture.

While topical anaesthesia (group A) though was painless, but it accentuated the anxiety and discomfort during the entire surgery.^{15,16} The surgeon had to repeatedly ask for the cooperation of the patient to keep the eye in desired position. It has been speculated that the apprehensions and anxiety of the patient during the surgery, causes increased eye squeezing, escalating the intraocular pressure and eventually leading to the forward movement of posterior capsule (Table 9).¹⁷ Stupp et al apprised that the rate of intraoperative complications were minimal in both the groups, but old age increased the risk in group A.¹⁸

The surgeon satisfaction was more with Peribulbar block as compared with the topical, owing to the fact that peribulbar block causes minimal intraoperative eye movements, steady fixation and better surgical control. This in turn leads to lesser intraoperative complications, satiating the Operating surgeon. On the other hand, patient satisfaction was more with Topical anaesthesia as it avoided the injection as well as the injection related complications.

Group B displayed higher degree of postoperative inflammation like chemosis, ecchymosis, subconjunctival hemorrhage as compared to group A (Table 10). The duration of surgery and final visual outcome was not found to be statistically significant between the two groups.

The choice of anaesthesia for phacoemulsification is still debatable as several studies report conflicting results.¹⁹⁻²²

The limitation of this study was short study duration and a small sample size.

CONCLUSION

Recent times have ushered topical anaesthesia as the most common employed anesthetic agent in phacoemulsification, as compared to the peribulbar block. Though topical anaesthesia gives pain and discomfort to the patient, yet it eliminates the risk of injection related complications. The use of supplementary medication to reduce pain as well as good counselling of the patient can enable technique of topical phacoemulsification to scale great heights.

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REFERENCES

1. Surgical Operations and procedure statistics. Available at https://ec.europa.eu/eurostat/statistics-explained/index.php/Surgical_operations_and_procedures_statistics (Last accessed on February 23'2020)
2. Hamilton R C. Complications of ophthalmic regional anesthesia. In: Kumar CM, Dodds C, Fanning GL, eds. *Ophthalmic anesthesia*. Lisse, Netherlands: Swets&Zeitlinger, 2002:181–196.
3. Davis DB 2nd, Mandel MR. Posterior peribulbar anesthesia: an alternative to retrobulbar anesthesia. *J Cataract Refract Surg*. 1986; 12:182–184. doi:10.1016/s0886-3350(86)80040-2
4. Kershner RM (1993) Topical anesthesia for small incision self-sealing cataract surgery. A prospective evaluation of the first 100 patients. *J Cataract Refract Surg* 19: 290–292.,
5. Yopez J, Cedeno de Yopez J & Arevalo JF (1999) Topical anesthesia for phacoemulsification, intraocular lens implantation and posterior vitrectomy. *J Cataract Refract Surg* 25: 1161–1164.
6. Eke T, Thompson JR. Serious complications of local anesthesia for cataract surgery: a 1 year national survey in the United Kingdom. *Br J Ophthalmol*. 2007; 91:470–475. doi:10.1136/bjo.2006.106005
7. Lee RM, Thompson JR, Eke T. Severe adverse events associated with local anesthesia in cataract surgery: 1 year national survey of practice and complications in the UK. *Br J Ophthalmol*. 2016; 100:772–776. doi:10.1136/bjophthalmol-2015-307060

8. Duguid I, Claoué C, Thamby-Rajah Y, et al. Topical anesthesia for phacoemulsification surgery. *Eye* 1995;9:456-459
9. Gupta SK, Kumar A, Agarwal S. Cataract surgery under topical anesthesia using 2% lignocaine jelly and intracameral lignocaine: Is manual small incision cataract surgery comparable to clear corneal phacoemulsification? *Indian J Ophthalmol* 2010;58:537-540
10. Apil A, Kartal B, Ekinci M, et al. Topical anesthesia for cataract surgery: the patients' perspective. *Pain Res Treat*. 2014; 2014:827659. doi:10.1155/2014/827659
11. Dadaci Z, Borazan M, ÖncelAcir N. Pain perception in phacoemulsification with topical anesthesia and evaluation of factors related with pain. *Turk J Ophthalmol*. 2016; 46:151–155. doi:10.4274/tjo.13914
12. Sharma YR, Vajpayee RB, Bhatnagar R, et al. A simple accurate method of cataract classification Cataract I. *Indian J Ophthalmol* 1989;37:112-11713.
13. Hamilton RC. Brain stem anesthesia following retro bulbar blockade. *Aesthesiology*. 1985;63:688-90.
14. Hamilton RC, Gimbel HV. Regional anesthesia for 12000 cataract extraction and IOL. *Can J Anaesth*. 1988;35:615-23.
15. Fichman RA. Topical technique appear safer in patient with anticoagulant Anesthesia. *Intensive Care*. 2001;29:8-11.
16. Bardocci A, Lofoco G, Perdicaro S, Ciucci F, Manna L. Lidocaine 2% gel versus lidocaine 4% unpreserved drops for topical anesthesia in cataract surgery: a randomized controlled trial. *Ophthalmology*. 2003;110:144-9.
17. Monestam E, Kunsik M. Prelimbal topical anesthesia was an effective and easy. *Sweden Cataract Refer Surg*. 2000;26:1403-8.
18. Stupp T, Hassouna I, Soppart K, Thanos S, Förster W. Systemic adverse events: A comparison between topical and peribulbar anaesthesia in cataract surgery *Ophthalmologica*. 2007;221:320–5
19. Boezaart A, Berry R, Nell M. Topical anesthesia versus retrobulbar block for cataract surgery: The patients' perspective. *J Clin Anesth*. 2000;12:58-60.
20. Johnston RL, Whitefield LA, Giralt J, Harrun S, Akerele T, Bryan SJ, et al. Topical versus peribulbar anesthesia, without sedation, for clear corneal phacoemulsification. *J Cataract Refract Surg*. 1998;24:407-10.
21. Khezri MB, Merate H. The effects of melatonin on anxiety and pain scores of patients, intraocular pressure, and operating conditions during cataract surgery under topical anesthesia. *Indian J Ophthalmol*. 2013;61:319-24.
22. Trikha S, Turnbull AM, Morris RJ, Anderson DF, Hossain P. The journey to femtosecond laser-assisted cataract surgery: New beginnings or a false dawn? *Eye (Lond)*. 2013;27:461-73.