

Original Research Article

Comparison of topical versus peribulbar anaesthesia for manual small incision cataract surgery with intraocular lens implantation

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ABSTRACT

Background: Manual small incision cataract surgery (MSICS) is an alternative to phacoemulsification for high volume cataract surgery especially in developing countries. Aim of this study is to compare patient and surgeon satisfaction, anaesthesia related and post-operative complications following topical (TA) versus peribulbar anaesthesia (PA) for MSICS with intraocular lens (IOL) implantation.

Methods: Observational study was done over a period of six months. Patients who underwent MSICS under TA and PA were prospectively evaluated for satisfaction with anaesthesia intraoperatively and four hours after surgery through a questionnaire. Any intraoperative or post-operative complications were also assessed. Surgeon satisfaction was also assessed by a questionnaire.

Results: Out of 62 patients 28 underwent MSICS under TA and 34 patients under PA. There was no significant difference in age and co-morbidities between two groups. 88.24% had mild pain and 11.76% had moderate pain during PA which was statistically significant ($P < 0.05$). 17.9% patients in TA group had mild pain at 4 hours while only 2.9% patients in PA group had pain ($p < 0.05$). The intra operative complications were not significant. There was no statistically significant difference in post-operative complications and surgeon satisfaction between two groups.

Conclusions: Although the administration of PA is painful compared to TA, the patient satisfaction was more post operatively in PA group. TA is a safe and effective alternative to PA in MSICS with proper selection and education of patient.

Keywords: Manual small incision cataract surgery, Peribulbar anaesthesia, Topical anaesthesia

INTRODUCTION

Refinements in cataract surgery techniques have led to faster visual rehabilitation, improved patient comfort and surgeon satisfaction. With the advent of phaco with foldable IOL, changes have occurred in the delivery of anaesthesia from peribulbar anaesthesia, parabulbar or sub tenon block to topical anaesthesia.

Peribulbar injection of anaesthetic agent has been used for many decades but is associated with a high risk of injury to intraorbital structures. Topical anaesthesia is being widely used in phaco with foldable IOL and several

studies have been conducted to assess patient and surgeon satisfaction following TA versus PA for phacoemulsification.^{1,2}

Manual small incision cataract surgery is a suitable alternative technique for high volume cataract surgery especially in developing countries. It is cost effective and the manipulation during surgery is considerably less compared to the conventional extra capsular cataract extraction (ECCE). This has led to the use of topical anaesthesia with various modifications in MSICS ensuring patient comfort and surgeon satisfaction comparable to phacoemulsification. This study aims to

compare the patient and surgeon satisfaction, anaesthesia related and post-operative complications following topical (TA) versus peribulbar anaesthesia (PA) for manual small incision cataract surgery (MSICS) with intra ocular lens implantation.

METHODS

This observational study was conducted in the department of Ophthalmology over a period of six months. Institutional ethics committee approval was obtained. Written informed consent was taken from all patients. Adult patients who were selected for MSICS with posterior chamber intraocular lens (PCIOL) implantation comprised the study population.

Patients were included if they were above 40 years old with uncomplicated senile cataract and without a history of previous ocular co-morbidities, injury or surgery. Uncooperative patients, patients with allergy to lignocaine, bupivacaine or proparacaine, anterior segment pathology, anxiety, dementia, deafness and ocular movement disorders were excluded from the study. Patients were randomly assigned to each group to be operated upon by four surgeons.

Pre-operative preparation included instillation of topical antibiotic, followed by a combination of tropicamide 0.8% and phenylephrine 5% and flurbiprofen eye drops for dilatation of pupil. Anti-anxiety drug alprazolam 0.25mg was given the previous night.

Before start of surgery betadine 5% drops was instilled 2 times into conjunctival sac. For the TA group one drop of proparacaine hydrochloride 0.5% was instilled 4 times at an interval of 5 minutes before the start of surgery For the PA group combination of 4 ml of 2% lignocaine (in which 1500 IU hyaluronidase was mixed) and 2 ml of 0.5% bupivacaine was injected using 23G, one inch needle. The needle was inserted at the junction of middle and outer third of lower orbital margin and directed towards the floor of orbit. The eyelid was closed and intermittent massage was given for 5 minutes.

The surgical procedure did not vary between the two study groups. In PA group the globe was fixed by superior rectus bridle suture. In both groups conjunctiva was incised either superiorly or temporally, bleeding

vessels were cauterised followed by creation of 5-7 mm sized sclero corneal tunnel incision. A single side port incision of 0.8mm size was created, followed by injection of visco-elastic substance into anterior chamber and continuous curvilinear capsulorrhexis.

Wound extension was done followed by hydrodissection, delivery of lens nucleus, aspiration of remaining cortical lens material and in the bag implantation of 5.5 or 6 mm rigid PC IOL. The residual viscoelastic material was aspirated and wound approximated. Topical anaesthesia was supplemented by intra cameral preservative free 1% lignocaine, 0.5ml through side port before capsulorrhexis. Intraoperative heart rate, blood pressure and respiratory rate were monitored.

After surgery patients were asked to grade the pain during administration of anesthetic, during surgery and 4 hours post operatively. For that purpose a 10 point visual analog scale was used, where 0,1=no pain, 2,3,4=mild pain 5,6,7=moderate pain 8,9,10=severe pain. Post operatively patients who complained of moderate pain were given oral analgesics.

The surgeon was also requested to grade any difficulties encountered during surgery based on patient cooperation (excellent, good, poor) difficulty due to ocular movements(no difficulty, some difficulty, great difficulty) and anterior chamber stability(excellent, good, poor) using a 4 point scale where 1=no difficulty,2=mild difficulty, 3=moderate difficulty, 4=extremely difficult.

Statistical analysis

The data was analysed using statistical package for social studies (SPSS 16). Analysis was done using Mann-Whitney Test and p value <0.05 was taken significant.

RESULTS

Out of 62 patients, 28 underwent manual SICS under TA and 34 under PA. In PA group 10 patients were males and 18 were females. In TA group 8 patients were males and 26 were females. In TA group age varied between 45 to 85 with a mean age of 63 whereas in PA group it varied from 49 to 89 with an average age of 65.21. There was no significant difference in age, and co-morbidities between two groups.

Table 1: Pain during anaesthesia.

Pain score	TA		PA	
	Number	Percentage %	Number	Percentage %
No	28	100	0	0
Mild	0	0	30	88.24
Moderate	0	0	4	11.76
Total	28		34	

Table 2: Intra operative pain score during TA and PA.

Pain score	TA		PA	
	Number	Percentage %	Number	Percentage %
No	10	35.7	10	29.4
Mild	15	53.57	21	61.76
Moderate	3	10.7	3	8.8
Total	28		34	

During anesthesia none of the patients in TA group complained of pain whereas 30 (88.24%) had mild pain varying from 2 to 4 in the visual analog scale and 4 (11.76%) patients had moderate pain during needle insertion in PA group.

There was statistically significant difference between two groups with p value <0.05 (Table 1). Intra operatively 15 patients (53.57%) experienced mild pain, the score varying from 2-4 in the visual analog scale in TA group compared to 21 (61.76%) in PA group. This was not statistically significant. 35.7% in TA and 29.4% in PA

had no pain.10.7% in TA group experienced moderate pain compared to 8.8% in PA group (Table 2).

Four hours post operatively 17.9% in TA had mild pain compared to 2.9% in PA (p<0.05) which was statistically significant.

22 patients (78.57%) in TA group had no pain while 31 (91.17%) in PA group did not complain of pain 4 hours postoperatively. 5.8% of patients in PA group experienced moderate pain compared to 3.57% in TA group (Table 3).

Table 3: Pain score 4hours postoperatively in TA and PA.

Pain score	TA		PA	
	Number	Percentage %	Number	Percentage %
No	22	78.57	31	91.17
Mild	5	17.9	1	2.9
Moderate	1	3.57	2	5.8
Total	28		34	

Table 4: Comparison of post-operative complications.

Post-operative complications	TA		PA	
	Number	Percentage %	Number	Percentage %
Corneal haze	4	14.3	6	17.64
Sub conjunctival haemorrhage	16	57.1	28	82.35
Chemosis	2	7.1	18	52.9

Post operatively sub conjunctival haemorrhage and chemosis was significantly more in PA group compared to TA group (p value<0.05) (Table 4). None of the patients in TA group developed intra operative complication, compared to PA group where two patients had posterior capsular rent during surgery.

9 patients (32.1%) had blood pressure (BP) variation ranging from 10- 20mm hg systolic and diastolic BP in TA group. In PA group 11 patients (32.4%) had similar variation in blood pressure. The response to questions related to surgeon satisfaction while performing surgery suggested that there is no significant difference between the TA and PA group.

DISCUSSION

With the introduction of small multiplanar, self-sealing incision very little manipulation is needed which resulted in the wide spread acceptance of subtenon, and topical anesthesia in cataract surgery.^{3,4} Peribulbar anesthesia involves administration of anesthetic agent into the peripheral space of orbit and achieves good ocular akinesia and anesthesia .However administration of PA is painful.

In present study 88% of patients had mild pain and 11.76% had moderate pain during peribulbar anaesthesia while none of the patients in TA group complained of

pain. This is consistent with other studies in which this was the main reason for negative feedback from patients.⁵⁻⁷ The pain was more during insertion of needle for PA. A Study by Kuldeep Dole et al has reported that 89% of PA patients had pain during needle insertion.¹

TA can be in the form of eye drops or viscous gel. TA agents block trigeminal nerve endings in cornea and conjunctiva only and intra ocular structures are not anesthetized. So patient may experience pain or discomfort during manipulation of iris and stretching of ciliary zonules during surgery. The addition of intracameral anesthesia during surgery greatly improves patient comfort and surgeon satisfaction.⁸ Akinesia is not considered by many surgeons as an important requirement for cataract surgery.

There was no significant difference in intra operative pain in our study. Intra operatively 53.57% experienced mild pain in TA group compared to 61.76% in PA group which was not significant. This is consistent with observation of Pablo et al, Sauder et al and Nauman et al but other studies have reported more intra operative pain in patients receiving TA compared to PA.^{2,9-11}

Four hours post operatively pain was significantly less ($p < 0.05$) in PA group compared to TA in our study. This was consistent with other studies which reported that feeling of pain and discomfort was lower in PA compared to TA four hours post operatively.¹² The intra operative complications were not significant in present study. In our study there was no significant difference in level of surgeon satisfaction between the TA and PA groups. The addition of intracameral lignocaine may be the cause for this. Pablo LE et al also noted that addition of intracameral lidocaine improved patient and surgeon comfort.¹³ Dole et al reported that surgeon comfort was more on operating patients with PA compared to TA.¹ But Johnston et al in their study noted that phaco emulsification under TA resulted in no difficulties or complications.¹⁴ Post operatively chemosis and subconjunctival haemorrhage was significantly more in PA group compared to TA ($p < 0.05$) in our study which is comparable with other studies.¹⁵

The limitation of our study was that there could be bias from patient satisfaction score recorded. Also some cases of TA and PA were done by an experienced cataract surgeon. This may have limited the assessment of surgeon satisfaction.

Patient safety and comfort, anaesthesia efficacy and surgeon's expertise are all important factors in determining the use of anaesthesia technique in cataract surgery.¹⁶ In recent years topical anaesthesia for cataract surgery has gained popularity. Complications of peribulbar and retrobulbar anesthesia include chemosis, retrobulbar haemorrhage, and penetration of globe, intrathecal injection and optic nerve damage- directly or

by vascular occlusion. Inadvertent intravascular injection of anesthetic agent can be fatal.

The benefits of TA over PA are that there is no risk of needle technique and globe penetration, analgesia is immediate, there is no rise in intra ocular pressure and no need for pre-operative sedation.¹⁷ Additional use of intracameral preservative free lignocaine improved the patient and surgeon comfort. However PA is definitely considered in certain conditions like complicated cataract surgery that needs iris manipulation and total akinesia.¹⁶

Lack of akinesia is a drawback of TA. But it does not cause any difficulty to experienced surgeons. There are some reports of allergy due to use of topical proparacaine drops.¹⁸ Prolonged use of TA can be toxic to corneal epithelium causing temporary haziness of cornea making surgery difficult, corneal erosion or delayed wound healing. To avoid complications and to detect any systemic adverse events the patients must be monitored carefully after administration of anesthesia and also during surgery. In present study there were no local and systemic complications due to anesthesia.

CONCLUSION

Patient satisfaction was significantly more in PA group post operatively although the administration of PA had caused mild to moderate pain and discomfort. There is no difference in surgeon satisfaction between the two groups. TA is a safe and effective alternative to PA in MSICS. Patient satisfaction can be improved with addition of intracameral preservative free lignocaine, proper selection and education of patients.

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REFERENCES

1. Dole K, Kulkarni S, Shisode KD, Deshpande R, Kakade R, Khanderkar R, et al. Comparison of clinical outcomes, patient and surgeon satisfaction following topical versus peribulbar anaesthesia for phacoemulsification and intraocular lens implantation: A randomised, controlled trial. *Indian J Ophthalmol.* 2014;62:927-30.
2. Nauman A, Zahoor A, Saeed AM, Saba J, Waleed R. satisfaction level with topical vs peribulbar anesthesia experienced by same patient for phacoemulsification: *Saudi J Anesthesia.* 2012;6:363-6.
3. Canavan KS, Dark A, Garrioch MA. Sub-Tenon's administration of local anaesthetic: a review of the technique. *Br J Anaesth.* 2003;90:787-93.
4. Kershner RM. Topical anesthesia for small incision self-sealing cataractsurgery. A prospective

- evaluation of the first 100 patients. *J Cataract Refract Surg.* 1993;19: 290-2.
5. Ahmad N, Zahoor A, Motowa SA, Jastaneiah S, Riad W. Satisfaction level with topical anaesthesia experienced by same patient for phacoemulsification. *Saudi J Anaest.* 2012;6:363-6.
 6. Zhao LQ, Zhu H, Zhao PQ, Wu QR, Hu YQ. Topical anaesthesia versus regional anaesthesia for cataract surgery: A meta-analysis of randomized controlled trials. *Ophthalmology.* 2012;119:659-67.
 7. Kallio H, Uusitalo RJ, Maunuksela EL. Topical anaesthesia with or without propofol sedation versus retrobulbar/peribulbar anaesthesia for cataract extraction: Prospective randomized trial. *J Cataract Refract surgery.* 2001;1372-9.
 8. Gills JP, Cherchio M, Raanan MG. Unpreserved lidocaine to control discomfort during cataract surgery using topical anaesthesia. *J Cataract Refract Surg.* 1997;23:545-50.
 9. Pablo LE, Ferreras A, Perez-Olivan S, Polo V, Honrubia FM. Comparison of the efficacy and safety of contact versus peribulbar anaesthesia in combined eye surgery. *Ophthalmologica.* 2009;223:60-7.
 10. Sauder G, Jonas JB. Topical versus peribulbar anaesthesia for cataract surgery. *Acta Ophthalmol Scand.* 2003;81:596-9.
 11. Fukasaku H, Marror JA. Pinpoint anaesthesia; a new approach to local ocular anaesthesia. *J Cataract Refract surg.* 1994;20:468-71.
 12. Syed Z, Malik TM, Malik AM, Khan DA, Ejas U, Farooq A. Peribulbar versus topical anaesthesia for cataract surgery; Patient's satisfaction. *Pak J Ophthalmol.* 2014;30(2).
 13. Pablo LE, Ferreras A, Perez-Olivan S, Larrosa JM, Gomez ML, Honrubia FM. Contact-topical plus intracameral lidocaine versus peribulbar anaesthesia in combined surgery. A randomized clinical trial. *J Glaucoma.* 2004;13:510-5.
 14. Johnston RL, Whitefield LA, Giralt J, Harrun S, Akerele T, Bryan SJ, et al. Topical versus peribulbar anaesthesia, without sedation, for clear corneal phacoemulsification. *J Cataract Refract Surg.* 1998;24:407-10.
 15. Heurmann T, Anders N, Rieck P, Hartmann C. Peribulbar anaesthesia versus topical anaesthesia in cataract surgery: comparison of the post-operative course. *Ophthalmologie.* 2000;97:189-93.
 16. Malik A. Efficacy and Performance of Various Local Anaesthesia Modalities for Cataract Surgery. *J Clinic Experiment Ophthalmol.* 2013. S1:007. doi:10.4172/2155-9570.S1-007.
 17. Jacobi PC, Dietlein TS, Jacobi FK. A comparative study of topical vs retrobulbar anaesthesia in complicated cataract surgery. *Arch Ophthalmology.* 2000;118:1037-43.
 18. Dannaker CJ, Maibach HI, Austin E. Allergic contact dermatitis to proparacaine with subsequent cross-sensitization to tetracaine from ophthalmic preparations. *Am J Contact Dermat.* 2001;12:177-9.

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