

COMPARISON OF PERIBULBAR ANAESTHESIA WITH TOPICAL ANAESTHESIA IN
SMALL INCISION CATARACT SURGERYDr. Smita Narayan^{1*} and Dr. Mallika V.²¹Additional Professor of Ophthalmology, Govt. Medical College, MG Kavu, Thrissur.²Assistant Professor of Ophthalmology, Govt. Medical College, MG Kavu, Thrissur.

*Corresponding Author: Dr. Smita Narayan

Additional Professor of Ophthalmology, Govt. Medical College, MG Kavu, Thrissur.

Email ID:

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ABSTRACT

Aim: To compare the efficacy of peribulbar with topical anaesthesia using Lignocaine 2% drops and jelly in manual small incision cataract surgery by quantitatively assessing both, the pain scores of the patient and the surgeon's satisfaction. **Materials and Methods:** This was a randomized comparative study. The first 150 eyes of 148 patients were chosen. They were operated by two experienced surgeons. 5ml of 2% Lignocaine with adrenalin and 2ml of 0.5% Bupivacaine was given as peribulbar anaesthesia. 4% Lignocaine drops followed by Lignocaine 2% jelly was used as topical anaesthesia. Patients were assessed during various steps of the surgery and then 4 hours after surgery using the modified visual analogue pain scale. After each surgery surgeon's experience was assessed based on patient's cooperation, difficulty due to ocular movements and Anterior chamber stability. Data was analysed using appropriate statistical methods and using Chi-square test and p-values to compare the two groups. **Results:** There were 78 eyes were in peribulbar group and 72 in the topical group. Grade 0-1 pain was in 96% in peribulbar group and 100% in topical anaesthesia group. The mean pain score 4 hours after surgery was significantly higher with the topical group as compared to the peribulbar group ($p=0.00...$). Surgeons evaluation of the efficacy of anaesthesia indicates that unwanted ocular movements significantly decreased the surgeon's satisfaction ($p=0.00073$). **Conclusion:** Topical anaesthesia in the form of Lignocaine drops and jelly is an effective alternative to peribulbar anaesthesia for small incision cataract surgery.

KEYWORDS: Peribulbar Anaesthesia, Topical Anaesthesia, Small Incision Cataract Surgery

INTRODUCTION

The rapid advances of cataract surgery have necessitated that the techniques of anaesthesia be comfortable for the patient and also are with minimal complications. Retrobulbar anaesthesia has given way to peribulbar anaesthesia which is now one of the most preferred means of anaesthesia for cataract surgery. However topical anaesthesia is rapidly catching up. The self-sealing incision of manual small incision cataract surgery has considerably shortened the duration of surgery.^[1] This has resulted in the use of shorter acting anaesthetic agents with less invasive methods of administration.^[1,3] Further small incision cataract surgery is the most cost effective of all surgical interventions for cataract in terms of quality of life restored.^[2]

The aim of this study is to compare the efficacy of peribulbar with topical anaesthesia in manual small incision cataract surgery by quantitatively assessing both, the pain scores of the patient and the surgeon's satisfaction. To the best of our knowledge no such comparative study has been performed where Lignocaine jelly was used for topical anaesthesia.

MATERIALS AND METHOD

A randomised comparative case series study was conducted between June 2009 and August 2009 in the Department of Ophthalmology, Government Medical College, Thrissur.

Assuming 90% power and 95% level of significance and also assuming that there would be no pain in 40% and 60% of cases by topical and peribulbar technique, it was found that each arm should have a minimum of 58 patients. Assuming loss of 20% to follow up, the study aimed to randomise 150 patients though 144 would have been sufficient. The first 150 eyes of 148 patients were recruited for the study. The exclusion criteria were:

1. Age less than 30 and more than 90 years.
2. Sensitivity to Xylocaine
3. High risk patients with history of CAD or CVA.
4. Patients who prefer Phacoemulsification
5. Patients with previous intraocular injury or inflammation or surgery.
6. Poorly dilating pupil
7. Inability to understand the visual analog pain scale

8. Inability to understand and comply with verbal commands (e.g. those with deafness dementia or aphasia).

Informed consent was obtained after a full discussion of the procedure with the patient. Patients underwent full preoperative evaluation including history and ophthalmological examination. The randomisation schedule was obtained from a table of random numbers for each surgeon.

They were operated by two experienced surgeons who each had done more than 1000 cataract surgeries with peribulbar anaesthesia and 100 surgeries each under topical anaesthesia. Pre operatively pupillary dilatation was achieved by using Tropicamide 0.8%, Phenylephrine 5% and Flurbiprofen 0.03% drops.

The peribulbar block was given by a senior resident who had a previous experience of more than 500 blocks. The technique of peribulbar anaesthesia is as follows: 5ml of 2% Lignocaine with 1: 10,000 Adrenaline and 2ml of 0.5% Bupivacaine was injected using a 24 G needle at the junction of middle and outer one thirds of the orbital margin with the needle kept parallel to the floor of the orbit. A supplementary injection of 2ml of the solution was given between the caruncle and supraorbital notch with the needle directed parallel to the orbital roof, if necessary. The eyelid was closed and pressure applied to the eyeball intermittently for 3-5 minutes.

Topical anaesthesia was in the form of Lignocaine eye drops applied once about 3 minutes prior to insertion of the eye speculum and then by pouring Lignocaine 2% jelly on the exposed ocular surface.

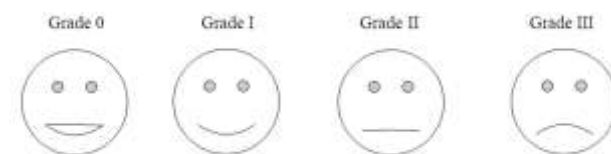
For both modes of anaesthesia the patient was instructed to look at the operating microscope light and the surgery was started. No superior rectus suture was taken. The sclera was exposed by taking a fornix based conjunctival flap and the bleeding vessels were cauterized with a bipolar wet field cautery. The rest of the steps were same as for any small incision cataract surgery with intraocular lens implantation.

At the start of surgery, the patients were instructed to hold the hand of the paramedical staff and to squeeze it whenever they felt pain. This was then recorded with the surgical step during which they felt pain. The patient was asked for pain during surgery and 4 hours after surgery using the modified visual analog pain scale.^[5]

After each surgery the surgeon evaluated her experience based on 3 parameters namely patient cooperation, difficulty due to ocular movements and anterior chamber stability which were graded on a scale of 1 to 3 with a cumulative range of minimum 3 and maximum 9 points. The fourth parameter was adverse events which were mentioned as and when they happened.

Data was entered in an Excel sheet and analyzed using Statistical Package for Social Sciences (SPSS version 10) software for analysis. The mean, standard deviation, difference of mean and the 95% confidence intervals were calculated. For qualitative variables, the odd's ratio and a 95% CI were calculated.

Modified visual analog pain scale



RESULTS

There were 78 eyes in the peribulbar group and 72 eyes in the topical group (Table 1). There were no statistically significant differences in the patient profile between groups. None of the patients in the topical group received supplemental anaesthesia.

Table 1: Anaesthetic technique used by each surgeon.

Surgeon	Peribulbar	Topical	Total
A	43	35	78
B	35	37	72

95% of the patients experienced pain during needle insertion in the peribulbar group while none of the patients in the topical group had pain during administration of anaesthesia. Table 2 shows the various grades of pain during surgery in both the groups. Pain was mild (Grade 0 and 1) in 96% in peribulbar group and in 100% in topical group. The 3 patients who felt moderate pain in peribulbar group had increased intraorbital pressure. The score was higher in the peribulbar group though not statistically significant.

Most of the patients felt pain during prolapsing of the nucleus into the anterior chamber and during stretching of the wound while delivering the nucleus in both groups.

Table 2: Pain during surgery.

	Peribulbar	Topical
Grade 0	66	64
Grade 1	9	8
Grade 2	3	0
Grade 3	0	0

Table 3 describes pain 4 hours after surgery. 3 patients in peribulbar group reported Grade 2 pain 4 hours after surgery compared to 2 patients in the topical group. However 70 patients had no pain 4 hours after surgery in peribulbar group while only 24 had no pain in topical group. This was statistically significant (p value = 0.0000 [95% CI: 0.002-0.004]).

Table 3: Pain 4 hours after surgery.

Grade	Peribulbar	Topical
Grade0	70	24
Grade1	5	46
Grade2	3	2

Table 4: Surgeon's score in Peribulbar anaesthesia.

Surgeon's score	Patient cooperation	Unwanted ocular movements	Anterior chamber stability
1	74	57	72
2	2	14	1
3	2	7	5

Table 5: Surgeon's score in Topical anaesthesia.

Surgeon's score	Patient cooperation	Unwanted ocular movements	Anterior chamber stability
1	69	69	70
2	2	2	0
3	1	1	2

	Patient cooperation	Unwanted ocular movements	Anterior chamber stability
P value	0.87	0.00073 (significant)	0.30
Chi square test	0.02	11.3	1.05

There was no significant difference in both groups with regards to uncorrected and corrected visual acuity. 73/78(93.58%) patients in peribulbar group and 67/72(93.05%) in topical group had Best Corrected Visual Acuity 6/9 or better.

The average time taken for surgery from insertion of eye speculum to taking it off after completion of surgery was 7 minutes.

DISCUSSION

Koller was the first to use cocaine as topical anaesthesia in the eye in 1884. Fichman reintroduced it for cataract surgery in 1992.^[5] Amar Agarwal has even described a no anaesthesia cataract surgery which although without side effects is very stressful for the surgeon.^[6]

Topical anaesthesia is used to block the afferent nerves of the cornea and conjunctiva. This however does not eliminate the pain sensitivity of iris, zonules and ciliary body. There is also no akinesia. Peribulbar block leads to deposition of the local anaesthetic in the Orbicularis oculi muscle which blocks the ciliary nerve and the cranial nerves III and VI.

Various studies have been conducted to compare the role of anaesthetic techniques in Phacoemulsification. This is

a machine enabled process utilizing a clear corneal incision with minimal or no stretching of the section. Johnson et al had a pain score of 0.84(SD±1.30 range 0-7) for peribulbar group and 0.73(SD±1.5, range 0-5) for topical group.^[7] In a similar study Saunderson et al showed that pain score did not differ significantly between the two groups ($p=0.54$).^[8] Extrapolating our results to compare with these studies we find that our pain scores are comparable. Our surgery, on the other hand was small incision cataract surgery.

Small Incision cataract surgery is a surgeon intensive procedure involving construction of a scleral tunnel and stretching of the wound during nucleus delivery. Our scores for topical compare well with Gupta et al (0.7) and Mithal et al (0.82).^[9, 10] However they had supplemented the procedure with intracameral or subtenon Lignocaine.^[11]

This study compares the role of topical and peribulbar techniques in Small Incision cataract Surgery where the painful step of passing the superior rectus bridle suture has been eliminated. The dilatation of the pupil using Tropicamide (0.8%) with Phenylephrine (5%) prior to the surgery is also a very important procedure to decrease pain in both methods. The fact that the time taken for surgery is less than 7 minutes is also contributory to the success of surgery under topical anaesthesia.

Our study has used only Lignocaine gel for topical anaesthesia. There has been no unwanted effect of the gel preparation of the drug on Extracapsular cataract surgery and phacoemulsification.^[13, 14] Gupta et al used intracameral 0.5% Lignocaine in addition to the Lignocaine gel for topical anaesthesia and obtained similar results.^[11]

The mean pain score 4 hours after surgery was much higher with the topical group as compared to the peribulbar group. This is self-explanatory as peribulbar has a longer duration of action. The pain was easily controlled with systemic NSAID. None of the studies give details of pain scores 4 hours after surgery.

Surgeon's evaluation of the efficacy of anaesthesia indicates that patient cooperation was around 96.5% in both the techniques. Increase in intraorbital pressure was seen in 3 patients in the peribulbar group which led to anterior chamber instability. Only 2 patients in the topical group had less anterior chamber stability which can be attributed to buttonholing of the incision and loss of the self-sealing nature of the incision in one. The cause was unknown in the second patient. The excellent patient cooperation was acquired by strictly adhering to the selection criteria. The incomplete akinesia is not exactly unwanted as the patient is able to follow the surgeon's instructions very well. Surgeons were not satisfied with the level of anaesthesia [Odds ratio 2.1

(95% CI: 1.3-3.5)] in the topical group compared to the peribulbar group in the study by Dole *et al.*^[12]

Fichman found no major changes in pulse rate, blood pressure and respiration rate of patients during surgery under topical anaesthesia.^[15] There is also no significant change in plasma cortisol levels during surgery under topical anaesthesia. This shows that the patient is not under any undue stress when using topical anaesthesia.

At the time of anaesthetic administration, topical anaesthesia scores much higher than peribulbar anaesthesia. The risk of globe perforation, Optic nerve injury, pain and fear of the needle are all eliminated with topical anaesthesia

Zavar and Kolte highlighted the use of topical Lignocaine jelly in medically high risk cardiac patients e.g. those with ectopic beats, old myocardial infarction and ischaemic heart disease.^[16] This obviates peribulbar anaesthesia with attendant use of adrenaline in the anaesthetic agent.

The limitations of our study include the subjective nature of the modified visual analog pain scale and the fact that the surgeries were done at a single center by only two surgeons.

CONCLUSIONS

Topical anaesthesia in the form of Lignocaine drops and jelly is an effective alternative to peribulbar anaesthesia for small incision cataract surgery.

Surgeons found it much easier to operate with peribulbar anaesthesia as compared to topical anaesthesia.

Pain 4 hours after surgery was much higher in the topical group as compared to the peribulbar group.

The risk of globe perforation, Optic nerve injury, pain and fear of the needle are all eliminated with topical anaesthesia and it can be safely used in cardiac patients.

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