Original Article

Comparing Retrobulbar and Topical Anaesthesia in Cataract Surgery

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ABSTRACT

Objective: To evaluate and compare perioperative and anesthetic complication and surgeon satisfaction in retrobulbar injection of anesthetic agent and topical anesthesia for cataract surgery.

Study Design: Randomized Control Trial study.

Place and Duration of Study: This study was conducted at the Department of Anaesthesia and Ophthalmology Nishtar Hospital, Bakhtawar Amin Medical and Dental College Multan and Shahida Islam Medical College, Lodhran from April 2017 to April 2018.

Materials and Methods: Adult patients of age limit from 35 to 60 years who were selected for cataract surgery were included. Patients were divided into two groups with computer randomization system. Preoperative, post-operative complication pain score and surgeon satisfaction are main outcome variables. SPSS version was used to analyze data. P value ≤ 0.05 was considered as significant.

Results: Three hundred patients were included in this study of both genders. Capsular tear, zonular tear and vitreous loss for the patients who received topical anesthesiawas noted as n=3 (2%), n=7 (4.7%) and n=2 (1.3%) respectively. Chemosis, periorbital hematoma, subconjunctival hemorrhage and supplement periocular anesthesiafor the patients who received topical anesthesiawas observed as n=13 (8.7%), n=8 (5.3%), n=14 (9.3%) and n=19 (12.7%) respectively. Corneal edema, wound leak and IOP >30 mm Hgfor the patients who received topical anesthesiawas noted as n=2 (1.3%), n=4 (2.7%) and n=14 (9.3%) respectively. While, capsular tear, zonular tear and vitreous loss for the patients who received retrobulbar anesthesia was noted as n=6 (4%), n=7 (4.7%) and n=4 (2.7%) respectively. Chemosis, periorbital hematoma, subconjunctival hemorrhage and supplement periocular anesthesia for the patients who received retrobulbar anesthesia was observed as n=12 (8%), n=8 (5.3%), n=12 (8%) and n=4 (2.7%) respectively. Corneal edema, wound leak and IOP >30 mm Hg for the patients who received retrobulbar anesthesia was noted as n=2 (1.3%), n=7 (4.7%) and n=7 (4.7%) respectively. Supplement periocular anesthesia and IOP >30 mm Hg was statistically significant (p=0.000) and (p=0.000) respectively.

Conclusion: This study reveals that surgeon satisfaction is almost similar in both topical and retrobulbar anesthesia groups, pain score is slightly high in topical anesthesia but safety from complications in topical aesthesia is high as compare to retrobulbar group.

Key Words: Retrobulbar anesthesia, Topical Anaesthesia, Cataract Surgery, Pain score.

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INTRODUCTION

Use of anesthetic agents in retrobulbar injection for cataract surgery has been in practice from a long time[1]. On the other hand lot of modalities has been evolved to reduce the risk of intra orbital structure damage because the blind insertion of infraorbitalneedles into retrobulbar space are not safe[2]. Another attractive alternative of local anesthetic agent is topical anesthesia which was first used by Fichman.

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Topical use of anesthesia results high patient satisfaction due to fast recovery of vision[3].

Topical anesthesia have many advantages over retrobulbar injection like easy to apply, rapid Onset of anesthesia, no discomfort on administration and no risk of injection complications[4,5]. Another important difference is that it is more economical, rapid visual recovery and minimal cosmetic results[6]. Topical anesthesia only acts on trigeminal nerve and provides good analgesic effect to whole eye[7]. As many previous studies reported topical anesthesia as safe and effective on other hand some studies suggested that topical anesthesia should never be used in patient'ssevere concomitant ocular pathology[8].

In complicated cases manipulation of iris and stretching of ciliary muscles could irritateand unanesthetized the ciliary nerve ending which leads to discomfort and restrict the ciliary muscles[9]. After this mechanism surgeons require another anesthetic short through intracameral injection and use of fluid during ocular surgery[10]. This study is designed to investigate and

compare the benefits and drawbacks of retrobulbar injection and topical anesthesia.

MATERIALS AND METHODS

This randomized clinical trial was conducted in the department of Anaesthesia and Ophthalmology Nishtar Hospital, Bakhtawar Amin Medical and Dental college Multan and Shahida Islam Medical College, from April 2017 to April 2018. After permission from department ethical committee. Non probability consecutive sampling technique was used and sample size was calculated by using WHO sample size calculator. Three hundred patients selected for cataract surgery were enrolled in study. Patients with previous history of eye surgery, any traumatic injury, hypersensitivity to lidocaine or topical anesthetic, not native of operating room language and bells palsy were excluded from study. Patients were divided into two equal groupsretrobulbar andtopical anesthesia groups (150 in each group) through random number table.

Patients included in retrobulbar group were given oral sedation of 3 to 5mgof midazolambefore thirty minutes of 5% bupivacaine hydrochloride single injection 0.5 ml hyaluronidase and 2% lidocaine injection in retrobulbar space by consultant anesthetist with more than 5 years post fellowship experience. Volume was given 3.5 to 5.5ml rage but according to body weight. HonanBalloon was used for ocular compression was achievement. Effect of anesthesia was assessed by eye surgeon

Patients in topical anesthesia group were given minimum 5 doses 2% topical lidocaine. Four doses were given into inferior and superior cul-de-sac about 5 to 10 minutes before surgical procedure, draping, initial corneal Incision and finally before phacoemulsification. Additional doses of 2% lidocaine as 80 µL were given for breakthrough of pain. If all these techniques were not effective 75% bupivacaine injection subconjunctival was given.

All surgical procedures were performed by the senior surgeon who was performing cataract surgery from last five years under topical anesthesia and retrobulbar injection. Foldable IOL was inserted with standard phacoemulsification technique. Clear temporal corneal Incision was made and using three step Incision technique and eye was immobilized with Thornton fine ring. Paracenteses was done with tow sided ports each from 90 degree meridian. Pupil dilation was done where feel to be necessary after IOL implantation and removal of viscoelastic substances constriction of pupil was done with intracameral 1% carbachol. No patient required any type of suture for wound closure and leakage of fluid was tested by applying gentle compression using sponge. After surgery 50 mg of Mezlocillin and dexamethasone acetate was injected subconjunctival. Topical corticosteroids and combination of steroid and antibiotic was given in ointment form for night dose.

For pain assessment purpose visual analogue scale score was used which shows numerical representation of pain severity. Number “0” no pain and number “10” shows severe pain. Surgeon satisfaction about surgery was also asked which represents in form no difficulty, slightly difficult and extremely difficult.Complications and adverse events preoperatively, postoperatively and after 24 hours of surgery was noted in a pre-designedperforma.

Data was entered in computer software SPSS version 24 and analyzed for mean and standard deviation of numerical data like age pain score. Frequency and percentages were calculated for categorical data like gender, surgeon satisfaction and complications. Student T-test and chi square test was applied to see association. P value ≤0.05 was taken as significant.

RESULTS

Three hundred patients were included in this study, both genders. n=150 (50%) patients received topical anesthesia while n=150 (50%)patients received retrobulbar anesthesia. The mean age and pain score was 52.10±2.99 years and 1.20±0.90 respectively. There were n=97 (64.7%) males and n=53 (35.3%) females. While, the mean age and pain score was 56.34±4.06 years and 1.16±0.90 respectively. There were n=117 (78%) males and n=33 (22%) females.The difference was statistically significant for age (p=0.000) and gender (p=0.011). (Table I).

Capsular tear, zonular tear and vitreous loss for the patients who received topical anesthesiawas noted as n=3 (2%), n=7 (4.7%) and n=2 (1.3%) respectively. Chemosis, periorbital hematoma, subconjunctival hemorrhage and supplement periocular anesthesiafor the patients who received topical anesthesiawas observed as n=13 (8.7%), n=8 (5.3%), n=14 (9.3%) and n=19 (12.7%) respectively. Corneal edema, wound leak and IOP >30 mm Hgfor the patients who received topical anesthesiawas noted as n=2 (1.3%), n=4 (2.7%) and n=14 (9.3%) respectively. While, capsular tear, zonular tear and vitreous loss for the patients who received retrobulbar anesthesia was noted as n=6 (4%), n=7 (4.7%) and n=4 (2.7%) respectively. Chemosis, periorbital hematoma, subconjunctival hemorrhage and supplement periocular anesthesia for the patients who received retrobulbar anesthesia was observed as n=12 (8%), n=8 (5.3%), n=12 (8%) and n=4 (2.7%) respectively. Corneal edema, wound leak and IOP >30 mm Hg for the patients who received retrobulbar anesthesia was noted as n=2 (1.3%), n=7 (4.7%) and n=7 (4.7%) respectively. Supplement periocular anesthesia and IOP >30 mm Hg was statistically significant (p=0.000) and (p=0.000) respectively. Anesthetic-related difficulties were shown in Table 2. Intraoperative complications within 24 hours were described in Table 3.

Table No. I: **Demographic Variables among the groups**

Variables	Patients who received topical anesthesia n=150	Patients received retrobulbar anesthesia n=150	p-value
Age (years)	52.10±2.99	56.34±4.06	0.000
Pain score	1.20±0.90	1.16±0.90	0.750
Gender			
Male	n=97 (64.7%)	n=117 (78%)	0.011
Female	n=53 (35.3%)	n=33 (22%)	

Table No.2: Anesthetic-related difficulties

Variables	Patients who received topical anesthesia n=150	Patients received retrobulbar anesthesia n=150	p-value
Intraoperative			
Capsular tear	n=3 (2%)	n=6 (4%)	0.130
Zonular tear	n=7 (4.7%)	n=7 (4.7%)	1.0
Vitreous loss	n=2 (1.3%)	n=4 (2.7%)	0.409
Anesthesia related			
Chemosis	n=13 (8.7%)	n=12 (8%)	0.835
Periorbital hematoma	n=8 (5.3%)	n=8 (5.3%)	1.0
Subconjunctival hemorrhage	n=14 (9.3%)	n=12 (8%)	0.681
Supplement periocularanesthesia	n=19 (12.7%)	n=4 (2.7%)	0.000
Early Preoperative			
Corneal edema	n=2 (1.3%)	n=2 (1.3%)	1.0
Wound leak	n=4 (2.7%)	n=7 (4.7%)	0.357
IOP >30 mm Hg	n=14 (9.3%)	n=7 (4.7%)	0.000
Surgeon-related difficulties			
None to slightly difficult	n=132 (88%)	n=136 (90.7%)	0.484
Moderately difficult	n=12 (8%)	n=7 (4.7%)	
Extremely difficult	n=6 (4%)	n=7 (4.7%)	

Table No.3: Intra-operative complications

Intraoperative complications	PEX n=18 (16%)	Miosis n=128 (42.7%)	Previous surgery n=87 (29%)	Myopia n=17 (5.7%)	Hyperopia n=20 (6.7%)
Capsular tear	n=15 (31.3%)	n=17 (13.3%)	n=7 (8%)	n=5 (29.4%)	n=3 (15%)
Zonular tear	n=24 (50%)	n=26 (20.3%)	n=15 (17.2%)	n=9 (52.9%)	n=5 (25%)
Vitreous loss	n=28 (58.3%)	n=29 (22.7%)	n=17 (19.5%)	n=11 (64.7%)	n=8 (40%)

DISCUSSION

This study was a comparison between two aesthetic techniques retrobulbar injection of anesthetic agent and topical aesthesia for cataract surgery. First outcome variables are comparison complications during and after surgical procedure and second variables was pain assessment in both groups finally surgeon's satisfaction about procedure. Observations of our study shows surgeon satisfaction is almost similar in both groups, pain score is slightly high in topical anesthesia but safety from complications in topical aesthesia is high as compare to retrobulbar group.

Philip C Jacobi et al[11] conducted a similar study on this topic and concluded similar results that retrobulbar technique is quit unsafe when complications like capsular tear, vitreous loss chemosis and other anesthesia related and post-operative complications when compared with topical anesthesia but pain score is high in topical anesthesia. A similar study was conducted by Wong DH et al[12] and reported that in European countries such type of experiences are inhibited but topical anesthesia got fame due to its successful use and safety measures.

In a study Gombos K et al[13] also reported reduced use of retrobulbar anesthesia in experienced surgeons but for new surgeons it this technique is still successful, drawback of this anesthetic technique is that it will cause little anxiety in patients. In another study conducted by BoezaartA et al[14] reported that patients who received topical anesthesia and retrobulbar anesthesia preferred retrobulbar anesthesia. This preference may be due to maximum pain relief.

Patel BCet al[15] conducted a study on this topic in 1996 and reported topical anesthesia is a safe anesthetic technique for cataract surgery with little discomfort at the time administration. Not only anesthetic technique but surgical experience and technique are also important for safe and better outcomes. Intracameral, retrobulbar and topical anesthesia are common techniques used for cataract surgeries; all these techniques need no additional anesthesia[16,17].

Another study was conducted by Usitaloet al[18] and compares two techniques topical anesthesia and retrobulbar anesthesia. Results of his study reveal that both techniques have equal complication rate and discomfort. Topical anesthesia has little justification over retrobulabr anesthesia as safety and ease of use. This study is also comparable with our study.

A study was conducted by Morgan CM et al[19] on complications of retrobulbar injections and reported six complications of this injection. Most common of these complications are emboli in vasculature of optic head nerve, eboli in retinal circulation, central retinal artery occlusion and retrobulbar hemorrhage. This is a main reason of reduction in fame of retrobulbar injection of anesthetic agent in cataract surgery.

In a study Hunter Maclean et al[20] compare topical anesthesia and peribulbar anesthesia and reported efficacy and safety of topical anesthesia over peribulbar injection when compare in terms of patients comfort and surgeons satisfaction. Patient's assessment for pain relief is not outcome variable in many studies but in our

study this level of comfort also assessed and ranked in variable list for gateway of new research.

CONCLUSION

This study reveals that surgeon satisfaction is almost similar in both topical and retrobulbar anesthesia groups, pain score is slightly high in topical anesthesia but safety from complications in topical aesthesia is high as compare to retrobulbar group. Further research is needed to conclude confirm betterment of anesthetic technique.

Author's Contribution:

Concept & Design of Study:	Malik Jamil Ahmed
Drafting:	Muhammad Nasir
Data Analysis:	Rida Arshad
Revisiting Critically:	Malik Jamil Ahmed, Muhammad Nasir
Final Approval of version:	Malik Jamil Ahmed

Conflict of Interest: The study has no conflict of interest to declare by any author.

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