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COMPARISON OF EFFICACY OF TOPICAL VS PERIBULBAR ANESTHESIA IN PHACOEMULSIFICATION CATARACT SURGERY

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ABSTRACT

Objective: The goal was to assess how well peribulbar anesthesia performed in phacoemulsification cataract surgery in comparison to topical anesthetic. **Materials and Methods**. This randomized controlled experiment was conducted at the Hayatabad Medical Complex in Peshawar's Ophthalmology department. The study was conducted in five months from 1st August 2019 to 1st January 2020. In total, 154 individuals were enrolled in the study, with acuities ranging from counting finger (CF) to 6/12 on the Snellen visual acuity chart and visually significant age-related cataract found on slit lamp binocular microscope examination. Preoperatively, Group A had topical Lidocaine 0.5% eye drops three to five times every five minutes, while Group B received an injection of Xylocaine 2% with adrenaline and injection of Bupivacaine 0.5% in the peri-bulbar region. Using the Visual Analogue Score of less than 2 during the Phacoemulsification procedure preoperatively, the efficacy of both medications was assessed. **Results**. In this study, participants ranged in age from 40 to 70 years. In group A, the mean age was 57.077 years, the mean number of months with symptoms was 5.766, and the mean pain score was 3.233. In group B, the mean age was 56.064 years, the mean number of months with symptoms was 6.077, and the mean pain score was 32.181. Efficacy was observed in group A at 22.6% versus group B at 54.5% (P=0.001).**Conclusion**: When utilized for cataract surgery, peribulbar anesthesia dramatically increased patient satisfaction compared to topical anaesthetic.

Keywords: Phacoemulsification cataract surgery, Peribulbar anesthesia, Topical anesthesia, Efficacy.

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INTRODUCTION

Cataract surgery is the most common ocular operation performed worldwide[1]. Age-related cataract, which includes nuclear, cortical, and posterior subcapsular cataract, is the main cause of visual impairment globally[2]. Over the last 20 years, significant advances in cataract surgery procedures and instruments have been made. These include phacoemulsification without corneal suture and the creation of foldable intraocular lenses via a reduced, self-sealing incision. Furthermore, a variety of anesthetic procedures for cataract surgery have

been established. There are three types of anesthesia: general, ophthalmic regional (retro-bulbar / peri-bulbar / sub-conjunctival), and topical[3]. A 1-inch needle is used to provide efficient anesthetic and akinesia through the skin or conjunctiva. Penetration of the globe is a rare but severe consequence, hence peribulbar is avoided or treated with extreme caution, especially in myopic eyes. Topical anaesthesia is achieved with the use of drops or gel (proxymetacaine 0.5%, tetracaine 1% drops, lidocaine 2% gel) supplemented with intracameral preservative-free lidocaine 0.2%-1%. Analgesia is adequate in most cases, although less effective than peribulbar or sub-Tenon blocks[4]. The peribulbar group had greater anesthesia-related problems than the topical group[5]. Apil et al., studied the efficacy of 0.5% propacaine as topical anesthesia during phacoemulsification and discovered that phacoemulsification with topical anesthesia is not fully painless. The degree of pain varies depending on the type of cataract and the stage of surgery[6]. Lee et al., conducted a systematic evaluation comparing akinetic (sub-Tenon, peribulbar, or retrobulbar) and kinetic (topical or topical + intracameral) local anesthetic for phacoemulsification surgery in terms of morbidity. They discovered that eleven (0.74%) of 1494 akinetic eyes and eleven (0.80%) of 1368 kinetic eyes underwent posterior capsule rupture. The chi-square test indicated that there was no statistically significant difference (P =.84). This study found no clinically or statistically significant difference in the probability of posterior capsule rupture between akinetic and kinetic local anesthetic procedures[7]. Joshi RS used a visual analogue score to assess the efficacy of a single drop of 0.5% proparacaine hydrochloride versus 0.5% intracameral preservative free xylocaine in simple cataract surgery with phacoemulsification. There was no pain (0 score) in 21.8% of proparacaine group patients and 46.3% of xylocaine group patients. There was no statistically significant difference in intraoperative (P = 0.24) or postoperative (P = 0.164) pain levels between groups[8]. The study compared the efficacy of topical anesthetic against peribulbar anesthesia in phacoemulsification cataract surgery.

MATERIALS AND METHODS

This randomized controlled trial investigation was conducted over a five-month period, from 1st August 2019 to 1st January 2020, at the Hayatabad Medical Complex in Peshawar, Pakistan. Sampling was collected through non-probability consecutive sampling technique.World Health Orgazination (WHO) formula was used for sample calculation with 21.8% prevalence of topical anesthesia and 46.3% prevalence of peri-bulbar anesthesia [8] While confidence interval and level of significance was 95% and 5%. The sample size was total 154, which are classified into Group A (n=77) and B (n=77).Patients with visually significant age related cataract detected on slit lamp binocular microscope examination and having acuity ranging from counting finger (CF) to 6\12 on Snellen's visual acuity chart. All age cataract patients between 40-70 were included irrespective of gender. All patients undergoing phacoemulsification surgery and patients having decreased visual acuity due to cataract for at least 3 months duration with trauma history of eye were included. On the other side, patients having a history of open globe injury (penetrating or perforating), having complicated cataract secondary to ocular disease, with deep orbits (on surgeon's discretion), mentally retarded and deaf patients were excluded along with allergic to any drug. Consent form were taken from all patients before conducting study and ethical approval was also obtained from the ethical committee of Hayatabad Medical Complex, Peshawar. Two groups were designed: Group A: patients given topical anesthesia as per operational definition and Group B: patients given peri-bulbar anesthesia as per operational definition. The first patient was assigned to a group at random using a lottery technique, and following patients were alternately placed in groups using systematic sampling. Patients were told of the study's benefits and goal, and a written informed permission was acquired from them. To exclude confounders and bias in the study outcomes, a thorough history, clinical examination, including a thorough ophthalmological examination, and regular cataract surgical investigations were

performed on all patients. Preoperatively, Group A had topical Lidocaine 0.5% eye drops three to five times every five minutes, while Group B received an injection of Xylocaine 2% with adrenaline and injection of Bupivacaine 0.5% in the peri-bulbar region. Using the Visual Analogue Score of less than 2 during the Phacoemulsification procedure preoperatively, the efficacy of both medications was assessed. All of the information listed above, including name, age, gender, and residence, was entered into a pre-made proforma. SPSS version 20 was used to analyze the data. For categorical characteristics like gender, residence, the eye involved, and efficacy, frequencies and percentages were determined. For continuous variables like age, pain score, and symptom duration, mean±S.D. was calculated. The effectiveness of one variable was compared between Group A (topical anesthesia) and Group B (peri-bulbar anesthesia) using the Chi-squared test. Through Classification, confounders like age, length of symptoms, and residence were managed. To identify the effect modifiers, effectiveness was stratified by gender, age, the eye implicated, location, and the length of the symptoms. The chi square test was used after Classification. It was deemed important at P0.05. Tables and charts/graphs were used to present the results.

Results

Age range in this study was from 40 to 70 years with mean age of 57.077± 5.41 years, mean duration of symptoms 5.766±1.46 months and mean pain score was 3.233±1.27 in group A and mean age of 56.064± 5.50 years, mean duration of symptoms 6.077±1.64 months and mean pain score was 32.181±0.98 in group B (Table 1).

Male gender was dominant (54.5%) in Group-A and Female gender (64.9%) in Group-B. Frequency and percentage of residence and eye involved in both groups (Table 2).

Table 1: Demographic data of Group A and B Cataract Patients

Demographic variables	Group B Mean ± SD (n=77)	Group A Mean ± SD (n=77)
Age (years)	56.06±5.50	57.07±5.41
Duration of symptoms (months)	6.07±1.64	5.76±1.46
Pain score	2.181±0.98	3.233±1.27

Table 2: Gender (Male & Female), Residence (Rural & Urban), and Eye involvement (Left & Right) distribution in Group A and B Cataract Patients

Parameter	Group B n(%)	Group A n(%)
Gender		
Male	27(35.1%)	42(54.5%)
Female	50(64.9%)	35(45.5%)
Residence		
Urban	36(46.8%)	44(57.1%)
Rural	41(53.2%)	33(42.9%)
Eye Involved		
Left	26(33.8%)	28(36.4%)
Right	51(66.2%)	49(63.6%)

Efficacy was seen 22(28.6%) in group A as compare to 42(54.5%) in group B (P=0.001). Classification of efficacy in both groups with regard to age-wise, gender-wise, eye involved (Left or Right), residence (Urban & Rural), duration of symptoms (3-6 months & >6 months) (Table 3).

DISCUSSION

According to this study, individuals who received topical anesthetic felt more anxious and had higher ocular pain or discomfort. Due to this, the peribulbar block eye had significantly better satisfaction than the other eye that received topical anesthesia during phacoemulsification (P=0.001).

Table 3: Comparison of Efficacy in Group A and B Cataract Patients

Parameters		Group B n(%)	Group A n(%)	P-value
Efficacy-wise				
Efficacy	Yes	42(54.5%)	22(28.6%)	0.001
	No	35(45.5%)	55(71.4%)	
Age-wise				
40-55 years	Yes	13(50%)	7(31.8%)	0.203
	No	13(50%)	15(68.2%)	
56-70 years	Yes	29(56.9%)	15(27.3%)	0.002
	No	22(43.1%)	40(72.7%)	
Gender-wise				
Male	Yes	16(59.3%)	16(38.1%)	0.085
	No	11(40.7%)	26(61.9%)	
Female	Yes	26(52%)	6(17.1%)	0.001
	No	24(48%)	29(82.9%)	
Eye involvement (Left & Right)				
Left	Yes	15(57.7%)	6(21.4%)	0.006
	No	11(42.3%)	22(78.6%)	
Right	Yes	27(52.9%)	16(32.7%)	0.040
	No	24(47.1%)	33(67.3%)	
Residence (Urban & Rural)				
Urban	Yes	18(50%)	10(22.7%)	0.010
	No	18(50%)	34(77.3%	
Rural	Yes	24(58.5%)	12(36.4%)	0.057
	No	17(41.5%)	21(63.6%)	
Duration of Symptoms (3-6 months & >6 months)				
3-6 months	Yes	25(52.1%)	17(29.8%)	0.020
	No	23(47.9%)	40(70.2%)	
>6 months	Yes	17(58.6%)	5(25%)	0.020
	No	12(41.4%)	15(75%)	

Our results are analogous to those of Boezaart et al., who noted that while patients who underwent both treatments clearly preferred the injection, those who underwent only a topical anesthetic may be pleased with it[9]. In our study, topical anesthesia exacerbated the pressure, pain, and discomfort of surgery. Contrarily, peribulbar anesthesia surgery was less comfortable, despite the fact that patients felt greater pressure, pain, and discomfort during the injection. The presence of akinesia, enhanced eyelid anesthesia, and improved tolerance to the microscope illumination during surgery with the needle block are all possible contributing factors to this. According to earlier studies, peribulbar anesthesia and topical anesthetic are both equally secure and efficient for cataract surgery. Regarding postoperative pain, anxiety, patient discomfort, and patient satisfaction, contradictory results have been reported. These studies employed a Visual Analog Scale to measure the patient's subjective level of pain during surgery. According to the results of these studies, the majority of patients who got topical anesthetic didn't feel particularly uncomfortable, much as others who had surgery while under peribulbar or retrobulbar anesthesia[10]. According to other research, individuals who had only recently had a topical anesthetic were more likely to feel pain during iris manipulation and zonular stretching[11]. According to several studies, when postoperative pain is well managed, patient satisfaction rises[12, 13]. The perception of patient pleasure as a crucial measure of healthcare results[14]. For legitimacy, a patient satisfaction measurement tool must be reliable and accurate. Our research of the literature during this investigation revealed that there were several patient satisfaction questionnaires available for feedback on anesthesia. A paper by Bell et al., and Letaief et al., using the ISAS appears to give one of the best psychometric methods for gathering patient satisfaction data and has all of the psychometric properties required for efficient measurement, according to the established criteria[14, 15]. The scope of our study went beyond overall contentment. Additionally, data from patients with greater levels of satisfaction (IOWA satisfaction scale score > 2) were extensively evaluated and interpreted. According to research, there may be a bias from a higher to a lower satisfaction level if the patient is completely healed[12]. The majority of our patients had little to no education. Both of them were old and blind. They were seen responding instinctively, precisely as they felt. We didn't find any bias, or there was very little of it, when we examined the clinical data. The majority of patients who had peribulbar blocks were perfectly calm during the course of the procedure, in contrast to the topical group. In contrast to topical anesthesia, the majority of patients experienced pain and discomfort throughout the peribulbar block. However, patients were

happier with peribulbar block because of the overall comfort. Roman et al., research revealed a distinct learning curve and greater surgical complexity when utilizing topical anesthesia[16]. Two experienced surgeons performed each procedure in our research, and they only experienced minor issues while applying topical anesthesia[17]. This finding is in line with a recent research indicating higher intraoperative difficulties with topical anesthetic[16]. When cataracts develop, the ability to replace them with an IOL allows many individuals to maintain their quality of life and ability to see. Additionally, because to advancements in surgical methods, tools, equipment, and devices, it is now possible to implant an IOL and treat severe refractive issues (with or without removing the lens). An IOL may be implanted into the eye quickly, easily, and safely. However, there is always room for advancement and adapting tactics to other settings.

CONCLUSION

Peribulbar anesthesia results in statistically significantly improved patient satisfaction after cataract surgery compared to topical anesthesia. The surgeon said that the peribulbar block improved operating circumstances over topical anesthesia. The surgeon can select the best procedure for the greatest outcomes with the use of knowledge about patient preferences and satisfaction.

ETHICS APPROVAL: The ERC gave ethical review approval

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin

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REFERENCES

1. Roberts TV, Lawless M, Bali SJ, Hodge C, Sutton G. Surgical outcomes and safety of femtosecond laser cataract surgery: a prospective study of 1500 consecutive cases. Ophthalmology. 2013;120(2):227-33.
2. Song E, Sun H, Xu Y, Ma Y, Zhu H, Pan C-W. Age-related cataract, cataract surgery and subsequent mortality: a systematic review and meta-analysis. PLoS One. 2014;9(11):e112054.
3. Fernandes MBC, Souza RVFd, Vasconcelos GC, Ribeiro KG, Andrade BB, Fernandes CR. Assessing patient satisfaction with cataract surgery under topical anesthesia supplemented by intracameral lidocaine combined with sedation. Arquivos brasileiros de oftalmologia. 2013;76:345-9.
4. Kanski JJ, Bowling B. Clinical ophthalmology: a systematic approach: Elsevier Health Sciences; 2011.
5. Dole K, Kulkarni S, Shisode KD, Deshpande R, Kakade N, Khandekar R, et al. Comparison of clinical outcomes, patient, and surgeon satisfaction following topical versus peribulbar anesthesia for phacoemulsification and intraocular lens implantation: a randomized, controlled trial. Indian Journal of Ophthalmology. 2014;62(9):927.
6. Apil A, Kartal B, Ekinci M, Cagatay HH, Keles S, Ceylan E, et al. Topical anesthesia for cataract surgery: the patients' perspective. Pain research and treatment. 2014;2014.
7. Lee RM, Foot B, Eke T. Posterior capsule rupture rate with akinetic and kinetic block anesthetic techniques. Journal of Cataract & Refractive Surgery. 2013;39(1):128-31.
8. Joshi RS. A single drop of 0.5% proparacaine hydrochloride for uncomplicated clear corneal phacoemulsification. Middle East African Journal of Ophthalmology. 2013;20(3):221.

9. Boezaart A, Berry R, Nell M. Topical anesthesia versus retrobulbar block for cataract surgery: the patients' perspective. Journal of clinical anesthesia. 2000;12(1):58-60.
10. Maclean H, Burton T, Murray A. Patient comfort during cataract surgery with modified topical and peribulbar anesthesia. Journal of Cataract & Refractive Surgery. 1997;23(2):277-83.
11. Tseng S-H, Chen FK. A randomized clinical trial of combined topical-intracameral anesthesia in cataract surgery. Ophthalmology. 1998;105(11):2007-11.
12. Jenkins K, Grady D, Wong J, Correa R, Armanious S, Chung F. Post-operative recovery: day surgery patients' preferences. British Journal of Anaesthesia. 2001;86(2):272-4.
13. Scott N, Hodson M. Public perceptions of postoperative pain and its relief. Anaesthesia. 1997;52(5):438-42.
14. Letaief M, Bchir A, Mtiraoui A, Salem B, Soltani M. Translating patients concerns to prioritize Health care Interventions. Arch Public Health. 2002;60:329-39.
15. Bell DM, Halliburton JR, Preston JC. An evaluation of anesthesia patient satisfaction instruments. AANA journal. 2004;72(3).
16. Roman S, Auclin F, Ullern M. Topical versus peribulbar anesthesia in cataract surgery. Journal of Cataract & Refractive Surgery. 1996;22(8):1121-4.
17. Patel BC, Clinch TE, Burns TA, Shomaker ST, Jessen R, Crandall AS. Prospective evaluation of topical versus retrobulbar anesthesia: a converting surgeon's experience. Journal of Cataract & Refractive Surgery. 1998;24(6):853-60.