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COMPARISON OF 2% LIDOCAINE & 0.5% BUPIVACAINE WITH 2% LIDOCAINE AND 0.75% ROPIVACAINE IN PERIBULBAR BLOCK FOR CATARACT SURGERY

Ophthalmology

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ABSTRACT

Introduction: Cataract surgery is usually performed under regional anaesthesia. Peribulbar block is preferable over retrobulbar block in achieving anaesthesia for intraocular and extraocular surgeries. Bupivacaine is commonly used local anaesthetic in ophthalmic surgeries, whereas ropivacaine is preferred in elderly individuals. **Aim:** To compare the efficacy of 2% lidocaine and 0.5% bupivacaine with 2% lidocaine and 0.75% ropivacaine in peribulbar block for cataract surgery. **Materials &methods:** Prospective randomised, comparative double-blinded study was conducted from 80 eyes of 80 patients undergoing cataract surgery from September 2019 to September 2021. Patients were randomly divided into two groups. Group B(n=40) patients received 5ml (1:1 mixture) of 0.5% Bupivacaine, 2% Lidocaine,1500IU of Hyaluronidase while group R(n=40) received 5ml(1:1 mixture)0.75%Ropivacaine,2% lidoocaine,1500IU of Hyaluronidase. Patients were evaluated for onset of sensory block, motor, block, quality of the block, intraocular pressure, visual analogue scale(VAS) score, duration of analgesia for both groups and were then compared. **Results:** In this study regarding the onset of sensory block,motor block and duration of analgesia Ropivacaine group scored better than Bupivacaine group. **Conclusion:** Ropivacaine can be used as a safer alternative for Bupivacaine in peribulbar block for Cataract Surgery.

KEYWORDS

Lidocaine, Bupivacaine, Ropivacaine, Peribulbarblock,Cataract surgery.

INTRODUCTION:

Cataract is thecommonest cause for which eye surgeries are performed, usually under regional anaesthesia. Peribulbar block is preferable over retrobulbar block in achieving anaesthesia for intraocular and extraocular surgeries. It is widely used because of ease to perform and less painful. It has a higher safety and is equally effective as it does not need an accessory facial block. [1] Bupivacaine is commonly used local anaesthetic in ophthalmic surgeries, whereas ropivacaine is preferred in elderly individuals because of less toxicity and better pharmacological profile.[2]

AIM:

To compare the efficacy of 2% lidocaine and 0.5% bupivacaine with 2% lidocaine and 0.75% ropivacaine in peribulbar block for cataract surgery.

MATERIALAND METHODS:

The study was conducted in Department of Ophthalmology, Alluri Sitarama Raju Academy Of Medical Sciences, Eluru, from October 2021 to September 2022 after obtaining approval from Institutional Ethical Committee.

Study Design:

Prospective randomised,comparative double-blinded study.

Sample Size: 80 eyes of 80 patients undergoing cataract surgery

Inclusion Criteria:

Patients undergoing cataract surgery

Exclusion Criteria:

Local sepsis, Glaucoma, Serious coagulation impairment, Chronic smokers, Orbital abnormalities.

METHOD:

After obtaining informed and written consent from patient, our senior consultant randomised patients into two groups.

Group B received 5ml(1:1 mixture) of 0.5% Bupivacaine(ANAWIN 0.5%, NEON LABORATORIES LTD),2% Lidocaine(XYLOCAINE® 2%, AKUMS DRUGS & PHARMACEUTICALS LTD),1500IU of Hyaluronidase(HYNIDASE, SHREYAS LIFE SCIENCES PVT LTD) while group R received 5ml(1:1 mixture) 0.75% Ropivacaine (ROPIN 0.75%, NEON LABORATORIES LTD),2% lidoocaine, 1500IU of Hyaluronidase.The same consultant drew up 5ml of either of the drug using sterile precautions and coded them.

Before giving the block, all the patients were examined thoroughly. Basic parameters like Blood Pressure, Pulse rate, Respiratory rate and basic investigations(RBS, viral markers) were checked. Then, ophthalmologist resident blinded to this study was given coded syringes and asked to perform block.

Procedure Of Peribulbar Block:

Bloomberg's adaptation of the Davis and Mandel technique[3] was used to perform peribulbar block.

Patients were instructed to look straight ahead.First 22G,25mm needle was pierced through the skin at the junction of the lateral 1/3rd and medial 2/3rd of the lower orbital edge in the inferotemporal area.The needle was directed along orbital floor until it reaches mid-orbit in lateral extraconal area.Then,3ml of the drug was administered after meticulous negative aspiration.

The second injection was given in superonasal area by inserting same needle through upper eyelid vertically above the medial limbus up to 2cm deep, aiming tangentially away from the globe in the medial extraconal space, and 2ml drug was given. After giving the block, eyeball was gently compressed to facilitate the spread of anaesthetic solution.

Patients were evaluated for onset of sensory block,motorblock,quality of the block, visual analogue scale(VAS) score, duration of analgesia for both groups andthen compared.

Sensory block was evaluated by loss of sensation ofcornea with cotton. Post giving the injection, sensations were checked every minute, and the time at which sensations were lost was noted. Ocular globe motility was evaluated in the four quadrants using a 3-point scoring system:

- 0 -Akinesia (ocular movement <1 mm)
- 1 -Reduced movement (ocular movement >1 mm but < 4 mm)
- 2 -Normal movement (ocular movement >4 mm).

This scoring system gives a maximal aggregate score of 8 for the four muscles. After the block was given, ocular movements were checked after 2 minutes and then after every minute until an ocular movement

score of ≤ 2 obtained. Reduced movements in all directions, was taken to indicate successful block and time taken formotor block was noted.

The surgeon was asked to assess the block quality. Once ocular akinesia was achieved ,the block was considered satisfactory. However, after 10 minutes of the block, ocular movements were considered unsatisfactory, and an additional supplement of 3ml of the drug was given. Persistence of ocular movements despite giving the supplement was considered as a failed block.

The patients were asked to mark their pain level after giving the block, during the intraoperative period and then postoperatively after 60 minutes,120 minutes,180 minutes,240 minutes,300 minutes and 360 minutes. The time gap between the peribulbar block and reaching a VAS Score of ≤3 was noted to calculate the total duration of effective analgesia and compared for both groups.

Statistical Analysis:
Categorical variables was analysed using Pearson's chi-square test. Continuous variables were analysed using "Z" test.P < 0.05 was considered statistically significant.

RESULTS:
In both B and R group,45-55 years made up most cases accounting for 41(51.25%) of total cases. The mean age in bupivacaine group was 57.03±7.087 years and in ropivacaine group was 56.88±7.491 years.

Table 1: Demographic Data Distribution

VARIABLE	GROUP B	GROUP R	P VALUE
AGE(YEARS)	57.03±7.087	56.88±7.491	0.927
SEX(M/F)	22/18	24/16	0.651
LATERALITY(RE/LE)	19/21	21/19	0.655

From the above table, no statistically significant difference was noted for age, sex and laterality between the two groups.

Table 2: Mean Vas Score In Both Groups

TIME OF ASSESSMENT	MEAN±SD		SIGNIFICANCE	
	B GROUP	R GROUP		
PRE OP VAS	4.220±0.947	4±0.784	0.251	*NS
INTRAOP VAS	0.300±0.46	0.170±0.38	0.189	*NS
PO 60 MINUTES VAS	0.525±0.554	0.425±0.500	0.396	*NS
PO 120 MINUTES VAS	1.075±0.266	0.900±0.303	0.005	**S
PO 180 MINUTES VAS	1.675±0.474	1.400±0.496	0.011	**S
PO 240 MINUTES VAS	2.350±0.483	1.900±0.632	0.003	**S
PO 300 MINUTES VAS	2.675±0.474	2.425±0.549	0.029	**S
PO 360 MINUTES VAS	2.050±0.714	2.350±0.699	0.057	*NS

Table 2 shows significant difference in the mean VAS score between group B and R at PO 120 minutes, 180 minutes, 240 minutes, 300 minutes where ropivacaine group shows comparatively low VAS score than bupivacaine group, which was statistically significant (p < 0.05) thereby showing ropivacaine provides better analgesic effect than bupivacaine.

Table 3: P Mean Value Comparison

DESCRIPTION	B GROUP MEAN±SD	R GROUP MEAN±SD	P VALUE
Duration of sensory block(min)	3.15±0.975	3.20±0.992	0.820
Duration of motor block(min)	7.22±0.39	4.80±0.45	0.0003
Duration of analgesia(min)	299.5±39.44	338.62±39.93	<0.001

From table 3, mean value for onset of sensory block was 3.15±0.975 minutes for B group while it was 3.20±0.992 minutes for R group with p value being 0.820. This shows no statistically significant difference between two groups regarding onset of sensory block.

However, PO VAS score at 360 minutes was less in bupivacaine group than in ropivacaine group, with p value >0.05. It also shows the mean duration of analgesia in B group was 299.50±39.44 minutes and in R group was 338.62±39.93 minutes. p value for both groups was <0.001, which shows a highly statistically significant difference between both groups, with R group having a longer duration of analgesia than the B group.

DISCUSSION:
The use of local anaesthetics in ophthalmic surgery is popular because of fewer respiratory and hemodynamic events when compared to general anaesthesia. Moreover, postoperative pain, nausea and vomiting are less with regional anaesthesia. The usage of retrobulbar anaesthesia is associated with rare but severe complications. Peribulbar anaesthesia is considered safe and effective for cataract surgery.

In the current study, the mean duration for sensory blockade in the bupivacaine and ropivacaine groups was 3.15±0.975 minutes, 3.20±0.992 minutes, respectively, with p value of 0.820 which was statistically insignificant between the two groups.

This is similar to study done by Ya-li Zhou et al.[4] to compare the intraoperative and postoperative clinical properties of 1% ropivacaine, 0.75% bupivacaine, 2% lidocaine, and a 0.75% bupivacaine and 2% lidocaine (bupi+lido) mixture given in peribulbar anaesthesia during vitrectomy. They observed that there was no statistically significant difference among the groups regarding onset of sensory blockade.

Regarding the onset of motor block, the mean duration for akinesia in B group was 7.22±0.39 minutes while it was 4.80±0.45 minutes for R group with p value being 0.0003 which is statistically significant. This is similar to study done by W. Pathanjali Rao et al.[5] to compare 2% Lidocaine plus 0.5% Ropivacaine versus 2% Lidocaine plus 0.5% Bupivacaine for peribulbar anaesthesia in cataract surgeries where mean time for motor blockade in ropivacaine group was 2.77 minutes, while in bupivacaine group, it was 10.77 minutes, thereby concluding that ropivacaine had a faster onset of action than bupivacaine. Similar studies by J.R. Nociti et al[6], T.Huha et al.[7] showed that ropivacaine had a faster onset of action than bupivacaine.

The total duration of analgesia was taken as the interval between peribulbar block and time taken to reach visual analogue scale score ≤ 3. The mean value for total duration of analgesia in the bupivacaine group was 299.5±39.44 minutes, while in ropivacaine group, it was 338.62±39.93 minutes. This shows that ropivacaine provides a better and longer duration of postoperative analgesia than bupivacaine, similar to a study done by Luigi Gioia et al. [8] Similar studies by Parag Yashwant Dongreet al.[9], V.Gnana Ganesh et al.[10] had showed that ropivacaine had longer duration of analgesia than bupivacaine.

Limitations:
Return of ocular movements could not be assessed as pad and bandage were placed on the operated eye.

CONCLUSION:
Ropivacaine can be used as a safer alternative for Bupivacaine in peribulbar block for cataract Surgery.

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