

PERIBULBAR ANAESTHESIA IN OCULAR SURGERY: ROPIVACAINE COMPARED TO BUPIVACAINE AND LIDOCAINE COMBINATION

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ABSTRACT

Objective: To assess efficiency of Ropivacaine compared with Bupivacaine/lidocaine combination for inducing peribulbar anaesthesia in ocular surgery

Study design: Comparative descriptive study

Place and Duration of Study: Department of Ophthalmology, Avicenna Medical College Lahore from 1st January 2016 to 31st December 2016.

Patients & Methods: A descriptive, study was carried out on 110 patients selected for cataract extraction under peribulbar block. Patients of both sexes aged 40–70 years scheduled for surgery was included in this study after taking written informed consent. They were placed equally in two groups with respect to pharmacological agent (LA) given. Half of the patients receive Ropivacaine for akinesia (Group 1) and other half were given Bupivacaine mixed with lidocaine (Group 2). Nerve block was carried out by injection of 5–7 ml of the respective local anaesthesia in both groups for peribulbar block..

Results: In this study 110 patients were included, 55 patients in Group A, who received local anesthesia with Ropivacaine and 55 patients in Group B who received anesthesia with Bupivacaine plus lidocaine. There were 72 (64.5%) males and 38 (34.5%) females. Visual acuity ranges between 6/60 to hand movement HM+. There was adequate akinesia using Ropivacaine alone, which is comparable to Bupivacaine lidocaine group. Pain score, surgeon or patient contentment between two groups were nearly same.

Conclusion: We concluded that Ropivacaine alone can safely be indicated for effective akinesia by peribulbar block as Bupivacaine combined with lidocaine routinely allows.

Key words: Ropivacaine, Lidocaine, peribulbar anaesthesia, local anaesthesia, Bupivacaine, cataract surgery

INTRODUCTION

Ocular anaesthesia with peribulbar block now days is the most favored method to achieve akinesia for patients booked for cataract extraction surgery.¹ Regional anesthesia using cocaine as a topical anesthetic was first proposed by Percy in 1856.² Knapp³ later on described retro bulbar anesthesia which remained the choice of anesthesia in succeeding years. But over time its local and systemic complications compelled ocular surgeons to search for an alternative route to achieve analgesia and akinesia; hence the technique peribulbar anesthesia was evolved. Peribulbar anesthesia in practice usually contains a combination of local anesthetics, mostly Bupivacaine and lidocaine.⁴ These drugs are notorious for their complications on heart and brain.

Ropivacaine is a piperidinecarboxamide-based amide-type local anaesthetic (amide caine) in which

(S)-N-propylpipecolic acid and 2,6-dimethylaniline are combined to form the amide bond. It is claimed to be much safer compared to Bupivacaine for cardio complications and central nervous system toxicity.^{5,6}

Huha et al in 1999 found that Ropivacaine gives more complete akinesia as has some what early onset of action in a study on patients selected for cataract extraction under peribulbar anesthesia compared to those who receive Bupivacaine for nerve block.⁷ So a study was devised to assess efficiency of Ropivacaine compared with Bupivacaine/lidocaine combination for inducing peribulbar anaesthesia in ocular surgery.

PATIENTS AND METHODS

This comparative descriptive study was carried out at Avicenna Medical College Lahore from 1st January 2016 to 31st December 2016. 110 cases coming to eye

OPD on day to day basis and found suitable for cataract extraction during this year were included in the study. Patients with cataract, irrespective of whether cataract is mature or immature, cortical or nuclear, male or female between the ages of 40-70 years, with normal baseline intraocular pressure, with normal ECG rhythm and ASA grades I or II were included. Patient with active ocular infection, only one functional eye, allergic to amide-type local anesthetics, profound mental impairment, anxiety requiring sedatives, diabetes, hypertension, any other preexisting disease, ocular or systemic drug therapy and extreme age 70 plus were excluded from the study. Pre-operatively patients were examined on slit lamp after taking their visual acuity by snellen acuity charts. Then on slit lamp anterior segment examination was carried along with tonometry for baseline record. Posterior segment dilated examination was carried out with 90 D lens. A pre-anesthetic checkup was done for all patients included a detailed history, general physical and systemic examination.

They were placed equally in two groups with respect to pharmacological agent (LA) given, Half of the patients receive Ropivacaine for akinesia. (Group 1=55) and other half were given Bupivacaine mixed with lidocaine (Group 2=55). Written consent was taken after explaining the procedure to each case individually.

Nerve block was carried out by injection of 5–7 ml of the local anaesthesia 10 cc disposable syringes and number 25 gauge needles were used for the block. On arrival inside operation theatre baseline eyelid, eye muscle motility were checked and noted. Topical anaesthesia of the ocular surface was achieved by administering drops of Alcaine in conjunctival sac. Standard monitoring was started and intravenous line established. The eyelids and its surrounding were cleaned with 5% povidone solution. 5-7 cc of anesthetic solution was taken in a 10 cc syringe with 25 gauge needle. 3-4ml is injected at inferolateral quadrant near outer third of lower lid,. Then 2-3ml of anesthetic solution was injected in same manner at supero nasal quadrant near medial one third of upper lid. Required quantity of nerve block anesthetics were used in each patient depending on type of orbit while observing appearance of visible ptosis. Then mild compression was applied to eyeball for few .minutes for diffusion of anesthetic.

The two groups were compared for any rise of fall in intraocular pressure by tonometry, development of akinesia, (loss of eyelid and globe mobility), and pain during and after surgery and cardiovascular condition after application of peribulbar block. Finally surgeon contentment about effectiveness of block at the end of surgery was taken. How early ad deep akinesia and

anaesthesia was achieved by each pharmacological agent was compared. Patient view about drug was noted. Local Complications of both type of drugs and ant cardiovascular side-effects were also looked for. Measurement of Intraocular Pressure (IOP) was carried out by Goldmann tonometer at baseline i.e before block, then after injection at 2 min, 5 mins, 10 mins and 15 mins respectively.

Development of akinesia was noted in terms of decreased or loss of ocular mobility due to pharmacological nerve blockage supplying extra ocular muscles at 2 min, 5 mins, 10 mins and 15 mins after injection according to three-point scoring system proposed by Nicoll and co-workers.⁶ Heart was monitored by recording pulse rate, oxygen saturation and Blood Pressure before the anaesthesia and at 2, 5, 10 and 15 minutes after the anaesthesia by two types of drugs.

Pain reduction or complete pain free period was assessed by asking patient to label the pain in terms of severity from 1-10. Surgeon contentment was assessed by asking to grade akinesia in a scale of 1-4. The data was analyzed using SPSS 20.

RESULTS

There were 72 (64.5%) males and 38 (34.5%) females (Table 1). Visual acuity ranges between 6/60 to hand movement HM+. Intraocular pressure ranges between 10-18 mm of Hg. Cup disc ratio varied from 0.3 to 0.5. Patient age ranges from 40 to 70 years with mean value of 55 years.

Table 1: Socio demographic profile of subjects

Gender	No.	%
Male	72	65.4
Female	38	34.5

Table 2: Intraocular Pressure Comparison between both groups

Tonometry	Group 1	Group 2
Initial	14.38 ± 1.92	14.42 ± 2.10
2min	15.88 ± 2.04	16.03 ± 2.22
5 min	15.60 ± 2.37	15.92 ± 2.35
10 min	14.45 ± 2.30	15.34 ± 2.67
15 min	12.40 ± 2.71	14.00 ± 3.04

In both groups reading by Goldmann tonometry before local anaesthesia was injected in peribulbar area was nearly same. Minor variations are noted till 05 minutes after the block. There after more fall in pressure was observed in Ropivacaine group then Bupivacaine plus lidocaine group (Table 2). In our study, loss of

muscle mobility (akinesia) was seen slightly earlier in patients receiving Ropivacaine compared to patients given Lignocaine plus Bupivacaine (Table 3)

Table 3: Degree of Akinesia Comparison between both groups

Degree of Akinesia	Group 1	Group 2
Initial	8	8
2min	4.7±1.45	5.0 ± 1.84
5 min	3.9±1.62	4.3 ± 1.42
10 min	1.8±1.39	2.9 ± 1.35
15 min	0.4±0.19	1.0 ± 0.36

DISCUSSION

Local Anesthesia has an indispensable role in ocular surgeries. Most cataract surgeries are now a days performed under peribulbar anesthesia. To provide excellent analgesia and akinesia with minimum side effects using suitable local anesthetics is essential in cataract surgery. The peribulbar technique has gained much popularity due to complications associated with retrobulbar technique. An added advantage of Peribulbar anesthesia is hypotony of the globe due to the loss of extraocular muscle tone. Ropivacaine is a piperidine carboxamide-based amide-type local anesthetic having akinesic and anesthetic properties comparable to those of bupivacaine but is less toxic to heart and brain tissues..

In our study we tried to assess efficiency of peribulbar block induced by Ropivacaine compared with Bupivacaine/lidocaine combination. we focused on depth of akinesia and anaesthesia produced by Ropivacaine alone on ocular tissue, pain and IOP variation compared to bupivacaine plus lidocaine.

Our study suggest that ropivacaine has early onset of action on ocular tissues when injected in vicinity of extra ocular muscles for nerve block. Moreover akinesia and anaesthesia achieved by this drug alone is sufficient for good operating field as shown by surgeon and patient contentment at end of surgery. This single drug results are comparable to previously used local agents for ocular anaesthesia in combination like bupivacaine and lignocaine. Considerable reduction in intraocular pressure was seen in two groups around 10 mins after local anaesthetic were injected around orbit for akinesia. Ropivacaine shows more fall in IOP than bupivacaine although decrease in intraocular tension is visible in both groups. Similar statistically reduction in ocular tension was documented in previous studies after peribulbar block.^{7, 9, 10}

Huha et al⁷ reported more rapid development of akinesia with ropivacaine than bupivacaine at 2 min. Gioia et al¹¹ did a study for vitreoretinal Surgeries

under peribulbar anesthesia and concluded that ropivacaine mode of action is comparable to lidocaine-bupivacaine combination.

Our study showed that ropivacaine results in earlier onset of kinesis, acceptable duration and lesser intraocular pressure changes than bupivacaine with lidocaine and cardiovascular toxicity is not seen with either ropivacaine or bupivacaine when used in peribulbar block for cataract extraction.

CONCLUSION

Ropivacaine seems to be a safe agent for use in ocular surgeries, Since its effects on ocular tissues are comparable to Bupivacaine/ lignocaine in peribulbar block. Moreover it has lower systemic toxicity and does not show much variations on intra ocular dynamics. Therefore, Ropivacaine alone seems to be a suitable option for performing peribulbar block in cataract surgery. The use of Ropivacaine is a safer alternative and the apprehensions about its lower efficacy on eye anesthesia are not proved so far in our study research.

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