Research Paper Medical Science

# Comparison of 0.75% Ropivacaine with Bupivacaine and Lidocaine for Peribulbor Anesthesia


| | |
|---|---|
| **Dr Mahima Batra** | Associate Professor, Peoples Medical College, Bhopal, MP, India |
| **Dr Smriti Saraf** | Associate Professor, Peoples Medical College, Bhopal, MP, India |
| **Dr. Abhilekh Jain** | Associate Professor, Peoples Medical College, Bhopal, MP, India |
| **Dr. Krishna Kumar Thakur** | Resident Anaesthesiology, Peoples Medical College, Bhopal, MP, India |
| **Dr Vaishali Waindeskar** | Professor, Peoples Medical College, Bhopal, MP, India |



## ABSTRACT

*Aim:The objective of this study was to compare the rapidity of onset and efficiency of peribulbar block produced with 0.75% Ropivacaine alone with the traditional mixture of 0.5% Bupivacaine and 2% Lidocaine for cataract Surgery.*

*Methods: A total number of 60 patients scheduled for cataract surgery with peribulbar anesthesia were randomly allocated into two groups of 30 patients each, who receive mixture of 0.5% 2 ml + Lidocaine 2% 3 ml (Group I) or 0.75% Ropivacaine 5 ml (Group II). Hyaluronidase was added to both the groups. Ocular and eyelid movement scores were evaluated at 2,4,6,8 minutes after injection. Intraoperative analgesia was evaluated by verbal pain scores, need for supplementary anesthesia, hemodynamic parameters and incidence of perioperative complications were recorded.*

*Results: The ocular movement scores at 2,4,6 and 8 min was significantly lower in Group I than in Group II, however there was no significant difference between both the groups at 8 min. Duration of surgery and hemodynamic parameters did not differ among the groups.*

*Conclution: 0.75% Ropivacaine alone is an effective alternative to 0.5% Bupivacaine and 2% Lidocaine for peribulbar anesthesia. Although the traditional mixture of Bupivacaine and Lidocaine resulted in significantly lower ocular movement scores at 2,4 and 6 minutes ;at 8 minute both anesthetic solutions provide similar anesthetic conditions to perform cataract surgeries.*


**KEYWORDS : Cataract surgeries, peribulbor block, Ropivacaine, Bupivacaine, Lidocaine.**

**Introduction:**Regional anesthesia with peribulbar block is anaesthetic technique of choice in cataract, by most of ophthalmic surgeons. Peribulbar anaesthesia forn cataract surgery was described by Davis & Mande in 1986. Even Retrobulbar block provides faster and reliable anaesthesia than peribulbar block, it is performed over retrobulbar block because it has higher margin of safety. In our Institution a mixture of Bupivacaine and Lidocaine is used routinely, lidocaine providing a rapid onset and Bupivacaine a long duration of action

Ropivacaine is an amide local anesthetic agent with a greater margin of safety i.e less central nervous system and cardiac toxicity than other amide local anaesthetics.

We have shown that 0.75% Ropivacaine is an effective alternative to 0.5% Bupivacaine when used with 2 % Lidocaine for peribulbar anesthesia (Nicholason G, Sutton B, Hall GM: Ropivacaine for Peribulbar Anesthesia 1999). The objective of our study was to compare the onset, quality of ocular and lid akinesia and need for supplementary anesthesia and risk of complications if any. We found that 0.75% Ropivacaine 5ml alone is an effective alternative to 0.5% Bupivacaine 2 ml and 2% Lidocaine 3 ml for peribulbar anesthesia. Although the Bupivacaine, Lidocaine mixture resulted in significantly lower ocular movement scores at 2,4 and 6 min at 8 min both anesthetic solutions provided similar anesthesia . The faster onset with Bupivacaine-Lidocaine group is probably due to lidocaine.

**Methodology:** After obtaining approval from Ethics Committee and taking written consent informed Institutional Consent we studied 60 patients (Age 20-70 yrs) posted for cataract surgery under local anesthesia i.e peribulbar block. Patients were divided into 2 groups of 30 patients in each group. Patients were excluded if there was a history of allergy to amide type local anesthetic and patients wit ASA Grade III and IV. After obtaining history and thorough physical examination patients were randomly allocated into two groups. One group received Ropivacaine 0.75% 5 ml with hyaluronidase (15 microgram/ml) while the other group received a mixture of 3 ml 2% Xylocaine and 2 ml 0.5 % Bupivacaine with Hyaluronidase (15 microgram/ml), by ophthalmic surgeon.

Patients were not fasted and did not receive any premedication, perioperative sedation or supplementary oxygen. On receiving patients standard monitoring was started and I/V access with 20 G canula was established. Peribulbar block was carried out by Ophthalmic surgeon in our institute as a routine practice with 24 G needle transcutaneously at lateral 1/3rd and medial 2/3rd junction. After test aspiration 5 ml local anesthetic mixture was injected. Manual compression and gentle massage of the eyeball was performed for 5 min. Patients were assessed for eyelid and ocular movements at 2,4,6,8 and 10 minutes(Bramha et al) until the block was considered adequate for surgery. Eyelid movement score=0 and ocular movement score < 2. If block was inadequate after 10 minutes supplementary anesthesia was provided with another injection using similar technique. Complications during or after injection were recorded and the patients were asked specifically about pain while performing the block and during surgery. The main outcome criteria were difference in median ocular and eyelid movement scores at 8 minutes and time needed to obtain adequate block to start surgery.

**TABLE 1. SCORING SYSTEM FOR DEGREE OF OCULAR MOVEMENT Brahma et al**

| Ocular Movement | Score |
|---|---|
| Full Movement | 3 |
| Moderate Movement | 2 |
| Quivering | 1 |
| No Movement | 0 |

**Table 2: Demographic Characteristics of Study Subjects.**

| Patient Characteristic | Group I | Group II |
|---|---|---|
| Age(Years) Mean± SD | 70 ± 5 | 69 ± 7 |
| Sex (Male/Female) | 17/13 | 16/14 |
| Weight | 60 ± 7 | 62 ± 7 |
| Duration of Surgery | 20 min. | 20 min. |

**Table 3: Movement Scores at various intervals.P <0.05 betveen groups**

| Scores | Bupivacaine 0.5% and 2 % Lidocaine (n=30) | Ropivacaine 0.75% (n=30) |
|---|---|---|
| Ocular Movement Scores<br>2min<br>4 min<br>6 min<br>8 min | <br>5 [3-7]<br>3[2-6]<br>2[1-5]<br>2[0-4] | <br>7[5-8]<br>5[3-7]<br>4[2-6]<br>2[1-5] |
| Eyelid Movement Scores<br>2 min<br>4 min<br>6 min<br>8 min | <br>1[1-2]<br>1[0-2]<br>0[0-2]<br>0[0-1] | <br>1[1-2]<br>1[0-2]<br>1[0-2]<br>0[0-1] |
| Supplementary Anesthesia<br>Complication<br>Hematoma<br>Chemosis<br>Pain | 5<br><br>0<br>7<br>11 | 7<br><br>1<br>6<br>13 |

## STATISTICAL ANALYSIS

Statistical analysis was done by using SPSS software .There were 30 patients in each group,groups were comparable with respect to age ,height ,weight and sex of the patients.The main criteria were difference in median ocular and eyelid movement scores at 8 min. and time needed to obtain adequate block to start surgery.Median eyelid movement scores were not significantly different between the groups,ocular movement scores were significantly decreased in bupivacaine group campared with ropivacaine group at 2 min (P=0.011),4 min(P =0.022)and 6 min (P =0.047);but not significant at 8 min (P =0.13).The delay to start surgery and occurance of complications were compared using 'chi –square test'.

## DISCUSSION

In our study we compared .75% ropivacaine with .5% Bupivacaine & 2% lignocaine in peribulbar block for cataract surgeries. Johnson RW in 1995 described the anatomy of opthalmic anaesthesia and approaches to various techniques [1]. Eke T & Thompson JR et al studied the safety profiles of local anaesthesia in a national survey study [2]. Wang DH also studied role of regional anaesthesia for intraocular surgeries.[3]

Peribulbar block was the anaesthesia technique used in our study as it is much safer; but it requires large volume of local anaesthetic solution . S Ahmed also shared his experiences with peribulbar block and its safety profile. Shreen Ahmed, Afzal Ahmed et al in their clinical experience with peribulbar block found it to be safe & reliable. They studied 2600 patients and found only 5 patients with minor peribulbar haemorrage and 3% patients needed supplemental block.[4]. Oksana Demediuk Ranjit Dhaniwal et al compared peribulbar & retrobulbar anaesthesia and concluded that both provide equal levels of akinesia and analgesia and each requires intra opertive supplementation in 32% cases. Similar students were done by MB Al Hassan,F, Kyari et al who compared the two block techniques for cataract surgeries & found similar results. [5,6] Dempsey, Jul et al added hyaluronidaze as adjuvent in bupivacaine/lidocaine mixture. Lidocaine has advantage of early block but adding bupivacaine prologs the block. Combination has its advantages but sometimes prolonged block causes drying and irritation in the eyes.[7,8]

Nicholson added rupivacaine ;Brahama et al studies prilocaine [9,10]. Than researchers with advent of newer & safer drugs studied the comparison of ropivacine with ( bupivacaine/lidocaine) mixture. JR Nociti et al did a comparative study on 80 patients between ropivacaine & bupivacaine in peribulbar block. They inferred that ropivacaine had a faster onset, with low systemic toxicity & slightly lower potency as compared with bupivacaine [11]

Gioia et al studied peribulbar anesthesia with either 0.75% ropivacaine or a 2% lidocaine and 0.5% bupivacaine mixture for vitreoretinal surgery surgeries. Giola, Prandi et al did a study very similar to our study in which they compared .75% ropavacine with 2% lidocaine & .5% bupivacine mixture (1:1) only difference was that they studied vitreoretmal surgeries. Surgical block was achived in 8±5 minutes in lido/bupivacine group & 10±5 min in ropivacaine on Post operative day one, 87% of patients in ropavaicaine group reported no pain as compared to 60% in lido- bupavacaine group.[12] Nicholson also did a similar study [13] Our study was similar to Croke PJ/Baker J/et al [14]

JH Loots & Koots et al JH did a study, the objective of which was to determine the efficacy in peribulbar block of bupavacaine .5% , .75% and combination of bupivacaine .5& lig 2%. They found that akineria was not achieved in 54% of the cases; in contract; our study had akinesia in 100% in 8 min in all patients.[15] ; Huha also studied clinical efficacy & Kinetics of 1% ropavacaine & 75% bupivacaine for peribulbar anaesthesia in cataract surgery.[16] Complication were studied by Rubin et al and Baker J P et al. Baker et al compared post operative symptoms such as pain nausea & vomitting in patients undergoing cataract surgery in either General anaesthesia or local anaesthesia. While Rubin studied complications & post op morbidity follow cataract surgeries [17,18]

David B et al did a huge study in which they studied the efficacy & complication rate in 16224 consequtive peribulbar blocks in 12 center of United States , Gemany & Chile. Degree of akinesia, amaurosis, percentage of supplemental block & complication for 6 weeks were noted. Peribulbar block is as effective as retrobulbar block with fewer site & life threatening complications. The observations ,results and complication rate much similar to our study.[19]

## CONCLUTION

0.75% Ropivacaine alone is an effective alternative to 0.5% Bupivacaine and 2% Lidocaine for peribulbar anesthesia. Although the traditional mixture of Bupivacaine and Lidocaine resulted in significantly lower ocular movement scores at 2,4 and 6 minutes ;at 8 minute both anesthetic solutions provide similar anesthetic conditions to perform cataract surgeries.

## REFERENCES


1. Johnson RW. Anatomy for ophthalmic anaesthesia. British journal of anaesthesia. 1995 Jul 1;75(1):80-7.
2. Eke T, Thompson JR. The national survey of local anaestxhesia for ocular surgery. II. Safety profiles of local anaesthesia techniques. Eye. 1999 Mar 1;13(2):196-204.
3. Wong DH. Regional anaesthesia for intraocular surgery. Canadian journal of anaesthesia. 1993
4. AHMAD S, AHMAD A, BENZON HT. Clinical experience with the peribulbar block for ophthalmologic surgery. Regional Anesthesia and Pain Medicine. 1993 May 1;18(3):184-8.
5. Alhassan MB, Kyari F, Ejere HO. Peribulbar versus retrobulbar anaesthesia for cataract surgery. Cochrane
6. Database Syst. Rev. Jul. 2015 Jan 1;16(3).
7. Demediuk OM, Dhaliwal RS, Papworth DP, Devenyi RG, Wong DT. A comparison of peribulbar and retrobulbar anesthesia for vitreoretinal surgical procedures. Archives of Ophthalmology. 1995 Jul 1;113(7):908.
8. Dempsey GA, Barrett PJ, Kirby IJ. Hyaluronidase and peribulbar block. British journal of anaesthesia. 1997 Jun 1;78(6):671-4.
9. Jul Kallio H, Paloheimo M, Maunuksela EL. Hyaluronidase as an adjuvant in bupivacaine-lidocaine mixture for retrobulbar/peribulbar block. Anesthesia & Analgesia. 2000 Oct 1;91(4):934-7.1;40(7):635-57.
10. Nicholson G, Sutton B, Hall GM. Ropivacaine for peribulbar anesthesia. Regional anesthesia and pain medicine. 1999 Aug 31;24(4):337-40.
11. Brahma AK, Pemberton CJ, Ayeko M, Morgan LH. Single medial injection peribulbar anaesthesia using prilocaine. Anaesthesia. 1994 Nov 1;49(11):1003-5.
12. Nicholson G, Sutton B, Hall GM. Comparison of 1% ropivacaine with 0.75% bupivacaine and 2% lidocaine for peribulbar anaesthesia. British journal of anaesthesia. 2000 Jan 1;84(1):89-91.
13. Nociti JR, Mateus Serzedo PS, Zuccolotto EB, Cagnolati CA, Machado Nunes AM. Ropivacaine in peribulbar block: a comparative study with bupivacaine. Acta anaesthesiologica scandinavica. 1999 Sep 1;43(8):799-802.
14. Gioia L, Prandi E, Codenotti M, Casati A, Fanelli G, Torri TM, Azzolini C, Torri G. Peribulbar anesthesia with either 0.75% ropivacaine or a 2% lidocaine and 0.5% bupivacaine mixture for vitreoretinal surgery: a double-blinded study. Anesthesia & Analgesia. 1999 Sep 1;89(3):739.
15. Corke PJ, Baker J, Cammack R Comparison of 1% ropivacaine and a mixture of 2% lignocaine and 0.5% bupivacaine for peribulbar anaesthesia in cataract surgery. Anaes-

thesia and intensive care. 1999 Jun 1;27(3):249.
16. Loots JH, Koorts AS, Venter JA. Peribulbar anesthesia: A prospective statistical analysis of the efficacy and predictability of bupivacaine and a lignocaine/bupivacaine mixture. Journal of Cataract & Refractive Surgery. 1993 Jan 31;19(1):72-6.
17. Huha T, Ala-Kokko TI, Salomäki T, Alahuhta S. Clinical efficacy and pharmacokinetics of 1% ropivacaine and 0.75% bupivacaine in peribulbar anaesthesia for cataract surgery. Anaesthesia. 1999 Feb 1;54(2):137-41.
18. Barker JP, Vafidis GC, Hall GM. Postoperative morbidity following cataract surgery. Anaesthesia. 1996 May 1;51(5):435-7.
19. Rubin AP. Complications of local anasthesia for opthamlic surgery. British journal of anaesthesia. 1995 Jul 1;75(1):93-6.
20. Davis DB, Mandel MR. Efficacy and complication rate of 16,224 consecutive peribulbar blocks: a prospective multicenter study. Journal of Cataract & Refractive Surgery. 1994 May 31;20(3):327-37.