

Comparison of Ropivacaine 0.75% and Bupivacaine 0.5% in Peribulbar Block for Small Incision Cataract Surgery - A Prospective Randomized Controlled Study

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Abstract: Background: Ropivacaine is amide local anaesthetic agent. The aims of study are to assess the anaesthetic efficacy of 0.75% ropivacaine as a peribulbar block in cataract surgery and to compare the anaesthetic efficacy of 0.75% ropivacaine vs 0.5% bupivacaine. Materials and Methods: After ethical committee clearance and taking written informed consent from patients they will be randomized to receive peribulbar anaesthesia using 0.75% ropivacaine with hyaluronidase 50 IU/ml in group R (n=25) and 0.5% bupivacaine with hyaluronidase 50 IU/ml in group B (n=25). Inclusion criteria is ASA I & II patients. Exclusion criteria is patients refusing consent, taking anticoagulants etc. Parameters studied are akinesia score, visual analogue score and first dose of rescue analgesia needed post-operatively after peribulbar block. The power of study was kept at 80%. Chi square test and Fischer test are statistical tests used. Conclusion: Ropivacaine may be a more appropriate anesthetic for peribulbar anesthesia than bupivacaine.

Keywords: Bupivacaine, Ropivacaine, Peribulbar block

1. Background

Ropivacaine is an amino amide local anaesthetic agent with greater margin of safety than bupivacaine for cardio toxicity and neurotoxicity. The efficacy and safety of ropivacaine for anaesthesia during cataract surgery is well studied abroad, with most of the studies using peribulbar technique and hyaluronidase to facilitate the onset of anaesthesia and akinesia. There is reduced risk for globe perforation and optic nerve damage with peribulbar (extraconal) than retrobulbar (intraconal) block. Ropivacaine is recently being introduced in Indian market and needs to be evaluated in Indian perspective.

Regional anesthesia with peribulbar block is the technique of choice for most patients undergoing cataract surgery. A mixture of bupivacaine and lidocaine is the most frequently used local anesthetic, lidocaine providing a rapid onset and bupivacaine a long duration of action.

Ropivacaine has the potential advantage of reduced cardiovascular and neurological toxicity compared with other local anesthetics that are commonly used for peribulbar anesthesia. However, the motor sparing attributed to ropivacaine is a potential disadvantage that might reduce the onset of motor block required for ophthalmic surgery. Hyaluronidase hydrolyses the C1-C4 bonds between glucosamine and glucuronic acid in ground substance, thus promoting spread of anaesthetic through the tissue. The proposed advantages of using hyaluronidase include enhanced speed of onset and improved operating condition.

2. Aims of Study

- 1) To assess the anaesthetic efficacy of 0.75% ropivacaine as a peribulbar block in cataract surgery.

- 2) To compare the anaesthetic efficacy of 0.75% ropivacaine vs 0.5% bupivacaine as a peribulbar block in cataract surgery

3. Materials and Methods

We selected 50 ASA physical status I & II patients undergoing small incision cataract surgery. After thorough preanaesthetic evaluation patients refusing consent, taking anticoagulants, allergic to amide local anaesthetic or hyaluronidase, patients with psychiatric illness, with major systemic diseases, and with a single eye were excluded from the study. After written informed consent from the patients they will be randomized to receive peribulbar anaesthesia using 0.75% ropivacaine with hyaluronidase 50 IU/ml in group R (n=25) or 0.5% bupivacaine with hyaluronidase 50 IU/ml in group B (n=25). Standard monitoring will be established, vitals will be monitored. The anaesthetic solution will be prepared individually immediately before block. The investigators performing the injections and assessment will be blinded to the solution used. Peribulbar injection of local anaesthetic will be given by using 25 G, 1 inch needle at the junction of lateral one-third and medial two-third directed deliberately toward the orbital floor and drug will be injected until peribulbar fullness was observed or to a maximum volume of 7 ml. Light massage over the globe will be applied for the spread of solution for a minute. Residual ocular movement will be recorded at 1, 5 & 10 min interval after the block. Movements in superior, inferior, medial and lateral quadrants were scored according to akinesia score as 0 (no movement), 1 (flutter), 2 (partial movement) and 3 (full movement). This gave a range of 0 (complete akinesia) to 12 (full movement). Postoperatively, patients were shifted to the post anaesthesia care unit and monitored for the regression of ocular muscle movement and time for the first rescue analgesic required.

Volume 7 Issue 3, March 2018

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4. Results

In our study conducted in 50 patients, which was divided in two groups, Ropivacaine group (n=25) and Bupivacaine group(n=25), we found that VAS score was 2/10, 1/10, 0/10 at 1min, 5min and 10 mins in ropivacaine group, whereas in bupivacaine group it was 3/10, 2/10 and 0/10 at 1, 5 and 10 minutes. The time needed for first dose of rescue analgesia post operatively was 1hr for ropivacaine and 2hours for bupivacaine. Akinesia in ropivacaine group was attained at 1minutes whereas in bupivacaine group it was attained at 2-3minutes.

5. Discussion

The goal of this study was to compare the effect of two local anesthetics, bupivacaine and ropivacaine, each administered with hyaluronidase, on the quality of the block obtained after peribulbar anesthesia by supra and infra ocular injection. Ropivacaine was found to be less toxic to the heart and central nervous system, and in healthy volunteers, it led only to mild symptoms of central nervous system toxicity at doses 25% higher than bupivacaine, while evidence of reduced cardiac conductivity and contractility appeared at doses 33% larger, and at plasma concentration levels 38% larger. For this reason, ropivacaine may be a more appropriate anesthetic for peribulbar anesthesia than bupivacaine and the motor block being mainly achieved by adding lidocaine

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