ORIGINAL RESEARCH PAPER

Ophthalmology

COMPARISON OF PERIBULBAR INJECTIONS LIGNOCAINE VERSUS LIGNOCAINE AND BUPIVACAINE IN ALLEVIATING POST OPERATIVE PAIN IN CATARACT SURGERY PATIENTS

KEY WORDS:
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INTRODUCTION:

Quick onset of block with prolonged postoperative analgesia is an important goal in regional anesthesia for ophthalmic surgery.[2]

The use of regional anesthesia for ophthalmic surgery has become increasingly popular over the last years because it is associated with fewer respiratory and hemodynamic untoward events than general anesthesia [3]. Moreover, postoperative pain relief and the incidence of nausea and vomiting are better controlled after regional anesthesia than after general anesthesia.

Retrobulbar anesthesia is associated with rare but severe complications (such as ocular perforation, direct optic nerve injury, extraocular muscle paresis, severe retrobulbar hemorrhage, retinal vascular occlusion, contralateral amaurosis, and systemic local anesthetic toxicity). To reduce the morbidity risks associated with retrobulbar anesthesia, Davis and Mandel [4] developed peribulbar block, which seems to be associated with fewer complications than retrobulbar anesthesia [5]. For this reason, peribulbar anesthesia is now considered a safe and effective technique for cataract surgery Although lidocaine provides a rapid onset of analgesia and akinesia, it has a shorter duration.[6] So, the mixture with equal volumes of bupivacaine and lidocaine is often used for a quick onset of analgesia and a prolonged duration of action; however, the mixture may lead to a reduction of the advantages of both zagents.[7] Although various agents are used for peribulbar block, there is no consensus regarding the bestanaesthetic agent. Some studies have reported thatbupivacaine provides a better quality of anaesthesia than a mixture of bupivacaine and lidocaine.[8] No researchers ever compared the clinical properties of lidocaine and a mixture of bupivacaine and lidocaine in one peribulbar anaesthesia study, we therefore conducted this study to compare the intraoperative and postoperative clinical propertiesof different agents 2% lidocaine and a mixture of 0.5% bupivacaine and 2% lidocaine.

Before surgery, all of the patients were examined and routine laboratory investigations were performed. To prevent rebreathing and ensuing hypercarbia once draped, all of the patients received an oxygen enriched breathing atmosphere. Routine monitoring, including non-invasive arterial blood pressure, heart rate, electrocardiogram, pulse oxygen pulse oximetry and clinical observation were applied before the administration of the peribulbar anaesthesia until the end of the surgery. It is about 5–10 min before the injection, the patients were provided with the appropriate information regarding anaesthesia and surgery, thereby reducing their anxiety.[10] The peribulbar anaesthesia was always administered by one of the authors who was blinded to the particular anaesthetic and has substantial experience in regional anaesthesia techniques for ophthalmic surgery.

Simultaneously, a masked investigator was responsible for scoring the progression of anaesthesia after training.Each participant received one drop of combination of 0.5% tropicamide and 5% phenylephrine eye drops in operated eye every 5 min for four times before the surgery. The patients were asked to look up and not move the eyes. Then, a 25-gauge steel needle was inserted at the third lateral of the inferior eyelid, with the bevel facing the globe. The steel was directed along the inferior orbital floor to a distance of approximately 25 mm, 4–7 mL of the local anaesthetic agent was injected after gentle negative aspiration for blood. Then, in the same way, 1–3 mL was injected at the superiorquadrant along the superior orbital roof if the block is insufficient. The injection wasstopped when the globe became tense and firmness in the globe was confirmed by gentle palpation.[11] After two sites of injection, the globe was massaged with the palm placed over a few pieces of sterile gauze pad using gentle pressure. The total volume of local anaesthetic solution used was recorded. For every 20 s, pressure was released for 5 s to allow for vascular filling.[8]

Then, the patients were assessed for the efficacy of blockade at 20 s intervals after the second administration. First, sensory blockade was assessed by touching the cornea with a cotton swab and communication with the patients. Then, the scoring system of Brahma et al[16] was used for motor blockade. Ocular movement was evaluated in the four quadrants of gaze directions using the following four-point scoring system: 3 (full movement), 2 (moderate movement), 1 (almost no movement) and 0 (akinesia), with a possible total maximum score of 12 points. An ocular movements score of less than 6 and reduced ocular movements in all directions were taken to indicate suffi-cient block. Once analgesia and akinesia had been achieved, no further assessments were made. The onset time of analgesia and akinesia were defined as the time elapsed from the end of the injection until the best anaesthesia was reached. If after 5 min from the time of the end of injection sensory blockade was insufficient and the patients were still feeling pain,a supplementary injection of 1–2 mL of the test solution was used. If motor blockade was insufficient and the total ocularmovement score was 6 or more or there was full movement in one of the four directions, depending on the quadrant, a supplementary injection was administered at the inferior lateral or superior lateral site using 1–2 mL of the test solution.

During the surgery, the patients were encouraged to communicate with the surgeon if pain occurred.

If the patients expressed pain, the time of the appearance of pain and what surgical procedures were done at that time were recorded . Whether additional anaesthesia was administered depended on the patient. No injection was given if the patients claimed that the pain was mild and they could endure it. When a patient expressed moderate pain or worse, a supplementary injection was administered as described previously. The duration of the surgical procedure was defined as the time the eye was draped to the time the drape was removed. Complications during surgery were also noted. After surgery, the efficacy of anaesthesia was graded from 0 to 5 and judged by the adequacy of analgesia and akinesia and any supplementary anaesthetic needed to obtain acceptable akinesia.[12]

On the first postoperative day, the degree of pain was recorded using the following five-point verbal rating score: 0 (no pain), 1 (mild pain), 2 (moderate pain), 3 (severe pain) or 4 (unbearable pain).[10][15]

RESULTS:

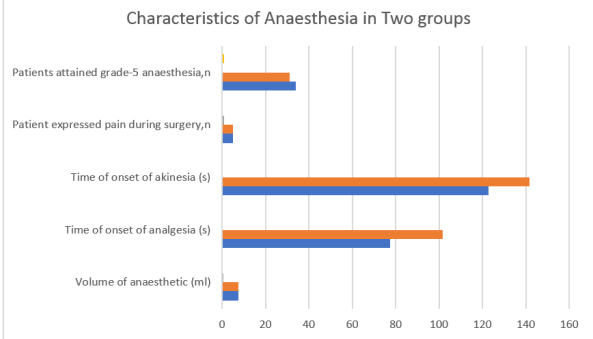
LIGNOCAINE GROUP (N=35)LIGNO+BUPI GROUP (N=35)P VALUEVolume of anaesthetic (ml) 7.67± 0.917. 63±0. 990.696Time of onset of analgesia (s) 77. 56± 13.31101.51±56.940.079Time of onset of akinesia (s) 122.66±49.65141.54±61.980.323Patient expressed pain during surgery,n420.931Patients attained grade-5 anaesthesia, n33340.966Patient characteristics, types of diseases, duration of surgery were similar among the four study groups except for age . Table 1 shows the volumes of anaesthetic, time of onset of sensory and motor blockade, the number of patients who expressed pain or attained a grade-5 block during surgery. The numbers of patients who experienced pain during surgery were the following: Four patients in the plain lignocaine group (5%) and two in the lignocaine +bupiacine group (2%). Of patients who attained grade-5 anaesthesia lidocaine group (97.1%) and lido+bupi group (98%) .

During the first day after surgery, one patient in lignocaine group experienced unbearable pain. The number of patients and corresponding degree of pain are shown in . The outcome of analysis showed that age and anaesthetic agents were associated with postoperative pain and were two independent protective factors of postoperative pain . For age,there was a negative correlation between age and postoperative pain that the young patients were more likely to experience a higher degree of pain than the older patients . For anaesthetic efficacy, lignocaine 1% +0.5% bupivacaine resulted in a significantly lower degree of pain compared with the other group.

No adverse events were noted during the delivery of both types of anaesthesia during surgery. The incidence of subconjunctival haemorrhage after surgery was significantly lower in ligno+bupi groups . Adverse events including nausea, vomiting, headache, dizziness and scalp anaesthesia were not significantly different among the two groups .

Table 1

	LIGNOCAINE GROUP (N=35)	LIGNO+BUPI GROUP (N=35)	P VALUE
Volume of anaesthetic (ml)	7.67±0.91	7.63±0.99	0.696
Time of onset of analgesia (s)	77.56±13.31	101.51±56.94	0.079
Time of onset of akinesia (s)	122.66±49.65	141.54±61.98	0.323
Patient expressed pain during surgery,n	4	2	0.931
Patients attained grade-5 anaesthesia,n	33	34	0.966



DISCUSSION:

A quick onset of anaesthesia with prolonged intraoperative analgesia and better postoperative comfort is a desired goal in local anaesthesia for ophthalmic surgery(15) ,bupivacaine is along-acting, amide-type local anaesthetics. Lignocaine is a short-acting amide-type local anaesthetic. The proton binding affinity (pKa) values determine the penetration time of the solution, and the specific pKa values are 7.7 for ligocaine and 8.1 for and bupivacaine,(15) which largely determine the onset of local analgesia.(13)agents with lower pKa constants provide a more rapid analgesic onset.The plasma binding rate of protein is 94%, 95% and 64% for bupivacaine, ropivacaine and lidocaine, respectively.(8, 12) The more capable an anaesthetic binds to protein, the longer the duration of action. The mixture of bupivacaine and ligocaine is often used based on the theoretical belief that this mixture provides a quicker onset and a longer duration of analgesia.

In our study, there was no significant difference in the time of onset of both analgesia and akinesia among the two groups. The findings are similar to the results of those of Jaichandran et al9 and Gioia et al,(9)who conducted a study on peribulbar anaesthesia for vitreoretinal surgery.

Among patients who experienced any pain during surgery in the lidocaine group was 4 (10%)and 2 in ligno+bupi group (5%). Among them, two patients in the lidocaine group and one in the lido+bupi group required a one-time supplementary block. Additionally, most patients attained a grade-4 to5 block .(8) Comparable to our results, a study conducted byJaichandran et al stated that the 2% lidocaine and the mixture solution caused significantly more patients to experience pain than the 0.75% bupivacaine during surgery, and all of the patients required a supplementary block at least once, and some patients were even supplemented twice. This difference may be due to the shorter duration of surgery. In our study, the mean duration times of surgery were approximately 40min in the. In the study by Jaichandran et al(8), the duration times were approximately 180 min and they concluded thatbupivacaine was a better choice for local anaesthetic solution.

Obviously, the duration of surgery in our study was far less than that conducted by Jaichandran et al, short duration of the surgery may be the main reason for only few patients required supplementary block and most patients attained satisfactoryanaesthetic effect in our study. postoperative pain relief and was superior to the other three agents. When the age of patients in our study is not consistent among the four groups, we compared risk-adjusted outcomes using ordered logit analysis that adjusted for patient factors,which included age, weight, duration of surgery, volume ofanaesthetic, sex (male/female), eye (left/right), types of cataract and anaesthetic groups.The outcome of ordered logit analysis showed that either age or anaesthetic agents were associated with postoperative pain, and they were two independent protective factors for postoperative pain .No other factors had an effect on the degree of postoperative pain. Our findings regarding age, which was negatively correlated with postoperative pain that the young patients were more likely to experience a higher degree of pain than the older patient, was consistent with the conclusion of a previous study.(14)(15)

three groups. From our study, we concluded that ropivacaine can provide effective pain relief during the postoperative period. For all patients, we covered the operated eye with a sterile gauze pad and bandage for at least 6 hours postoperatively.

CONCLUSIONS:

This study suggests that mixture of lignocaine 1% +0.5% bupivacaine is a suitable choice when administering

peribulbar anaesthesia for patients undergoing cataract surgery because it produces an adequate quality of intraoperative anaesthesia and better postoperative anaesthesia and also improves patient comfort compared with plain lignocaine as it is short acting, prolonged period of surgery,due to unusual characters of the cataract makes it difficult for the Patient and surgeon.As anaesthetic efficacy wears off quickly, post operative pain is experienced earlier, which makes it uncomfortable for patients in the immediate post operative period.

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