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ORIGINAL ARTICLE

Effect of Intrathecal Hyperbaric Bupivacaine with Midazolam and Hyperbaric Bupivacaine alone in Lower Limb Orthopaedic Surgeries

V N Vaid[1], Shipra Singh[2], Pankaj Mishra[3], K G Rao[4]

[1,4]Associate Professor, [2]Assistant Professor, Department of Anaesthesia, [3]Professor, Department of Social & Preventive Medicine, Mayo Institute of Medical Sciences, Barabanki, Uttar Pradesh, India

ABSTRACT:

Background:

Spinal anesthesia is successful in the administration of perioperative pain which stretches out into the underlying post operative period. With a specific end goal to boost postoperative agony free period various methods and more up to date medicates have been attempted. In this examination, the anaesthetic properties of 0.5% hyperbaric bupivacaine with 0.4 ml of ordinary saline and 0.5% hyperbaric bupivacaine with 2 mg of midazolam given intrathecally were compared. **Materials and Methods:** Patients of either sexual orientation (men = 44, ladies = 16), aged between 25-60 years, were haphazardly allotted to two gatherings (30 each). Group 1 got 0.5% hyperbaric bupivacaine with saline intrathecally, and Group 2 got 0.5% hyperbaric bupivacaine with additive free midazolam 2 mg intrathecally. Peak sensory level, total duration of analgesia, duration of motor blockade, pain score using the Visual Analogue Scale, along with vital parameters, namely heart rate and systolic, diastolic and mean blood pressure were assessed. **Results:** The duration of analgesia watched was altogether higher in Group 2 (321 ± 25.5 minutes) versus Group 1 (157 ± 17.4 minutes), and the pain score was less in Group 2 when contrasted with Group 1. The time of onset of sensory and motor block was essentially longer in group 2. Hemodynamic changes did not vary in patient of either gathering. The side effects were negligible in both the gatherings. **Conclusion:** Intrathecal administration midazolam in blend with hyperbaric bupivacaine 0.5% delivers better quality of analgesia, longer span of absense of pain, with mellow sedation and negligible symptoms along these lines lessening post operative pain relieving prerequisite.

Key Words: Hyperbaric bupivacaine, intrathecal midazolam, spinal anesthesia, postoperative analgesia.

Corresponding author: Dr. Shipra Singh, H.No. 202/A, Insaf Nagar, Indranagar, Lucknow-226016

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INTRODUCTION:

One of the essential points of anesthesia is to ease the patient's pain and anguish, along these lines allowing the execution of surgical techniques with no distress. Relief of postoperative agony has increased genuine significance as of late considering the focal, fringe and immunological anxiety reaction to tissue damage.[1] Any ability obtained in this field ought to be stretched out into the postoperative period, which is the time of extreme, heinous torment requiring consideration. So there is need of expanded absence of pain with no reactions to accomplish this objective.

Spinal anesthesia is unparalleled in the way a little mass of medication, for all intents and purposes without foundational pharmacologic impact, can create significant, reproducible surgical anesthesia.[2] The primary explanations behind the notoriety of spinal block are that the block has very much characterized end focuses and the anesthesiologist can deliver the blocks dependably with a solitary injection. The adaptability of spinal anesthesia is managed by an extensive variety of local analgesics and added substances that permit control over the level, the season of beginning and the length of spinal anesthesia. The appropriation of local analgesic arrangements inside the subarachnoid space decides the degree of the neural blockade created by spinal anesthesia.[3]

For a considerable length of time lignocaine had been the nearby analgesic of decision for spinal anesthesia. Its favorable circumstances are quick beginning of activity and great motor block showed as great muscle unwinding. Its utilization is restricted by its brief term of activity and has been embroiled in transient neurologic manifestations and

cauda equina disorder following intrathecal infusion.[4,5] Bupivacaine is three to four times more potent than lignocaine and has longer span of activity. Its disservices are slow onset of action and decreased motor block.

Hyperbaric bupivacaine 0.5% is broadly utilized as a part of India for spinal anesthesia. Despite the fact that the term of activity of bupivacaine is delayed, it won't deliver prolonged post operatiuve analgesia. Henceforth another adjuvant is required for creating drawn out post agent absence of pain. The disclosure of opioid receptors and endorphins in spinal and supraspinal districts soon prompted the utilization of spinal sedatives.[6] Midazolam is an imidazobenzodiazepine with remarkable properties when contrasted and different benzodiazepines. It is water dissolvable in its corrosive detailing however is profoundly lipid solvent in vivo. It has been accounted for to have a spinally intervened antinociceptive impact.[7]

The subarachnoid midazolam potentiates the blocking activities of local analgesics. It enhances the nature of sensory and motor block, without prolonging the time of recovery. It additionally gives delayed postoperative pain alleviation without creating sedation. The subarachnoid midazolam is likewise without inconveniences, for example, bradycardia, hypotension, postoperative queasiness and regurgitating, pruritus, urinary maintenance, and neurotoxicity.[8] A sum of 2 mg midazolam intrathecally has been observed to be the ideal measurements for easing the agony with no reactions. In this examination we assessed the pain relieving viability of blend of the intrathecal midazolam with bupivacaine and contrasted it and bupivacaine alone for the dragging out the postoperative analgesia in patients experiencing elective lower limb surgeries under spinal anesthesia.

MATERIALS AND METHODS:

60 patients, aged between 25-60 years of either sexual orientation, and experiencing elective lower limb surgeries, were incorporated into the examination. Patients with contraindications to central neuraxial bar, for instance gross spinal deformation, spinal delicacy, nearby obsessive conditions in the spinal region, known affectability to the medications utilized as a part of the investigation, or the presence of peripheral neuropathy, were avoided from the examination. Institutional morals board of trustees endorsement and composed educated assent for taking an interest in the investigation were gotten. A detailed pre sedative assessment of the patients selected in the investigation was directed a day before the method.

Routine examinations like haemogram, total leucocyte count, differential leucocyte count, ESR, complete urine examination, random blood sugar, electrocardiogram, chest x-ray, blood grouping, blood urea, serum creatinine were done. The patients were additionally acquainted with the Visual Analog Scale (VAS) and were instructed how to utilize it. Patient's weight and stature was additionally recorded. Once the patient was moved to the operating room, the patient was connected to the normal monitors including sphygmomanometer, pulse oximeter and electrocardiogram. All resuscitation equipments like intubation trolley with airways, laryngoscopes, endotracheal tubes alongside drugs like atropine, ephedrine, mephentermine were kept prepared. The anesthesia machine was additionally checked alongside the oxygen conveyance framework.

Before surgery, all patients were kept nil per oral for six hours for solids and three hours for clear liquids. No soothing premedication was managed. the patients enlisted in the investigation were arbitrarily doled out to both of the two gatherings. Group 1 patients were given 0.5% hyperbaric bupivacaine (3ml) + 0.4 ml normal saline intrathecally. Group 2 patients were given 0.5% hyperbaric Bupivacaine(3ml) + 0.2ml of additive free Midazolam (1mg) intrathecally.

Spinal anesthesia was performed while the patients were put in the sitting position. Disinfection of patients' back was done with povidone iodine and afterward skin and subcutaneous invasion with 2 ml of lidocaine 1% was performed. Spinal cut was performed utilizing a midline approach at the third to the fourth lumbar interspace spinal needle with the distal port confronting along the side. When free stream of cerebrospinal liquid was gotten, the study drug was infused at a rate of 0.2 ml/s. The patient was then swung to the supine position with a 20° against Trendelenburg tilt. Heart rate, blood pressure, and oxygen saturation (SpO2) were recorded at baseline, after intrathecal infusion, and afterward every 5 min until the finish of the surgical methodology. The duration of postoperative analgesia , the time from intrathecal injection until administration of the first rescue analgesia (primary outcome) was recorded.

RESULT:

The duration of analgesia watched was altogether higher in Group 2 (321 ± 25.5 minutes) versus Group 1 (157 ± 17.4 minutes), and the pain score was less in Group 2 when contrasted with Group 1. The time of onset of sensory and motor block was essentially longer in group 2. Hemodynamic changes did not vary in patient of either gathering. The side effects were negligible in both the gatherings. VAS score was found to be significantly higher among the patients who received only bupivacaine.

Table 1: Demographic profile

Variable	Group 1 (n=30)	Group 2 (n=30)
Age (years)	35.7 ± 5.7	36.8 ± 4.8
M:F	22:8	24:6
Weight (kg)	55.9 ± 4.3	57.3 ±5.4
Height (cm)	163.7 ±6.2	162.3. ± 4.7
Total duration of analgesia (mins)	157 ± 17.4	321 ± 25.5
VAS score	54.5 ± 7.7	35.4 ± 4.5

Table 2: Result of study

Characteristics (mins)	Group 1	Group 2
Time taken for onset of sensory blockade	2.69 ± 0.74	2.14 ± .0 64
Time taken for regression of two segments	72.5 ± 8.6	89.8 ± 7.9
Time taken for onset of motor blockade	3.97 ± 0.89	3.21 ± 0.76
Duration of motor blockade	167 .7 ± 11.2	176 .6 ± 10.8

DISCUSSION:

Spinal anesthesia is the most usually utilized local sedative strategy. Local anaesthetic agents utilized for this reason give great intraoperative analgesia. Be that as it may, they give an extremely constrained postoperative length of activity. Keeping in mind the end goal to defeat this issue and to expand the length of absence of pain, numerous adjuvants, for instance opioids, neostigmine, ketamine and clonidine, have been attempted progressively over the most recent two decades to ease postoperative pain.[9] Be that as it may, reactions in the postoperative period, for example, sickness, heaving, pruritus, urinary maintenance and respiratory depression, render most adjuvants as not as much as perfect. The method of reasoning for the utilization of intrathecal midazolam concentrates on the mindfulness that it is an agonist at the benzodiazepine restricting site, a subunit of the pentameric gamma aminobutyric corrosive (GABA) receptor. Agonist inhabitance of the benzodiazepine restricting site improves the action of GABA at the GABA receptor. This receptor is a chloride ionophore that, when actuated, ordinarily settles the transmembrane potential at, or close to, the resting potential. In neurons, this commonly serves to diminish volatility.[10]

Intrathecal benzodiazepine-initiated analgesia is spinally intervened. Restricting locales are GABA receptors, richly introduce in the dorsal root nerve cells, with the most extreme fixation found inside lamina II of the dorsal nerve cells, an area that assumes a conspicuous part in preparing nociceptive and thermoceptive incitement.[11] The present total involvement with intrathecal midazolam crosswise over species comprehensively affirms the security there of, the pain relieving action of the particle and its benzodiazepine pharmacology, and the absence of irreversible impacts.

This planned investigation was led to contrast intrathecal bupivacaine and bupivacaine and midazolam in lower limb surgeries. The patients were chosen indiscriminately, to evade any sort of predisposition and to permit similarity of results acquired. This was a twofold blinded controlled investigation where neither the patient nor the spectator who recorded the parameters knew about the gathering distribution and the medication got. The patients contemplated over the gathering did not shift much concerning age, sex , height and the kind of surgeries. Heart rate, systolic and diastolic pulse in both the gatherings did not differ fundamentally. Goodchild CS,[12] Noble J in 1987, Bahar M et al[13] and Batra Y.K et al[14] found no distinction in the hemodynamic reactions to the medications utilized relating with the present investigation.

The duration of analgesia was fundamentally higher in patients accepting bupivacaine and midazolam (321 ± 25.5) in contrast with bupivacaine alone (157 ± 17.4) which is similar to previous studies.[15] VAS score was observed to be altogether higher among the patients who got just bupivacaine in 0, first, second, third, and fourth hours in the postoperative period.

In the present investigation the onset of sensory blockade in group 1 was 2.69 ± 0.74 minutes contrasted with 2.14 ± .0 64 minutes in groupn2 which was factually exceedingly huge . It demonstrates that expansion of midazolam to local anesthetic delays the onset of analgesia. Essentially the onset of motor blockade in group 1 was 3.97 ± 0.89 minutes contrasted with 3.21 ± 0.76 minutes in group 2 which was additionally measurably exceptionally critical i.e., the option of midazolam to local anesthetic delays the onset of motor blockade. Yegin et al[16] have found in their investigation that expansion of 2mg of midazolam to hyperbaric bupivacaine in spinal anesthesia does not delay onset of sensory and motor blockade contrasted with hyperbaric bupivacaine alone in patients experiencing perianal surgery. In studies directed by Gupta et al. reported no huge contrast between the two gatherings with respect to time to beginning of sensory block(Gupta et al., 2007).[17]

From the above examination we conclude that there is variation in the onset of sensory and motor blockade in various investigations. In spite of the fact that it is measurably huge in our investigation it doesn't have any clinical ramifications.

In the present examination, the two segment regression of sensory level in group I was 72.5 ± 8.6minutes contrasted with 89.8 ± 7.9 minutes in group II which was measurably very critical. This demonstrates expansion of midazolam expands the term of sensory blockade. Bharti N and et al [15] found that duration of sensory block (ie., time to relapse to S2 section) was essentially longer in the midazolam aggregate than the control gathering (218 min versus 165min, P< 0.001). Accordingly we can reason that intrathecal midazolam builds the length ofsensory blockade.

In the present investigation, the span of motor blockade in group 1 was 167 .7 ± 11.2 minutes contrasted with 176 .6 ± 10.8 minutes in group 1 which was factually very huge (P<0.001). This demonstrates expansion of midazolam potentiates the engine bar gave by bupivacaine. Bharti N and et al in 2003 demonstrated that the duration of motor block was delayed in the midazolam bunch as contrasted and the control gathering (P< 0.01) and they likewise demonstrated that in 90% of the patients in the midazolam amass the nature of block was sufficient amid the intraoperative period as contrasted and just 65% of the patient in the control gathering.

In our examination, we saw that including additive free Midazolam with hyperbaric 0.5% Bupivacaine intrathecally, gave expanded term of tactile absence of pain and with expanded sedation score without delaying motor recovery.

CONCLUSION:

Taking everything into account, the postoperative analgesia is prevalent and of enhanced quality when Midazolam is added to spinal Bupivacaine. It can be induced that inj. midazolam 1 mg in mix with inj. bupivacaine 0.5% hyperbaric can be securely controlled intrathecally for better postoperative absense of pain. Both the gatherings were practically identical as for age, sex, kind of surgery, maximum level of block, onset quality and duration of motor block. It has been watched that, the addition of midazolam to 0.5% hyperbaric bupivacaine decreases the onset time of sensory block and prolongs the duration of analgesia with no increment in the frequency of inconveniences.

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