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Isobaric Levobupivacaine 0.5% Versus Isobaric Levobupivacaine 0.5% With 3mcg Dexmeditomidine In Spinal Anaesthesia- A Comparative Study

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ABSTRACT:Background: Levobupivacaine is a long acting, amide-type local anaesthetic that is the S(−) \3- isomer of the racemate bupivacaine. In general, in vitro, in vivo and human volunteer studies of nerve block indicate that levobupivacaine is as potent as bupivacaine and produces similar sensory and motor block. Dexmedetomidine is used as an adjuvant in spinal anesthesia and is associated with prolonged motor and sensory block, hemodynamic stability, and less requirement of rescue analgesia in 24 h as a result it facilitates reduction in dose of local anesthetic. Aim of the study: To compare isobaric levobupivacaine 0.5% versus isobaric levobupivacaine 0.5% with 3 mcg Dexmeditomidine in spinal anaesthesia. Materials and methods: The present study was conducted in the Department of Anesthesiology of the medical institution. For the study, we selected a total of 50 patients in the age group of 20-65 years of physical status American Society of Anesthesiologists (ASA) Classes I and II admitted for surgeries requiring spinal anesthesia. An informed written consent was obtained from all the participants after explaining them the protocol of the study. The patients were randomly grouped into two groups, Group 1 and Group 2. Group 1 patients received 3 ml (15 mg) of 0.5% isobaric levobupivacaine + 0.3 ml normal saline, whereas Group 2 patients received 3 ml (15 mg) of 0.5% isobaric levobupivacaine + 0.3 ml (3 µg) dexmedetomidine. Results: It was observed that the number of male patients in group 1 and 2 was 12 and 14, respectively. The number of female patients in group 1 and 2 was 13 and 11, respectively. The mean age of patients in group 1 was 46.28 years and in group 2 was 47.12 years. It was observed that the mean duration of sensory block in Group 2 was significantly higher than Group 1. The mean duration of motor block in both the groups was similar and was statistically non-significant. Conclusion: Within the limitations of the present study, it can be concluded that the duration of sensory block increases with addition of 3 mcg of dexmedetomidine with Levobupivacaine as compared to plain Levobupivacaine. The results were found to be statistically significant.

Keywords: Levobupivacaine, Dexmeditomidine, spinal anesthesia.

1. INTRODUCTION:

Levobupivacaine is a long acting, amide-type local anaesthetic that is the S(−) \3- isomer of the racemate bupivacaine. In general, in vitro, in vivo and human volunteer studies of nerve block indicate that levobupivacaine is as potent as bupivacaine and produces similar sensory and motor block. [1, 2] A trend towards a longer sensory block with levobupivacaine was seen in some studies, and may be related to the greater vasoconstrictive activity of levobupivacaine than that of the R(+)-enantiomer (dexbupivacaine) at lower doses. Levobupivacaine is long acting with an onset of action ≤15 minutes. The duration of action is dose-dependent and varies according to the anaesthetic technique. Adequate sensory and motor block for surgery was achieved in ≥90% of adult patients receiving adequate doses of levobupivacaine with satisfactory anaesthetic technique in most of the 10 available clinical trials. [3, 4] In an attempt to further minimize the effects of local anesthetics and prolong the duration of intraoperative and postoperative analgesia, various adjuvants such as vasoconstrictors, alpha-2 agonists, and opioids have been used.[5] Dexmedetomidine is used as an adjuvant in spinal anesthesia and is associated with prolonged motor and sensory block, hemodynamic stability, and less requirement of rescue analgesia in 24 h as a result it facilitates reduction in dose of local anesthetic. [6] Hence, the present study was conducted to compare isobaric levobupivacaine 0.5% versus isobaric levobupivacaine 0.5% with 3 mcg Dexmeditomidine in spinal anaesthesia.

2. MATERIALS AND METHODS:

The present study was conducted in the Department of Anesthesiology of the medical institution. The ethical clearance for the study was approved from the ethical committee of the hospital. For the study, we selected a total of 50 patients in the age group of 20-65 years of physical status American Society of Anesthesiologists (ASA) Classes I and II admitted for surgeries requiring spinal anesthesia. An informed written consent was obtained from all the participants after explaining them the protocol of the study. The patients were randomly grouped into two groups, Group 1 and Group 2. Group 1 patients received 3 ml (15 mg) of 0.5% isobaric levobupivacaine + 0.3 ml normal saline, whereas Group 2 patients received 3 ml (15 mg) of 0.5% isobaric levobupivacaine + 0.3 ml (3 μg) dexmedetomidine. Visual analog scale (VAS) with 0–10 cm line was used to determine the level of analgesia in the postoperative period for 24 h and was explained to the patient a day before surgery during the preanesthetic checkup. The first end mark “0” means “no pain” and the end marked “10” means “severe pain.” Rescue analgesia was given if VAS score >3.
The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student’s t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistically significant.

3. RESULTS:

In the present study, a total of 50 patients were recruited. Patients were grouped into Group 1 and 2 with 25 patients in each group. Table 1 shows the demographic data of the participants in group 1 and 2. It was observed that the number of male patients in group 1 and 2 was 12 and 14, respectively. The number of female patients in group 1 and 2 was 13 and 11, respectively. The mean age of patients in group 1 was 46.28 years and in group 2 was 47.12 years. The mean weight of participants in group 1 was 67.29 kg and in group 2 was 68.20 kg. Table 2 shows the mean duration of sensory and motor block. It was observed that the mean

duration of sensory block in Group 2 was significantly higher than Group 1. The mean duration of motor block in both the groups was similar and was statistically non-significant. [Fig 1]

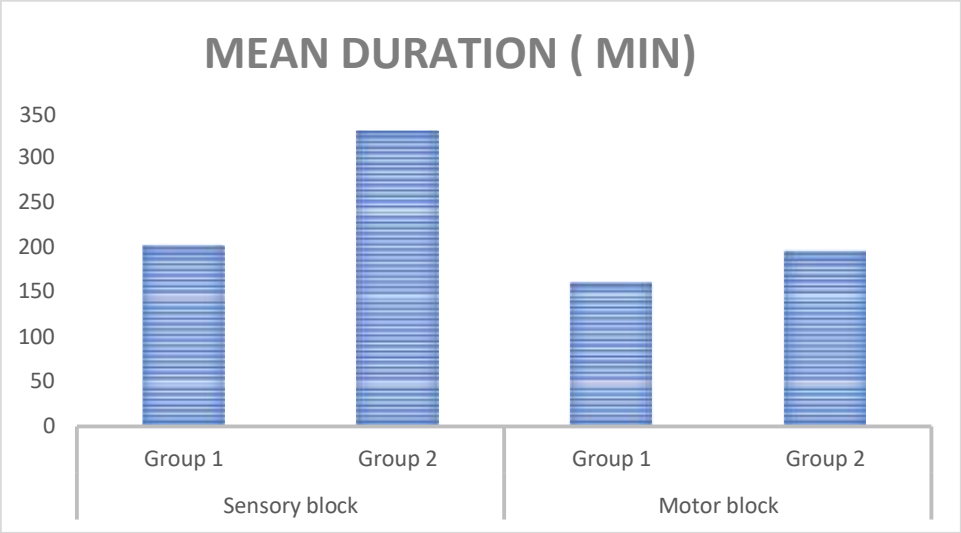
Table 1: Demographic data of the participants in group 1 and 2

Variables	**Group 1**	**Group 2**
Total no. of patients	25	25
No. of male patients	12	14
No. of female patients	13	11
Mean age (years)	46.28	47.12
Mean weight (kg)	67.29	68.20

Table 2: Mean duration of sensory and motor block

	Sensory block		**Motor block**	
	Group 1	Group 2	Group 1	Group 2
Mean duration (min)	201.28	329.24	160.28	195.35
p-value	0.002		0.25	

Fig 1: Sensory block and motor block in Group 1 and 2



4. DISCUSSION:

In the present study, we studied sensory and motor block with plain isobaric Levobupivacaine and with isobaric Levobupivacaine with Dexmedetomidine. We observed that the mean duration of sensory block in isobaric Levobupivacaine with Dexmedetomidine was significantly higher than plain isobaric Levobupivacaine. The mean duration of motor block in both the groups was similar and was statistically non-significant. The results were compared with previous studies from the literature. Dolma L et al [7] studied the effect of addition of dexmedetomidine 5 µg to isobaric ropivacaine 18.75 mg on block characteristics and hemodynamic parameters in patients undergoing surgeries for fracture neck of femur under subarachnoid block (SAB). Sixty-one American Society of Anesthesiologists (ASA)

Class I or II patients between 18-60 years undergoing surgeries for fracture neck of femur under SAB were recruited and randomized into two groups. Thirty patients in Group RN received 2.5 ml isobaric ropivacaine 0.75% (18.75 mg) with 0.5 ml normal saline (NS) to make a total volume of 3 ml, while 31 patients in Group RD received 2.5 ml isobaric ropivacaine 0.75% with dexmedetomidine 5 μg diluted with NS to make a total volume of 3 ml. Patients in Group RD had significantly longer duration of sensory block (202.90 ± 50.2 min) compared to Group RN. Time to first rescue analgesia request was significantly longer in the Group RD compared to Group RN. However, the sensory block onset, maximum block height, time to two dermatomal regression, and motor block intensity remained unaltered. Incidence of side effects like hypotension, bradycardia, nausea, vomiting, and shivering were statistically similar in both the groups. They concluded that addition of 5 μg dexmedetomidine enhances the analgesic effect of intrathecal 18.75 mg isobaric ropivacaine for the conduct of fracture neck of femur surgeries with minimal adverse events. Kataria AP et al [8] conducted a prospective, randomized study which included 60 adult patients between the age group of 20 and 65 years of physical status American Society of Anesthesiologists Classes I and II who underwent infraumbilical surgeries. Group L patients received 3 ml (15 mg) of 0.5% isobaric levobupivacaine + 0.3 ml normal saline while Group LD patients received 3 ml (15 mg) of 0.5% isobaric levobupivacaine + 0.3 ml (3 μg) dexmedetomidine. The two groups were compared with respect to the onset and duration of sensory and motor block and hemodynamic stability. The mean duration of sensory block in Group L was 199.50 ± 7.96 min while in Group LD was 340.20 ± 11.78 min. All the differences were statistically highly significant between the two groups. Mean duration of motor block in Group L and LD was 150.83 ± 9.17 min and 190.20 ± 9.61 min, respectively. Both the differences were highly significant. They concluded that Group LD has early-onset and prolonged duration of sensory and motor block and longer duration of postoperative analgesia than Group L.

Samar P et al [9] compared and evaluated the efficacy of 3-ml 0.5% isobaric levobupivacaine versus 3-ml 0.75% isobaric ropivacaine in patients undergoing elective lower abdominal and lower limb surgeries. They allocated 60 patients into two groups (n=30 each) to receive either a spinal block of 3-ml 0.5% isobaric levobupivacaine (group L) or 3-ml 0.75% isobaric ropivacaine (group R). The mean onset of sensory block in group L was significantly faster than in group R. Similarly, so was the mean onset of motor block in group L versus group R. The mean duration of sensory block in group L was significantly longer than in group R, as was the mean duration of motor block in group L versus group R. In group L, 13.3% of patients had complications, with hypotension being the most common (6.7%); in group R, 40% had complications, of which bradycardia was the most common (13.3%). They concluded that there was an earlier onset of sensory and motor block and prolonged duration of sensory and motor block with intrathecal administration of 3-ml 0.5% isobaric levobupivacaine as compared to 3-ml 0.75% isobaric ropivacaine. Ravipati P et al [10] compared efficacy of dexmedetomidine and fentanyl when given intrathecally as an adjuvant to 2.5 ml of 0.75% isobaric ropivacaine. Sixty selected patients were randomized to receive 2.5 ml of 0.75% isobaric ropivacaine with dexmedetomidine 5 mcg (Group RD) or 20 mcg of fentanyl (Group RF) intrathecally for lower limb surgeries, block characteristics, hemodynamic changes, and adverse effects were compared. Efficacy of both the drugs when given intrathecally was studied. Mean time needed for sensory blockade at T10 was 156.4667 ± 33.78 s in Group RD and 185.2000 ± 35.17 s in Group RF. The results are clinically and statistically significant. The mean of total duration of sensory block in Group RD was 194.400 min while it was 139.9000 min in Group RF which was clinically and statistically significant. Time taken for onset of motor block was almost same in both groups. The mean of total duration of motor block in Group RD was 136.7333 min while it was 94.8667 min in Group RF which was clinically and statistically significant. They concluded that

dexmedetomidine at a dose of 5 µg added to 2.5 ml of ropivacaine provided earlier sensory blockade, prolonged duration of sensory and motor blockade for patients under intrathecal anesthesia for lower limb surgeries with no sedation.

5. CONCLUSION:

Within the limitations of the present study, it can be concluded that the duration of sensory block increases with addition of 3 mcg of dexmedetomidine with Levobupivacaine as compared to plain Levobupivacaine. The results were found to be statistically significant.

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