

ORIGINAL ARTICLE**Comparative analysis of efficacy of Bupivacaine with or without Dexamethasone**

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ABSTRACT:

Background: Spinal anesthesia is the most consistent block for lower abdomen and orthopedic surgery. Spinal anesthesia avoids the risks of general anesthesia such as aspiration of gastric contents and difficulty with airway management. **Aim of the study:** To compare efficacy of Bupivacaine with or without Dexamethasone. **Materials and methods:** The present study was conducted in the Department of Anesthesia of the Medical institute. For the study, we selected 50 patients scheduled for abdominal surgery with ASA I and II. The patients were randomly grouped into two groups, Group 1 and Group 2 with 25 subjects in each group. Subjects in group 1 were administered intrathecal bupivacaine-dexamethasone; however, subjects in group 2 were administered intrathecal bupivacaine- normal saline. **Results:** We included 50 patients for the study. Patients were randomly grouped into two groups, Group 1 and Group 2. We observed that there was no statistically significant difference between demographic characteristics of the patients of both groups. The anesthesia onset time for Group 1 was 12.89 minutes as compared to 11.03 minutes for Group 2. The sensory block time period for Group 1 was 120.28 minutes in comparison to Group 2 that was 116.41 minutes. **Conclusion:** Within the limitations of the study, we conclude that dexamethasone with bupivacaine delays the sensory block in spinal anesthesia for abdominal surgeries.

Keywords: Bupivacaine, dexamethasone, spinal anesthesia.

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INTRODUCTION:

Spinal anesthesia is the most consistent block for lower abdomen and orthopedic surgery. Spinal anesthesia avoids the risks of general anesthesia such as aspiration of gastric contents and difficulty with airway management.¹ Bupivacaine is appropriate for procedures lasting up to 90-120 minutes.^{2, 3} Therefore, various additives such as epinephrine, phenylephrine, clonidine, opioids, etc. were added to local anesthetics.^{4, 5} The additions of epinephrine to local anesthesia cause tachycardia, pallor, and hypertension, which can be risky in patients with cardiovascular disease. Intrathecal opioid administration has central and respiratory depression effects. Dexamethasone is potent, selective glucocorticoid having minimal mineralocorticoid action.^{6, 7} Systemic anti-inflammatory and immunosuppressive properties may be responsible for the prolongation of analgesia when administered intravenously. Various studies proved the efficacy of steroids for the prolongation of effects of regional nerve blocks.⁸ Hence, the present study was conducted to compare efficacy of Bupivacaine with or without Dexamethasone.

MATERIALS AND METHODS:

The present study was conducted in the Department of Anesthesia of the Medical institute. The ethical approval for the study was obtained from the ethical committee of the institute. For the study, we selected 50 patients scheduled for abdominal surgery with ASA I and II. We excluded

patients who were allergic to anesthetic drugs, had diabetes mellitus or bleeding disorders. An informed consent was obtained from each patient prior to commencement of the study. The patients were randomly grouped into two groups, Group 1 and Group 2 with 25 subjects in each group. Subjects in group 1 were administered intrathecal bupivacaine-dexamethasone; however, subjects in group 2 were administered intrathecal bupivacaine- normal saline. Administration of spinal anaesthesia was done in the desk-bound projection at L 4 -L 5 level through a midline approach by means of a 25-gauge spinal needle. The evaluation of sensory block was done using pin prick test with a short bevel needle along mid-axillary line bilaterally. The assessment was done every 5 minutes awaiting a level 4 sensory level regression till end of the surgical procedure. Anesthesia onset time, sensory block time period, pain free time-period was recorded for each patient.

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 statistical significant.

RESULTS:

We included 50 patients for the study. Patients were randomly grouped into two groups, Group 1 and Group 2. Table 1 shows different demographic characteristics of the patients. We observed that there was no statistically

significant difference between demographic characteristics of the patients of both groups ($P>0.05$) (Figure 1). Table 2 shows the comparative analysis of different parameters of anesthesia between Group 1 and Group 2. The anesthesia onset time for Group 1 was 12.89 minutes as compared to

11.03 minutes for Group 2. The sensory block time period for Group 1 was 120.28 minutes in comparison to Group 2 that was 116.41 minutes. Also, pain free time-period for Group 1 was 208.26 minutes as compared to Group 2 that was 219.74 minutes (Figure 2).

Table 1: Demographic characteristics of patients

Variables	Group 1	Group 2	P-value
Age (years)	38.25	41.25	
Sex ratio (male/female)	12/13	11/14	0.09
Weight (kg)	68.11	65.23	0.11
Height (cm)	156.25	158.38	0.84

Figure 1: Demographic data

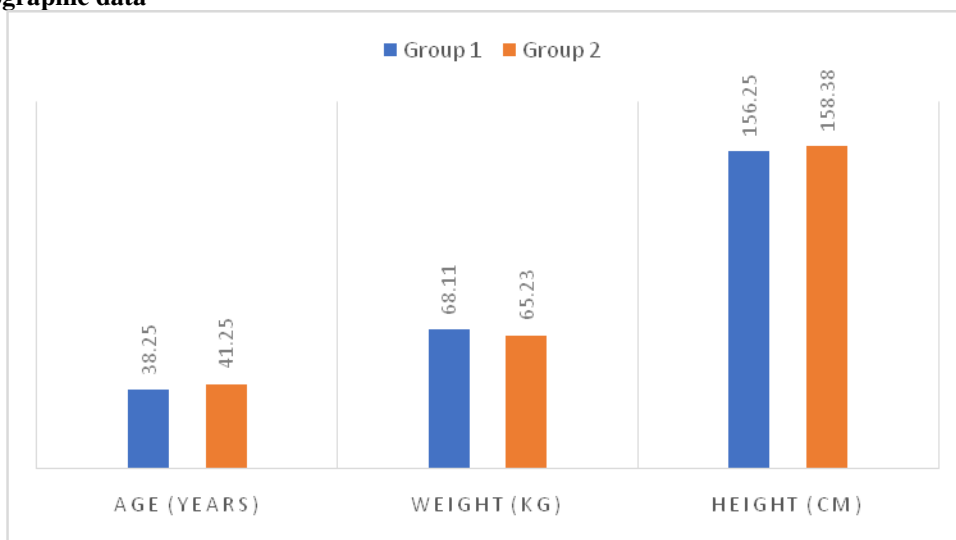
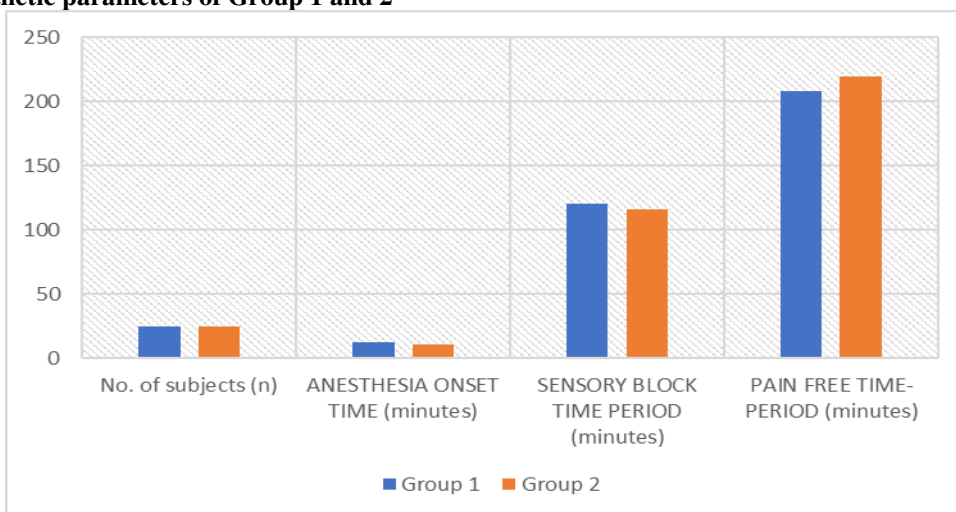


Table 2: Comparative analysis of different parameters of anesthesia between Group A and Group B

Parameters	Group 1	Group 2	P-value
No. of subjects (n)	25	25	
ANESTHESIA ONSET TIME (minutes)	12.89	11.03	0.14
SENSORY BLOCK TIME PERIOD (minutes)	120.28	116.41	0.002
PAIN FREE TIME-PERIOD (minutes)	208.26	219.74	0.0001

Figure 2: Anesthetic parameters of Group 1 and 2



DISCUSSION:

The present study demonstrated that the supplementation of spinal bupivacaine with 8 mg dexamethasone altogether drawn out sensory block and postoperative absence of pain contrasted and intrathecal bupivacaine, with no consequences for the onset time of sensory block in abdominal surgery. But the results were statistically non-significant. The results were compared with previous studies and results were consistent with previous studies. Colombo G et al investigated the effect applies to particles with much more rapid drug release and improved long-term biocompatibility. Male Sprague-Dawley rats were given sciatic nerve blocks with 75 mg of 3% or 60% (w/w) dipalmitoyl phosphatidyl choline (DPPC) spray-dried lipid-protein-sugar particles (LPSPs) containing 10% (w/w) bupivacaine and 0%, 0.05%, or 0.1% (w/w) dexamethasone. Sensory nerve block from bupivacaine-containing 3% and 60% (w/w) DPPC particles without dexamethasone yielded blocks lasting 301 +/- 56 and 321 +/- 127 min, respectively. Addition of 0.05% (w/w) dexamethasone increased block durations to 610 +/- 182 and 538 +/- 222 min, respectively; increasing dexamethasone loading to 0.1% did not further increase duration. One day after injection, dexamethasone-containing particles resulted in lower inflammation scores and capsule thickness than dexamethasone-free particles, but the difference was gone by day 4. Excipient composition had prominent effects at all time points. For all groups, inflammation was largely resolved by 2 weeks after injection. Dexamethasone approximately doubled the duration of nerve block from bupivacaine-loaded LPSPs, while maintaining excellent biocompatibility. Ammar AS et al evaluated the effect of adding dexamethasone to bupivacaine on the quality and duration of transversus abdominis plane (TAP) block. Sixty adult patients undergoing elective open abdominal hysterectomy were randomly allocated to receive TAP block using 20 mL of bupivacaine hydrochloride 0.25% + 2 mL saline 0.9% or 20 mL of bupivacaine hydrochloride 0.25% + 2 mL dexamethasone "8 mg". The pain VAS score was significantly lower at the postoperative 2 h, 4 h and 12 h. They concluded that the addition of dexamethasone to bupivacaine in TAP block prolonged the duration of the block and decreased the incidence of nausea and vomiting.^{9, 10}

Bani-hashem N et al determined whether the addition of dexamethasone to intrathecal bupivacaine would prolong the duration of sensory analgesia or not. A total of 50 patients were scheduled for orthopedic surgery under spinal anesthesia. The patients were randomly allocated to receive 15 mg hyperbaric bupivacaine 0.5% with 2 cc normal saline (control group) or 15 mg hyperbaric bupivacaine 0.5% plus 8 mg dexamethasone (case group) intrathecally. There were no significant differences in demographic data, sensory level, and onset time of the sensory block between two groups. Sensory block duration in the case group was 119±10.69 minutes and in the control group was 89.44±8.37

minutes which was significantly higher in the case group. The duration of analgesia was 401.92±72.44 minutes in the case group; whereas it was 202±43.67 minutes in the control group. This study has shown that the addition of intrathecal dexamethasone to bupivacaine significantly improved the duration of sensory block in spinal anesthesia without any changes in onset time and complications. Tandoc MN identified the effects of adding two different doses of dexamethasone on the duration and quality of interscalene block in patients undergoing shoulder surgery in ambulatory surgery settings. A total of 90 patients undergoing shoulder surgery using interscalene block with 0.5% bupivacaine (40 mL) were assigned randomly to one of three groups: control patients, "Group C," who received no additive; low dose, "Group L," who received additional dexamethasone 4 mg; and high dose, "Group H," who received dexamethasone 8 mg in addition to 0.5% bupivacaine. The duration of analgesia was significantly prolonged in both Group L and Group H compared with Group C. Similarly, the duration of motor block was longer in both Group L, and Group H compared to Group C. They concluded that the addition of dexamethasone to bupivacaine significantly prolonged the duration of the motor block and improved the quality of analgesia following interscalene block.^{11, 12}

CONCLUSION:

Within the limitations of the study, we conclude that dexamethasone with bupivacaine delays the sensory block in spinal anesthesia for abdominal surgeries.

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