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Original Research

Dexamethassone With Bupivacaine For Spinal Anesthesia: A Comparative Study

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ABSTRACT
Background: Peripheral nerve blocks enjoy great importance in anaesthesia practice. They can provide safe and effective anaesthesia with long-lasting analgesia. Various approaches have been described to block the brachial plexus. Infraclavicular approach represents a reliable and safe approach for the hand, forearm and the elbow surgeries. Different additives have been used as adjuvant with local anesthetics to achieve dense and prolonged block. Corticosteroids are believed to extend the duration of the nerve block. **Aim of the study:** To assess Dexamethassone with Bupivacaine for spinal anesthesia. **Materials and methods:** The present study was conducted in the Department of Anesthesia of the Medical institute. For the study, we selected 32 patients with American Society of Anesthesiologist (ASA) I-II for which abdominal surgical procedures were planned. Patients with history of long term steroid therapy, allergy to the anesthetic drugs, with uncontrolled hypertension and diabetes mellitus were excluded from the study. The time interval for surgery was about 40-60 minutes. A written informed consent was obtained from each patient preoperatively. **Results:** We included 36 patients for the study. Patients were randomly grouped into two groups, Group A and Group B. We observed that there was no statistically significant difference between demographic characteristics of the patients of both groups. The anesthesia onset time for Group A was 13.34 $\pm$ 1.96 minutes as compared to 12.38 $\pm$ 1.14 minutes for Group B. The sensory block time period for Group A was 130.21 $\pm$ 10.73 minutes in comparison to Group B that was 98.15 $\pm$ 9.58 minutes. **Conclusion:** Within the limitations of the study we conclude that dexamethasone with bupivacaine delays the sensory block in spinal anesthesia for abdominal surgeries and abatements opioid prerequisites in postoperative administration.

Key Words: Procedures, Patients Anesthesia

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INTRODUCTION

Peripheral nerve blocks enjoy great importance in anaesthesia practice. They can provide safe and effective anaesthesia with long-lasting analgesia.[1, 2] Brachial plexus block is a widely employed regional nerve block of the upper extremity. Various approaches have been described to block the brachial plexus. Infraclavicular approach represents a reliable and safe approach for the hand, forearm and the elbow surgeries. Different additives have been used as adjuvant with local anesthetics to achieve dense and prolonged block. Corticosteroids are believed to extend the duration of the nerve block. Dexamethasone has been used as an adjuvant to local anesthetics in peripheral nerve blocks.[3, 4] A meta-analysis found that addition of dexamethasone to local anesthetics prolonged brachial plexus blockade.3 However, recent studies using systemic dexamethasone controls failed to show major benefits from perineural dexamethasone. Systemic dexamethasone provides analgesia when used at more than 0.1 mg/kg,7 emphasizing the need for systemic controls.[5, 6] Hence, we planned the study to comparatively assess Dexamethassone with Bupivacaine for spinal anesthesia.

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 32 patients with American Society of Anesthesiologist (ASA) I-II for which abdominal surgical procedures were planned. Patients with history of long term steroid therapy, allergy to the anesthetic drugs, with uncontrolled hypertension and diabetes

mellitus were excluded from the study. The time interval for surgery was about 40-60 minutes. A written informed consent was obtained from each patient preoperatively. The patients were randomly grouped into two groups, Group A and Group B with 16 subjects in each group. Subjects in group A were administered intrathecal bupivacaine-dexamathasone; however, subjects in group B 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. Patients of Group A were administered 15 mg (3 ml) of 0.5% hyperbaric bupivacaine and 8 mg dexamethasone intrathecally whereas patients in Group B were administered 15 mg (3 ml) of 0.5% hyperbaric bupivacaine diluted in normal saline (2 ml). 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. Following the drop of 4 dermatome block, assessment of pain intraoperatively was done using visual analogue pain scale (VAS) every hour. Anesthesia onset time, sensory block time period, pain free time-period was recorded for each patient. Also, demographic data (age, sex, weight, height) of the patients were recorded. The statistical analysis of the data was done using SPSS software for windows. Chi-square test and Student's T-test were used to assess the significance of the data. Statistical significance level was defined as P value less than 0.05.

RESULTS

We included 36 patients for the study. Patients were randomly grouped into two groups, Group A and Group B. 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 A and Group B. The anesthesia onset time for Group A was 13.34 ± 1.96 minutes as compared to 12.38 ± 1.14 minutes for Group B (P=0.32). The sensory block time period for Group A was 130.21 ± 10.73 minutes in comparison to Group B that was 98.15 ± 9.58 minutes with a P value of 0.006. Also, pain free time-period for Group A was 312.14 ± 46.03 minutes as compared to Group B that was 202.45 ± 65.14 minutes with a P value of 0.004 (Figure 2).

Table 1: Demographic characteristics of patients

Variables	Group A (n=16)	Group B (n=16)	P-value
Age (years)	41.45±19.87	43.77±17.81	
Sex ratio (male/female)	9/7	11/5	0.21
Weight (kg)	69.33±19.22	71.32±11.18	0.09
Height (cm)	159.01 ± 9.14	161.11±9.18	0.11

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

Parameters	Group A	Group B	P-value
No. of subjects (n)	16	16	
ANESTHESIA ONSET TIME (minutes)	13.34 ± 1.96	12.38 ± 1.14	0.32
SENSORY BLOCK TIME PERIOD (minutes)	130.21 ± 10.73	98.15 ± 9.58	0.006
PAIN FREE TIME-PERIOD (minutes)	312.14 ± 46.03	202.45 ± 65.14	0.004

Fig 1: **Demographic characteristics of patients**

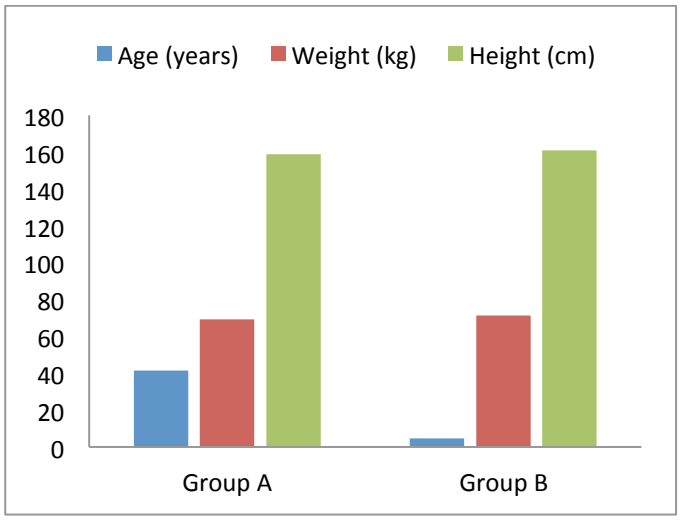
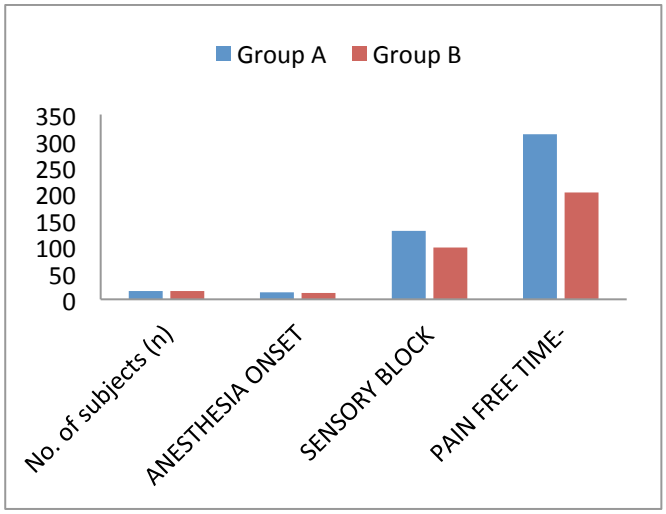


Fig 2: **Comparative analysis between Group A and Group B**



DISCUSSION

Corticosteroids cause skin vasoconstriction on topical application. The vasoconstriction impacts of topical steroids are interceded by inhabitance of established glucocorticoid receptors. In our review, dexamethasone delivered a critical delayed sensory block which can be clarified by vasoconstriction system, conversely with customary hypothesis of steroid activity; steroids tie to intracellular receptors and balance atomic interpretation. 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. 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% (control group, n=30) or 20 mL of bupivacaine hydrochloride 0.25% + 2 mL dexamethasone "8 mg" (dexamethasone group, n=30). The primary outcome was postoperative pain, as evaluated by visual analog scale (VAS) for pain scoring at 1, 2, 4, 12, 24 and 48 h postoperatively, whereas the secondary outcomes were time to first analgesia (TFA), morphine consumption and the occurrence of nausea, vomiting or somnolence. The pain VAS score was significantly lower at the postoperative 2 h, 4 h and 12 h. Furthermore, TFA was significantly longer in the dexamethasone group, with lesser morphine requirements in the postoperative 48 h and lower incidence of nausea and vomiting. No complications attributed to the block were recorded. They concluded that addition of dexamethasone to bupivacaine in TAP block prolonged the duration of the block and decreased the incidence of nausea and vomiting. Parameswari A et al evaluated the efficacy of dexamethasone added to bupivacaine for caudal block in children. This was a prospective, double-blinded trial on 130 children aged between 6 months and 6 years of age allocated randomly into one of two groups for elective subumbilical surgeries. Children in Group C received caudal bupivacaine and those in Group D received caudal bupivacaine with 0.1 mg/kg of dexamethasone. The mean duration of analgesia when dexamethasone was added to caudal bupivacaine was 1044.92 (±48.66) min, while it was 435.85 (±17.95) min with plain bupivacaine. The number of doses of rescue analgesics required and the mean pain score was also lesser in this group. It was concluded that the addition of 0.1 mg/kg of dexamethasone to caudal bupivacaine increases the duration of analgesia of caudal bupivacaine without any side effects in children undergoing subumbilical surgeries.[7, 8] Zhao W-L et al conducted a systematic review and meta-analysis of randomized controlled trials to assess the effect of perineural versus intravenous dexamethasone on local anesthetic regional nerve-blockade outcomes. The data of the selected trials were statistically analyzed to find any significant differences between the two modalities. The primary outcome was the duration of analgesia. Secondary outcomes included duration of motor block, postoperative nausea and vomiting, and postoperative analgesic dose at 24 hours. They conducted a planned subgroup analysis to compare the effects between adding epinephrine or not. Ten randomized controlled trials met the inclusion criteria of their analysis, with a total of 749 patients. Without the addition of epinephrine, the effects of perineural and intravenous dexamethasone were equivalent concerning the duration of analgesia. However, with the addition of epinephrine, the analgesic duration of perineural dexamethasone versus intravenous dexamethasone was prolonged. Likewise, the impact of epinephrine was the same on the duration of motor block. The two routes of administration did not show any significant differences in the incidence of postoperative nausea and vomiting, nor on postoperative analgesic consumption at 24 hours. Their results show that perineural dexamethasone can prolong the effects of analgesic duration when compared to the intravenous route, only when epinephrine is coadministered. Without epinephrine, the two modalities show equivalent effect as adjuvants on regional anesthesia. El-Baradey GF et al assessed the effectiveness of adding either dexamethasone or midazolam in comparison with epinephrine addition to 0.5% bupivacaine in supraclavicular brachial plexus block. This study was carried out in Tanta University Hospital on 60 patients of both sexes; American Society of Anesthesiologists physical Status I and II, age range from 18 to 45 years undergo elective surgery to upper limb. All patients were anesthetized with ultrasound guided supraclavicular brachial plexus block and randomly divided into three groups (each group 20 patients) Group E (epinephrine): 30 mL bupivacaine 0.5%with 1:200,000 epinephrine (5 µg/mL). Group D (dexamethasone): 30 mL bupivacaine 0.5% and dexamethasone 8 mg. Group M (midazolam): 30 ml bupivacaine 0.5% and midazolam 50 µg/kg. The primary outcome measures were onset and duration of sensory and motor block and time to first analgesic request. Onset of sensory and motor block was significantly rapid in Groups D and M in comparison with Group E. Time of administration of rescue analgesic, duration of sensory and motor block showed significant increase in Group D in comparison with Group M which showed significant increase in comparison with Group E. It was concluded that In comparison with epinephrine and midazolam addition of dexamethasone to bupivacaine had rapid onset of block and longer time to first analgesic request with fewer side-effects.[9, 10]

CONCLUSION

Within the limitations of the study we conclude that dexamethasone with bupivacaine delays the sensory block in spinal anesthesia for abdominal surgeries and abatements opioid prerequisites in postoperative administration.

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