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Original Research Article.

Efficacy Analysis of Dexamethasone as an Adjuvant to Bupivacaine during Spinal Anesthesia: An Institutional Based Study

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ABSTRACT

Background: Regional anaesthesia has gained much popularity in outpatient surgeries. Increasing duration of local anaesthetic action is desired for prolongation of postoperative patient comfort, as well as decreasing perioperative opioid consumption and subsequent side effects. Hence; the present study was conducted the effectiveness of dexamethasone in addition to bupivacaine for spinal anesthesia.

Materials and Methods: 40 subjects with American Society of Anesthesiologists (ASA) I–II who were scheduled for surgeries were chosen for the study. The surgical procedure took between forty and sixty minutes. Two groups of twenty patients each, Group A and Group B, were randomly assigned to the patients. Group A patients received intrathecal bupivacaine-dexamethasone, while Group B patients received intrathecal bupivacaine-normal saline.

Results: For the study, 40 patients were involved. Two sets of patients, designated as Group A and Group B, were randomly assigned. Group A experienced anesthesia onset at 14.29 + 2.01 minutes, while Group B experienced anesthesia onset at 12.47 + 1.94 minutes (P=0.32). Group B's sensory block time duration was 85 + 6.9 minutes, with a P value of 0.006. Group A's sensory block time period was 113 + 9.8 minutes. Additionally, Group A's pain-free time period was 401.23 + 45.8 minutes, while Group B's was 200.3 + 35.2 minutes, with a P value of 0.004.

Conclusion: Dexamethasone in addition to other medications slows the onset of sensory block and lessens the need for opioids during recovery.

Keywords: Bupivacaine, Dexamethasone, Spinal Anesthesia.

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INTRODUCTION

Regional anaesthesia has gained much popularity in outpatient surgeries. Increasing duration of local anaesthetic action is desired for prolongation of postoperative patient comfort, as well as decreasing perioperative opioid consumption and subsequent side effects. In regional anesthesia local anaesthetics alone provide analgesia for not more than 4-8 hours.[1,2] Increasing the duration of local anaesthetic action is often desirable because it prolongs surgical anaesthesia and analgesia. A number of adjuvant medications have been used in an attempt to prolong regional blockade.[2] Vasoconstrictors, such as epinephrine, classically have been used to decrease systemic absorption of local anaesthetics by vasoconstricting blood vessels, usually resulting in prolonged analgesia.[3,4] Epinephrine not only acts as a vasoconstrictor but may also produce analgesia through an α2 adrenergic mechanism. Additives like opioids, clonidine and verapamil were added to local anaesthetics, but the results are either inconclusive or associated with side effects. Steroids have powerful anti-inflammatory as well as analgesic properties.[5, 6]The purpose of the current investigation was to assess the effectiveness of dexamethasone in addition to bupivacaine for spinal anesthesia.

MATERIALS AND METHODS

The current investigation was carried out at the Department of Anaesthesia, Dr. V.R.K. Women's Medical College, Teaching Hospital & Research Centre, Aziznagar, Telangana, India. 40 patients with American Society of Anesthesiologists (ASA) I–II who were scheduled for surgeries were chosen for the study. The surgical procedure took between forty and sixty minutes. Prior to surgery, written informed permission was acquired from every patient. The subjects with the history of long-term steroid therapy, those allergic to drugs, those with uncontrolled hypertension,

chronic alcohol users and those who had addiction to opium or other drugs had been excluded from the study. Two groups of twenty patients each, Group A and Group B, were randomly assigned to the patients. Group A had intrathecal bupivacaine-dexamethasone administration, while Group B received intrathecal bupivacaine-normal saline administration. A 25-gauge spinal needle was used to administer spinal anesthesia in the desk-bound projection at L 4–L 5 level using a midline approach. Patients in Group B received 15 mg (3 ml) of 0.5% hyperbaric bupivacaine diluted in normal saline (2 ml), while patients in Group A received 15 mg (3 ml) of 0.5% hyperbaric bupivacaine and 8 mg dexamethasone intrathecally. A short bevel needle was used to perform the pin prick test at the mid-axillary line bilaterally in order to assess sensory block. Up to the end of the surgical operation, the assessment was performed every five minutes while waiting for a level 4 sensory level regression. The visual analog pain scale (VAS) was used to assess intraoperative pain every hour after the removal of four dermatome blocks. Every patient had their anesthesia start time, sensory block duration, and pain-free duration documented. Additionally, the patients' demographic information (age, sex, weight, and height) was noted. With Windows SPSS program, the data was statistically analyzed. The significance of the data was determined using the Student's T-test and the Chi-square test. P values less than 0.05 were used to define the statistical significance level.

RESULTS

For the study, 40 patients were involved. Two sets of patients, designated as Group A and Group B, were randomly assigned. Demographic features of the patients in the two groups did not differ statistically significantly (P>0.05).

Group A experienced anesthesia onset at 14.29 + 2.01 minutes, while Group B experienced anesthesia onset at 12.47 + 1.94 minutes (P=0.32). Group B's sensory block time duration was 85 + 6.9 minutes, with a P value of 0.006. Group A's sensory block time period was 113 + 9.8 minutes. Additionally, Group A's pain-free time period was 401.23 + 45.8 minutes, while Group B's was 200.3 + 35.2 minutes, with a P value of 0.004.

Table 1: Demographic characteristics of patients

Variables	Group A (n=10)	Group B (n=10)	P-value
Age (years)	36.15±8.28	38.11±5.10	
Sex (male/female)	1.8	2.43	0.77
Weight (kg)	77.45±9.23	78.75±11.1	0.98
Height (cm)	154.23 ±2.37	161.18±4.78	0.25

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)	20	20	
Anesthesia Onset Time (Minutes)	14.29 + 2.01	12.47 + 1.94	0.56
Sensory Block Time Period (Minutes)	113 + 9.8	85 + 6.9 minutes	0.009
Pain Free Time-Period (Minutes)	401.23 + 45.8	200.3 + 35.2	0.003

DISCUSSION

Spinal anesthesia is the technique of choice for caesarean delivery because it avoids the risks of general anesthetics and provides effective pain control, early ambulation, and fast return to daily activities, thereby increasing the quality of life.[5] Intrathecal block, however, has the disadvantage of limited duration sensory block. Dexamethasone is an effective adjuvant for prolonging peripheral nerve block duration with minimal side effects. Block can be prolonged by perineural[6-8] or intravenous administration of dexamethasone.[9,10]

Even though perineural administration of dexamethasone seems to be more effective than systemic use, and many providers use systemic dexamethasone to avoid mixing drugs that were not designed to be administered together, circumvent the problem of off-label perineural use, and profit from antiemetic effects of systemic dexamethasone.[11]

Doses between 4 to 10 mg have been used in adults.[12,13] The precise mechanism of action is not understood, and the potential for neurotoxic side effects is not adequately studied. However, the postulated mechanism for prolonging the duration of peripheral nerve blocks is attributed to the attenuation of the release of inflammatory mediators and inhibition of transmission in thin unmyelinated C fibers.[14,15]

Yallapragada SV et al[16] assessed the impact of clonidine on the hemodynamic strength and the span of anesthesia when added to intrathecal hyperbaric bupivacaine. Fifty patients planned for spinal anesthesia were randomized into two Groups A and B with 25 in each. Assemble A patients got 3 ml 0.5% overwhelming bupivacaine + 30 µg (0.2 ml) clonidine and Group B patients got 3 ml 0.5% substantial bupivacaine + 0.2 ml ordinary saline in the subarachnoid space. The circulatory strain and heart rate were nearly checked. The ideal opportunity for achieving crest tangible square, time for two fragment relapse, diminish in the heart rate, add up to prerequisite of mephentermine to counter the hypotension, and the quantity of patients requiring mephentermine in each gathering was organized and broke down. The ideal opportunity for accomplishing crest tactile square was comparable in both the gatherings. The ideal opportunity for two fragment relapse in Group A was 62.6 min and in Group B was 38.08 min. Twelve percent of patients in Group An and 52% of patients in

Group B required mephentermine with the mean utilization being 0.72 mg in Group An and 5.65 mg in Group B. it was reasoned that expansion of low-measurements clonidine to intrathecal bupivacaine delayed the length of spinal anesthesia as well as gave a stable intraoperative hemodynamic profile.[7, 8]

CONCLUSION

Based on the current study's findings, it can be said that using dexamethasone in addition to other medications slows the onset of sensory block and lessens the need for opioids during recovery.

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