

Evaluation of Efficacy of Dexamethasone as an Adjuvant to Bupivacaine For Spinal Anesthesia in Abdominal Surgery: An Institutional Study

Subrata Dutta^{1*}, Lokesh Kumar Gupta², Vinay Sharma³

^{1*}Associate Professor, Department of Anaesthesia and Critical Care, Saraswathi Institute of Medical Sciences, Hapur Road, Anwarpur, Uttar Pradesh, India.

²Assistant Professor, Department of Anaesthesia, Rama Medical College Hospital & Research Centre, Hapur, Uttar Pradesh, India.

³Associate Professor, Department of Pharmacology, Rama Medical College Hospital & Research Centre, Hapur, Uttar Pradesh, India.

ABSTRACT

Background: To enhance the nature of focal neuraxial block or spinal anesthesia, additional medications are utilized with local anesthetic drugs. These medications upgrade or potentiate the activities of local anesthetics with a specific end goal to enhance the inactivity of the block, span, and nature of absence of pain. The present study was planned to evaluate the efficacy of Dexamethasone as an adjuvant to Bupivacaine for spinal anesthesia in orthopaedic surgery.

Material and Methods: For the study, we selected 20 patients with American Society of Anesthesiologist (ASA) I-II for which abdominal surgical procedures were planned. The time interval for surgery was about 40-60 minutes. The patients were randomly grouped into two groups, Group A and Group B with 10 subjects in each group. Administration of intrathecal bupivacaine-dexamethasone was done in Group A and intrathecal bupivacaine- normal saline was administered to Group B patients.

Results: There was no statistically significant difference between demographic characteristics of the patients of both groups. The anesthesia onset time for Group A was 12.21 ± 1.96 mins as compared to 11.22 ± 1.45 mins for Group B. The sensory block time period for Group A was 122.21 ± 12.43 mins in comparison to Group B that was 94.11 ± 9.16 mins.

Conclusion: From the results of the present study, this can be concluded that adding up of dexamethasone altogether delays the sensory block and abatements opioid prerequisites in postoperative administration.

Keywords: Bupivacaine, Dexamethasone, Spinal Anesthesia.


*Correspondence to:

Dr. Subrata Dutta,
Associate Professor,
Department of Anaesthesia and Critical Care,
Saraswathi Institute of Medical Sciences,
Hapur Road, Anwarpur, Uttar Pradesh, India.

Article History:

Received: 27-02-2017, **Revised:** 12-03-2017, **Accepted:** 29-03-2017

Access this article online

Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2017.3.2.087	

INTRODUCTION

Spinal anesthesia is the most reliable block for abdominal and orthopedic surgical procedures. Spinal anesthesia stays away from the dangers of general anesthesia, for example, aspiration of gastric fluids and trouble with airway management.^{1,2} To enhance the nature of focal neuraxial block or spinal anesthesia, additional medications are utilized with local anesthetic drugs. These medications upgrade or potentiate the activities of local anesthetics with a specific end goal to enhance the inactivity of the block, span, and nature of absence of pain.^{3,4} It is realized that dexamethasone has mitigating and pain relieving activity by restraint of transmission in nociceptive C-strands and neural release. At the point when given as an added substance in peripheral nerve blocks or in intrathecal anesthesia, it delays the term of anesthesia.^{5,6}

So, the present study was planned to evaluate the efficacy of Dexamethasone as an adjuvant to Bupivacaine for spinal anesthesia in orthopaedic surgery.

MATERIALS AND METHODS

The present study was conducted in the Department of Anaesthesia and Critical Care, Saraswathi Institute of Medical Sciences, Hapur Road, Anwarpur, Uttar Pradesh (India). The ethical approval for the study was obtained from the ethical committee of the institute. For the study, we selected 20 patients with American Society of Anesthesiologist (ASA) I-II for which abdominal surgical procedures were planned. The time interval for surgery was about 40-60 minutes. A written informed consent was obtained from each patient preoperatively.

Exclusion Criteria

1. History of long-term steroid therapy
2. Allergic to drugs
3. Uncontrolled hypertension
4. Alcohol abuse
5. Addiction to opium or other drugs

The patients were randomly grouped into two groups, Group A and Group B with 10 subjects in each group. Administration of intrathecal bupivacaine-dexamethasone was done to Group A and intrathecal bupivacaine- normal saline was to Group B.

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

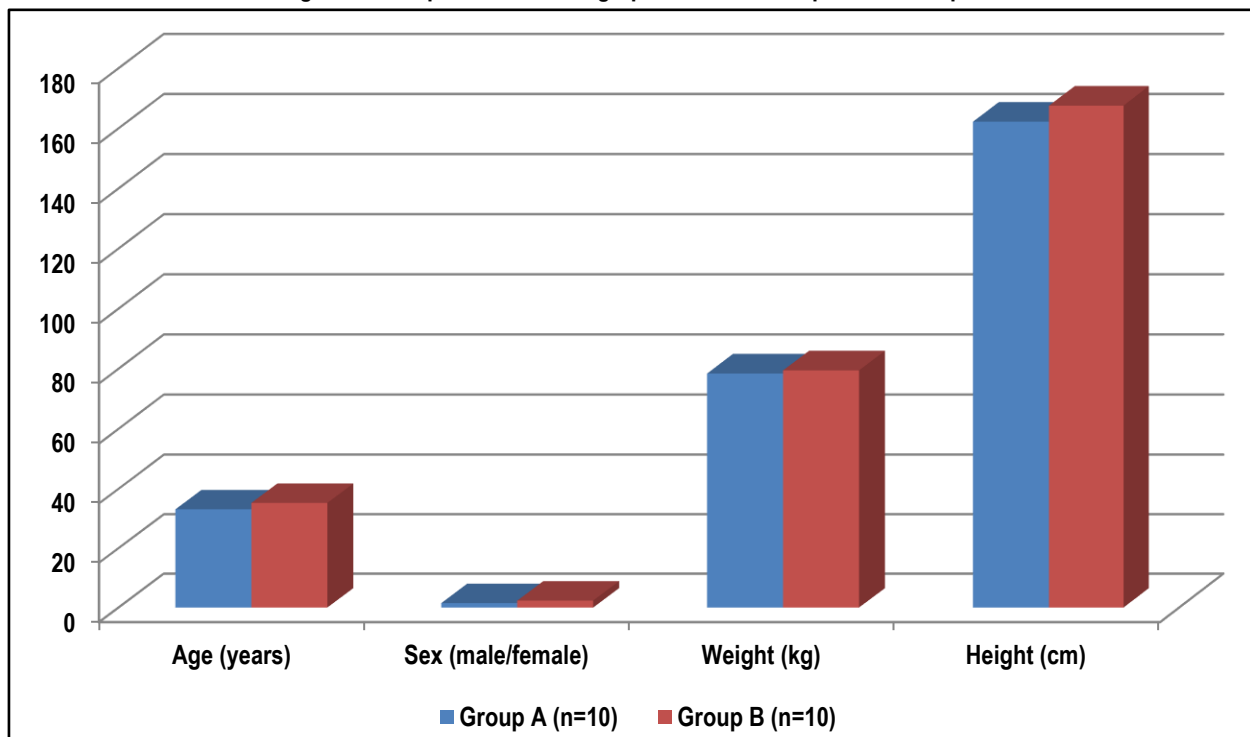
were administered 15 mg (3 ml) of 0.5% hyperbaric bupivacaine diluted in normal saline (2 ml). The evaluation of sensory block was done using pin prick test with a short bevel needle along mid-axillary line bilaterally. The assessment was done every 5 minutes awaiting a level 4 sensory level regression 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.

Table 1: Demographic characteristics of patients

Variables	Group A (n=10)	Group B (n=10)	P-value
Age (years)	33.11±10.21	35.26±12.11	
Sex (male/female)	1.5	2.33	0.54
Weight (kg)	78.43±11.33	79.45±10.22	0.87
Height (cm)	162.23 ± 3.74	167.56±4.23	0.43

Figure 1: Comparison of demographic data of Group A and Group B



RESULTS

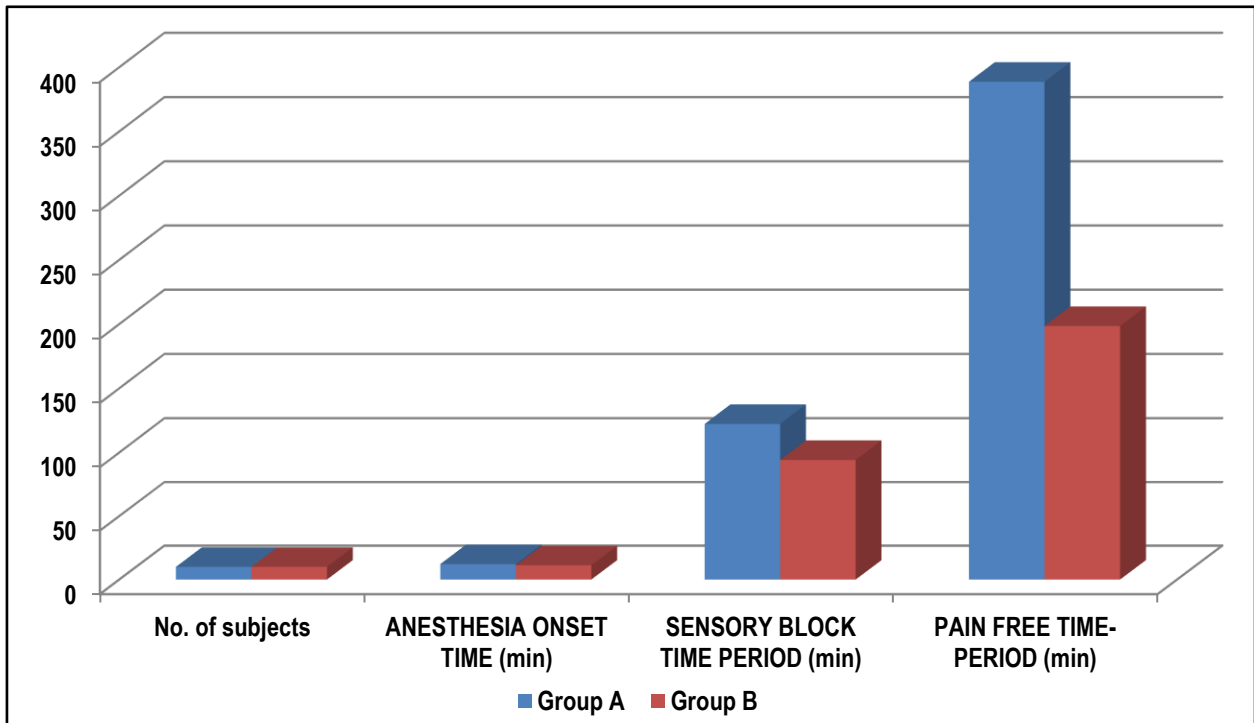
We included 20 patients for the study. Patients were randomly grouped into two groups, Group A and Group B. Table 1 shows different demographic characteristics of the patients. We observed that there was no statistically significant difference between demographic characteristics of the patients of both groups ($p>0.05$) (Fig 1). Table 2 shows the comparative analysis of different parameters of anesthesia between Group A & Group B.

The anesthesia onset time for Group A was 12.21 ± 1.96 minutes as compared to 11.22 ± 1.45 minutes for Group B ($P=0.32$). The sensory block time period for Group A was 122.21 ± 12.43 minutes in comparison to Group B that was 94.11 ± 9.16 minutes with a P value of 0.006. Also, pain free time-period for Group A was 388.65 ± 56.43 minutes as compared to Group B that was 198.45 ± 49.23 minutes with a P value of 0.004 (Fig 2).

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)	10	10	
ANESTHESIA ONSET TIME (minutes)	12.21 ± 1.96	11.22 ± 1.45	0.32
SENSORY BLOCK TIME PERIOD (minutes)	122.21 ± 12.43	94.11 ± 9.16	0.006
PAIN FREE TIME-PERIOD (minutes)	388.65 ± 56.43	198.45 ± 49.23	0.004

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



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.

Corticosteroids cause skin vasoconstriction on topical application. The vasoconstriction impacts of topical steroids are interceded by inhabitation of established glucocorticoid receptors. 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. Naziri F et al⁷ assessed the onset and length of sensory block of intrathecal dexamethasone and epinephrine as supplementary to lidocaine in patients who were possibility for cesarean segment. This twofold visually impaired clinical trial research was led on 90 pregnant ladies contender for cesarean segment under spinal anesthesia. Patients were arbitrarily assigned to get intrathecally either 75 mg hyperbaric lidocaine in addition to 100 µg epinephrine or 75 mg hyperbaric lidocaine in addition to 4 mg dexamethasone or 75 mg hyperbaric lidocaine. The onset and length of tangible piece and postoperative absence of pain were surveyed. An opportunity to achieve the pinnacle tangible piece in lidocaine gathering was shorter than that of other two gatherings. Length of sensory block in the control gathering, dexamethasone gathering, and

epinephrine gathering were 64.16±7.99 min, 74.79±12.78 min, and 99.30±10.93 min, separately. The creators inferred that intrathecal dexamethasone and intrathecal epinephrine as adjuvant to lidocaine increments tactile piece term in the ladies possibility for cesarean segment. Yallapragada SV et al⁸ 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 was 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 A and 52% of patients in Group B required mephentermine with the mean utilization being 0.72 mg in Group A 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.

Mahendru V et al⁹ looked at the onset, term of sensory and motor block, hemodynamic impacts, postoperative absence of pain, and unfriendly impacts of dexmedetomidine, clonidine, and fentanyl utilized intrathecally with hyperbaric 0.5% bupivacaine for spinal anesthesia. It included 120 American Society of Anesthesiology (ASA) class I and II patients experiencing lower appendage surgery under spinal anesthesia after endorsement from healing center morals advisory group with composed and educated assent of patients. The patients were arbitrarily distributed into four gatherings (30 patients each). Assemble BS got 12.5 mg hyperbaric bupivacaine with ordinary saline, bunch BF got 12.5 mg bupivacaine with 25 g fentanyl, gather BC got 12.5 mg of bupivacaine supplemented 30 g clonidine, and gathering BD got 12.5 mg bupivacaine in addition to 5 g dexmedetomidine. The onset time to achieve top tangible and engine level, the relapse time of tactile and engine piece, hemodynamic changes, and reactions were recorded. Patients in Group BD had essentially longer tangible and engine piece times than patients in Groups BC, BF, and BS with Groups BC and BF having practically identical length of tactile and engine square. The interim of two section tactile piece relapse was 147 ± 21 min in Group BD, 117 ± 22 in Group BC, 119 ± 23 in Group BF, and 102 ± 17 in Group BS ($P < 0.0001$). The relapse time of engine piece to achieve altered Bromage zero (0) was 275 ± 25 , 199 ± 26 , 196 ± 27 , 161 ± 20 in Group BD, BC, BF, and BS, individually ($P < 0.0001$). The onset times to achieve T8 dermatome and adjusted Bromage 3 engine piece were not essentially unique between the gatherings. Dexmedetomidine assemble indicated fundamentally less and postponed prerequisite of safeguard pain relieving. The creators inferred that intrathecaldexmedetomidine is related with drawn out engine and tangible piece, hemodynamic soundness, and diminished request of safeguard analgesics in 24 h when contrasted with clonidine, fentanyl, or solitary bupivacaine. Shashni S et al¹⁰ compared the pain relieving adequacy and nature of anesthesia delivered by midazolam (1 mg) versus magnesium sulfate (50 mg) when given as extras to hyperbaric bupivacaine intrathecally. There were two gatherings; amass MZ which got 3 ml of 0.5% overwhelming bupivacaine with 1 mg of additive free midazolam and gathering MG which got 3 ml of 0.5% substantial bupivacaine with 50 mg magnesium sulfate intrathecally. The onset and length of sensory block, onset and term of motor block, and span of absence of pain were recorded. The onset and length of tactile piece was longer in MG aggregate when contrasted with the MZ gathering. The onset and term of engine piece was longer in MG amass when contrasted with MZ gathering. Additionally, the aggregate length of absence of pain was more in MG amass when contrasted with MZ gathering. The authors presumed that 50 mg of intrathecal magnesium sulfate delayed the length of tangible and motor block and furthermore the span of postoperative absence of pain with low torment scores when contrasted with midazolam gathering. Be that as it may, it postponed the onset of sensory and motor block. Then again 1 mg of intrathecal midazolam delivered an early onset of tactile and motor block yet the length of absence of pain was less when contrasted with the magnesium gathering.

CONCLUSION

From the results of the present study, this can be concluded that adding up of dexamethasone altogether delays the sensory block and abatements opioid prerequisites in postoperative administration.

REFERENCES

1. Brown D.L. Spinal, Epidural and caudal anesthesia. In: Miller RD, (editor). Miller's Anesthesia 7 thed, Philadelphia: Churchill living stone; 2010. p. 1611-38.
2. Murali KT, Panda NB, Batra YK, Rajeev S. Combination of low doses of intrathecal Ketamine and midazolam with bupivacaine improves postoperative analgesia in orthopedic surgery. *Eur J Anesthesiol* 2008;25:299-306.
3. Gupta R, Bogra J, Verma R, Kohli M, Kushwaha JK, Kumar S. Dexmedetomidine as an intrathecal adjuvant for postoperative analgesia. *Indian J Anaesth* 2011; 55:347-351.
4. Gupta R, Verma R, Bogra J, Kohli M, Raman R, Kushwaha JK. A comparative study of intrathecal dexmedetomidine and fentanyl as adjuvants to bupivacaine. *J Anaesthesiol Clin Pharmacol* 2011; 27:339-343.
5. Tucker AP, Lai C, Nadeson R, Goodchild CS. Intrathecal midazolam I: A cohort study investigating safety. *Anesth Analg* 2004;98:1512-20.
6. Joshi SA, Khadke VV, Subhedar RD, Patil AW, Motghare VM. Comparative evaluation of intrathecal midazolam and low dose clonidine: Efficacy, safety and duration of analgesia. A randomized, double blind, prospective clinical trial. *Indian J Pharmacol* 2012;44:357-61.
7. Naziri F, Rabiee SM, Banihashem N, Hosseinjanzadeh K, Shirkhani Z, Solimani SS. Comparative Study of Intrathecal Dexamethasone with Epinephrine as Adjuvants to Lidocaine in Cesarean Section. *Zahedan J Res Med Sci* 2013 Sep; 15(9): 23-26
8. Yallapragada SV, Vemuri NN, Shaik MS. Effect of adding clonidine to intrathecal bupivacaine on the quality of subarachnoid block: A prospective randomized double-blind study. *Anesth Essays Res* 2016;10:451-4
9. Mahendru V, Tewari A, Katyal S, Grewal A, Singh M R, Katyal R. A comparison of intrathecal dexmedetomidine, clonidine, and fentanyl as adjuvants to hyperbaric bupivacaine for lower limb surgery: A double blind controlled study. *J Anaesthesiol Clin Pharmacol* 2013;29:496-502.
10. Shashni S, Nair AS, Gopal T. Clinical effects of intrathecal midazolam versus intrathecal magnesium sulfate as adjuncts to hyperbaric bupivacaine: A comparative study. *Indian J Pain* 2013;27:175-81.

Source of Support: Nil.

Conflict of Interest: None Declared.

Copyright: © the author(s) and publisher. IJMRP is an official publication of Ibn Sina Academy of Medieval Medicine & Sciences, registered in 2001 under Indian Trusts Act, 1882. This is an open access article distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Cite this article as: Subrata Dutta, Lokesh Kumar Gupta, Vinay Sharma. Evaluation of Efficacy of Dexamethasone as an Adjuvant to Bupivacaine For Spinal Anesthesia in Abdominal Surgery: An Institutional Study. *Int J Med Res Prof.* 2017; 3(2):419-22. DOI:10.21276/ijmrp.2017.3.2.087