



DEXAMETHASONE AS ADJUVANT TO INTRATHECAL BUPIVACAINE

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ABSTRACT

Spinal Analgesia is most preferred technique of regional analgesia for surgeries below umbilical region. The most commonly used drug is Bupivacaine heavy for the procedures lasting for 90 to 120 minutes. Sometimes procedures last longer requiring supplementation of anaesthesia or sedation. Various additives have been tried for prolongation of analgesia duration like Epinephrine, clonidine and opioids. Opioids can prove risky in elderly patients. Corticosteroids have shown positive effect on quality of sensory blocks and post operative analgesia on peripheral nerves. The purpose of this study was to evaluate the effect of Dexamethasone as adjuvant to intrathecal Bupivacaine, on onset time and duration of spinal analgesia.

Material and Method

Sixty patients between 18 to 65 years of age belonging to ASA group I and II were studied. Patients were divided into two groups of 30 patients each. Study group received intrathecal 15 mg (3 ml) of 0.5% hyperbaric Bupivacaine heavy and 8 mg (2.0ml) of preservative free Dexamethasone (Total 5.0 ml solution) and control group received intrathecal 15 mg (3 ml) of 0.5% hyperbaric Bupivacaine heavy with 2.0 ml normal saline (Total 5.0 ml solution).

Highest level of sensory block was noted and marked. It was evaluated every 5 minutes till 4 sensory segment level regression from highest level. Onset time and duration of sensory block were noted.

Patients were monitored in post operative period for any symptoms.

Conclusion

Addition of Dexamethasone with Bupivacaine has shown prolongation of duration of sensory block and decreased the requirement of analgesics in postoperative management.

KEYWORDS : Spinal Analgesia, Bupivacaine, Dexamethasone.

INTRODUCTION

Spinal Analgesia is most preferred technique of regional analgesia for surgeries below umbilical region. Spinal analgesia eliminates the risks involved in general anaesthesia like aspiration of gastric contents. The management of airway is simplified. The most commonly used drug is Bupivacaine heavy for the procedures lasting for 90 to 120 minutes. Some of the procedures last longer and require supplementation of anaesthesia or sedation. Various additives have been tried for prolongation of analgesia like Epinephrine, clonidine and opioids. Opioids can prove risky in some patients due to their respiratory and cardiovascular depressive action especially in elderly patients.

Corticosteroids have shown positive effect on quality of sensory block on peripheral nerves.

Dexamethasone is known to relieve pain by reducing inflammation and by blocking transmission of nociceptive C-fibres. Post-operative analgesia was observed to be prolonged in some studies when Dexamethasone was used as adjuvant in peripheral nerve blocks. Dexamethasone has been in use intrathecally for many years.

The purpose of this study was to evaluate the effect of Dexamethasone as adjuvant to Bupivacaine, on onset time and duration of spinal analgesia.

MATERIAL AND METHOD

After approval of institutional ethics committee for study was obtained, total sixty patients between age 18 to 65 years belonging to ASA group I and II posted for lower limb surgery and surgery below umbilicus were studied. The duration of surgery presumed was 30 to 120 minutes.

The written informed consent was taken after explaining the procedure in detail before taking the patient. The procedure for assessing the level of block was also explained to the patient.

Patient with history of long term steroid therapy, uncontrolled hypertension, known diabetes Mellitus cases, known neurological or psychological disorders, spinal column surgery, patients with low back pain, chronic alcoholism, and opium addiction or on any drug that modifies pain were not included in study.

Patients were divided into two groups of 30 patients each randomly, Group I as study group received intrathecal Bupivacaine-Dexamethasone combination and group II as control group received intrathecal Bupivacaine-Normal saline combination.

IV access was obtained and patients in both the groups were infused with Lactated Ringers solution 5 cc/kg body weight. Both the group patients received no premedication. The patients were put on of ECG, peripheral oxygen saturation (SPO2) and non-invasive arterial blood pressure (NIBP) monitoring when arrived in operating room. These parameters were recorded on arrival in O.T., thereafter at 5-minute intervals for first 30 minutes and every 10 minutes subsequently until the end of surgery. Vital signs were recorded every 15 minutes in the Post Anesthesia Care recovery room.

Under full aseptic precautions Lumber puncture for Spinal anaesthesia was performed in the sitting position at L3 -L4 level through a midline approach using a 25-gauge Quincke spinal needle. Patients of the control group were given 15 mg (3 ml) of 0.5% hyperbaric Bupivacaine heavy with 2.0 ml normal saline (Total 5.0 ml solution) and patients of the study case group were given 15 mg (3 ml) of 0.5% hyperbaric Bupivacaine and 8 mg (2.0ml) of preservative free Dexamethasone (Total 5.0 ml solution)

intrathecally. To ensure the blinding, the medication was prepared by an anaesthesiologist not involved in the study. Immediately after successful performance of the spinal anaesthesia patients were put in supine position. Oxygen 3 L/ min was given through face mask. The sensory block level was assessed by blinding the patient's eyes with cover and by a pin prick test by short bevel syringe needle in the mid-axillary line bilaterally. The sensory block level was controlled by tilt of OT table every 30 seconds for 20 minutes. The highest level of block was noted and marked. Block was evaluated every 5 minutes till 4 sensory segment level regression from highest level or completion of the surgery. Onset time was calculated as time from injection of drugs into intrathecal space to peak of sensory (highest dermatome level) and the duration of sensory block was calculated from time of peak of sensory block to 4 sensory level regressions or till patients felt pain in the field of surgery. The patients were requested to inform feel of pain sensation as soon as they felt.

The patients were observed for hypotension and bradycardia and were treated with IV Ephedrine 5-10 mg plus crystalloid fluids; IV Atropine 0.6 mg in incremental doses. Nausea and vomiting were treated with 4 mg Ondansetron.

Pain assessment was done in peri-operative period using Visual Analogue Scale (VAS) between 0-10. (0= no pain, 10=the most severe pain). If the pain was greater than 6 then it was treated by analgesics. Patients were examined at the time of discharge from hospital as well as after one month for any neurological symptoms. The data was analysed for results.

RESULTS

Total 60 patients were studied. There was no statistical difference between two groups demographically. [Table1].

Table 1 Comparison of Patient characteristics

	Bupivacaine + Normal Saline (Control Group)	Bupivacaine + Dexamethasone (Study Group)
Age (Years)	36.08+ 10.33	37.05 + 093
Sex (Male/Female)	15/15	18/12
Weight (in Kgs)	55.0-70.0(62.5)	58.0-70.0 (64)
Height	155 cms – 167.5 cms(161.25)	157 cms -168.0 cms (162.5)

TABLE 2 Comparison of Time & Durations

	Bupivacaine + Dexamethasone Group	Bupivacaine + Normal saline Group
No. Of patients in group	30	30
Onset Time (min)	11 min 20 sec + 2.0 min	10 min 50 sec+ 1min 50 sec
Duration of Sensory Block	109 min + 10 min	90 min + 8.0 min
Duration of Pain Free Period	390.0 min + 10.0 min	240.0 + 10.0 min

The Time of onset of sensory block was 11min 20 sec + 2.0 min, in study group while it was 10 min 50 sec + 1 min 50 sec in control group. The sensory block lasted for 109 min + 10 min in study group while it lasted for 90 + 8.0 min in control group.

The duration of pain free period was found to be longer in study group than in control group.

Hypotension was noticed to be moderate and there was no difference between two groups except one patient in the control group who had a mean arterial pressure less than 70 mmHg and

required 20 mg IV ephedrine to restore his blood pressure [Table 3]

Table 3 Comparison of Side effects in two groups

Symptoms	Bupivacaine + Normal Saline	Bupivacaine + Dexamethasone
Nausea & Vomiting	6 (20%)	3 (10%)
Hypotension	6 (20%)	6 (20%)
Bradycardia	5 (16.67%)	4(13.33%)
Shivering	9 (30%)	8(26.7%)
Headache	02	00

TABLE 4 LEVEL OF SENSORY BLOCK

Level of Sensory block in two groups	Bupivacaine + Dexamethasone (n=30)	Bupivacaine + Normal Saline (n=30)
T 4	06	06
T 6	10	11
T 8	10	08
T 10	04	05

The sensory block was up to between T 6 to T 10 in both the groups. No significant difference was observed in study and control group.

DISCUSSION

The Steroids are known to have anti-inflammatory as well as analgesic property. The mechanism of this property is still not known clearly [1]. The epidural injections of steroids along with other analgesics is being used in pain relief for low backaches with good results.[2-3] Some authors are of opinion that analgesic property of Dexamethasone is due to its systematic effect.[4] and prolongation of effect may be due to its local effect on nerve fibres.[5]

Methyl-prednisolone was injected by Kotani et al in Patients having Post-herpetic neuralgia along with Bupivacaine intrathecally for pain relief. They found that this combination gave excellent and prolonged analgesia.[6]. Kikuchi A, Kotani N, Sato T, Takamura K, Sakai I, Matsuki A also reported reduction in continuous pain in post herpetic neuralgia by injecting Methylprednisolone intrathecally.[7]

Pain was reduced in three patients with Cancer pain after injection of Betamethasone in intrathecal space in a study by Taguchi H et al [8]

Reduction in Morphine dose requirement was observed after Laparoscopic Cholecystectomy after 5 mg of epidural Dexamethasone with no untoward effects by Thomas. S. Et al [9]

Golwala et al in their study concluded, addition of dexamethasone to Bupivacaine significantly prolonged duration of pain relief in Supraclavicular Brachial Plexus block.[10]

Addition of Dexamethasone to Lignocaine has prolonged the duration of analgesia while no change was seen in onset time of Axillary block by Movafegh A et al. [11]

Mirzai et al reported decrease in the incidence of back pain in immediate post operative period after laminectomy Corticosteroids were added to Bupivacaine.[12]. No incidence of back pain was found in our study.

Corticosteroids are known to produce vasoconstriction in skin on topical application. This vasoconstriction effect is mediated by occupying classical glucocorticoid receptors.[13,14] In our study, prolongation of sensory block by Dexamethasone can be explained by vasoconstriction mechanism.

CONCLUSION

We used combination of Bupivacaine and 8 mg of Dexamethasone intrathecally in our study. We have found that addition of Dexamethasone with Bupivacaine has prolonged the duration of sensory block and decreased the requirements of analgesics in postoperative management.

To evaluate the optimal dose of Dexamethasone in Spinal Analgesia further studies are recommended.

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