ORIGINAL RESEARCH PAPER

Anaesthesiology

KEY WORDS: Bupivacaine , Buprenorphine, Visual Analogue Scale.

# INTRATHECALLY BUPRENORPHINE WITH 0.5% HEAVY BUPIVACAINE FOR POSTOPERATIVE ANALGESIA IN CESAREAN SECTION: A RANDOMISED CONTROL TRIAL.

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**ABSTRACT**

This study was aimed to evaluate the effect of addition of intrathecal Buprenorphine to Bupivacaine heavy 0.5% on post operative analgesia in caesarian sections and the side effects associated with use of Buprenorphine. Method: Sixty patients posted for elective caesarian sections were randomly divided in two groups of 30 patients each. Patient received either 1.7 ml 0.5% Bupivacaine with + 0.3ml NS (Group A) or 1.7 ml 0.5% Bupivacaine with 90 mcg (0.3ml) buprenorphine (Group B) intrathecally.

**Results:** Onset of analgesia was 3.2±0.2 min in group A while in group B 1.9±.1.42 min. Duration of postoperative analgesia was significantly prolonged in Group B (661.63±96.33min) than Group A (180.60±20.86min). Addition of buprenorphine 90µg to intrathecal bupivacaine prolonged the duration of postoperative analgesia after LSCS without effect of on neonatal Apgar score and with minimal maternal side effect.

## INTRODUCTION:

Spinal anaesthesia has become the preferred technique for patients undergoing elective cesarean delivery [1]. Postoperative analgesia after cesarean section helps to early ambulation for carrying of the neonate by mother. Various techniques have been tried for post operative pain relief but spinal anaesthesia is a simple safe and easier than other techniques. The goal of combining spinal opioids and local anaesthetics is to use lower doses of anesthetic agent, to maintain good and effective analgesia, to reduce the side effects and to blunt the stress response. The opioids acts by inhibiting the release of substance P in the dorsal horn of the spinal cord and local anaesthetics block the transmission of impulses at the level of the nerve axonal membrane so there is synergy of analgesic effect. Commonly used opioids used are fenanyl, morphine and buprenorphine. Our study is a comparison of bupivacaine alone or along with buprenorphine when injected intrathecally for alleviating postoperative pain in elective cesarean section. Buprenorphine is a mixed agonist-antagonist narcotic with high affinity at both Mu ( ) and kappa (k) opiate receptors. It is an effective analgesic similar to morphine in nearly all-clinical situations [2] [3]. Intrathecal doses of buprenorphine (30µg–150µg) are much smaller than parenteral doses and are known to prolong analgesia without sensory or motor blockade [4]. This study was conducted to evaluate and compare the characteristics of spinal block and its magnitude of side effects in patient undergoing caesarian section who received a subarachnoid block with bupivacaine heavy 0.5% with buprenorphine 90µg.

## MATERIAL AND METHODS:

After approval of Ethical committee of our institute and properly taken informed written consent, we conducted a prospective randomised double blind study at Jhalawar medical college & SRG hospital, Jhalawar, Rajasthan in which 60 patients were selected for study and randomly divided in two groups Group A (n=30) patient received Bupivacaine heavy ( 0.5%) 1.7ml with 0.3 ml NS intrathecally and in Group B (n=30) patient received Bupivacaine heavy ( 0.5%) 1.7ml with buprenorphine 90 g (0.3ml) intrathecal. Inclusion Criteria were age - 18 and above, ASA - I and II, elective caesarian section and informed consent. Exclusion criteria were not satisfying inclusion criteria. All patients were premedicated with inj. ondensetran 4mg and inj. ranitidine 50mg intravenously 30mins before surgery. The height, weight and Vital signs were recorded on the day of surgery. Each patient was taught about the Visual Analogue Scale (0-10) for pain. Vital parameters HR, BP, RR and spo2 was recorded pre operatively, intra operatively and post operatively. Patients were preloaded with 20ml/kg of lactated Ringers solution, prior to subarachnoid block. Under strict sterile aseptic precaution subarachnoid block was performed with 25G Quincke type spinal needle and patient in right lateral decubitus position at L3-L4 intervertebral space then drug was injected. Patient was immediately lied down in supine position to prevent aortocaval compression left uterine displacement was done by keeping a wedge under right hip. O2 4L/min administered to all patients through face mask. Intra operative hypotension was treated with inj. mephentramine 6 mg intravenous bolus dose. Bradycardia was to be treated with inj. atropine i.v 0.02mg/kg if heart rate decreased to <60/min. Dermatomal sensory blockade to pin prick was evaluated and maximum level of sensory block was noted. Onset of sensory analgesia and total duration of analgesia was recorded. The attending pediatrician assisted the neonatal APGAR scores at 1 minute and 5 minutes of delivery of the baby. Time of first demand for analgesia was noted and injection dilocfenac 75 mg intramuscular was given as a rescue analgesia when VAS > 4. Total duration of analgesia, postoperatively analgesia by VAS, and Side effects like nausea, vomiting, pruritus, respiratory depression, hypotension, bradycardia or sedation were recorded .

## RESULTS:

Mean values of age, height and weight were comparable and difference was statistically non significant (p- >0.05) (Table 1).

**Table 1: Demographic data.**

| Variables | | Group A | Group B |
|---|---|---|---|
| Age (Years) | Mean± S.D | 25.49 ±4.41 | 24.71±3.49 |
| Weight (Kg) | Mean± S.D | 64.52±8.30 | 65.42±4.84 |
| Height (cm) with range | Mean± S.D | 154.92±4.32 (158-165) | 155.89±3.41 (158-165) |

Peak sensory level was comparable among both the groups highest sensory level found was T4 level in 4 patients in Group A and in 10 patients in Group B. (table 2).

**Table 2: Distribution of patients according to level of peak sensory loss [no. (%)].**

| Peak sensory level | Group A (n) | Group B (n) |
|---|---|---|
| T4 | 4 (13%) | 10 (33%) |
| T6 | 15 (50%) | 18 (60%) |
| T8 | 11(37%) | 2 (6%) |

Onset of sensory loss was noticed earlier in Group B (1.9±1.42min) than Group A (3.2±2 min) (p-0.001) and duration of postoperative analgesia was also found significantly high in Group B (180.60±20.86 min) than Group A (661.63±96.33 min) (p-0.0001). (table 3)

**Table 3: Duration of post operative analgesia.**

| | Group A (mean±SD) | Group B (mean±SD) | P value |
|---|---|---|---|
| Onset of sensory | 3.2±2 min | 1.9±1.42min | 0.001 |
| Duration of postoperative analgesia (min) | 180.60±20.86 | 661.63±96.33 | 0.0001 |

Side effects like nausea, vomiting and drowsiness was seen more in Group B (20%, 10% and 13% respectively ) than Group A (0,6% and 0 respectively).

**Table 4: Distribution of patients according to complica tions [no(%)]**

| Complication | Group A | Group B |
|---|---|---|
| Nausea | 0 | 6 (20%) |
| Vomiting | 2 (6.66%) | 3 (10%) |
| Drowsiness' | 0 | 4 (13.33%) |

The paediatrician could not find any difference in neonatal Apgar score between the Group A and Group B after 1 and 5 min of delivery of baby.

## DISCUSSION:

Buprenorphine is a mixed agonist – antagonist type of opioid drug. It is highly lipid soluble. It has high affinity for opioid receptor and prolonged duration of action. During pregnancy chance of thromboembolism are already there so good postoperative pain relief is needed. Buprenorphine improve early mobilization by decrease in post operative pain and early ambulation of patients thus reduces the chance of thromboembolism. In our study onset of analgesia was significantly earlier in Group B (1.9±1.42min) than in Group A (3.2±2 min) due to addition of buprenorphine intathecally because buprenorphine has high lipid solubility and high affinity for opiate receptors [5],[6]. This is may be due to Buprenorphine increases sensory block without affecting motor block and haemodynamic alterations [7]. Our results are comparable to study of **dixit S.** [8] where onset of analgesia in study group was earlier (1.85±1.39 min) than control group (5.35±1.79 min).

In our study maximum sensory level achieved was T4-T8, T4 level was achieved in 10 patients in Group B where as 4 patients in Group A. In group A 15 patients achieved T6 level where as 18 patients in Group B. **Ravindran R et al** [4] concluded that increasing the dose of buprenorphine from 45µg to 60 µg will increases in the number of patients achieving the higher sensory level.

In our study duration of post operative analgesia was significantly higher in Group B (661.63±96.33 minutes) than Group A (180.60±20.86 minutes). In study of **Dixit S.** [8] duration of analgesia in study group (bupronorphine 60µg) was 491.26±153.91 minutes than control group 145.16±25.86 minutes. A similar result was recorded by **Ravindran R et al** [4] 6.11±5.18 hours, 12.3±6.5 hours and 2.76±1.39 hours with intrathecally bupronorphine 45µg, 60µg and control group respectively. As suggested by **Capogna G, Celleno D** [5] duration of analgesia is dose dependent and buprenorphine increases the duration of analgesia.

In our study incidence of side effects like nausea and vomiting was observed more in Group B 20% and 10% than Group A 0% and 7% cases respectively but drowsiness was recorded in 4 patients in Group B while it was not recorded in Group A. Though drowsy patients were easily arousable. **Dixit S** [8] also found that incidence of nausea was significant in study group. The concern regarding late respiratory depression from neuraxial opiates perhaps been the main reason for reluctance in the wide spread use of these analgesics techniques but this was not observed in any of the patients as buprenorphine is lipid soluble drug due to rapid absorption into the spinal venous plexus there is minimum increase in CSF concentration thus minimal risk of respiratory depression associated with rostral spread [9].

## CONCLUSION:

Thus this can be concluded that intrathecal buprenorphine is suitable drug for postoperative analgesia in cesarean section as it enhances the sensory blockade of local anaesthetics without affecting the sympathetic activity and cost effectiveness.

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