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Original Research Article

Efficacy of Adding Buprenorphine to the Local Anaesthetics in Patients Undergoing Lower Segment Caesarean Section (LSCS)

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ABSTRACT

Buprenorphine is a mixed agonist-antagonist narcotic with high affinity at both μ and k opiate receptors. The aim of the study was to compare intrathecal bupivacaine (0.5%) and buprenorphine (3mcg/kg) with bupivacaine (0.5%) an hour prior to surgery. One Hundred cases of LSCS of ASA-I, between age group 25-30 patients were taken for the study. First Fifty patients were given, 2ml of plain bupivacaine-Heavy 0.5%. Another fifty patients were given 2ml of Bupivacaine-heavy along with 0.5ml (3mcg/kg) of Buprenorphine pre-operatively, for all patients, BP, Pulse, SPO_2 monitored. In this study, there is an action of increasing the sensory block without affecting motorblock and haemodynamic alterations where the onset of analgesia was significantly earlier due to addition of buprenorphine mainly due to high lipid solubility and highest affinity for opiate receptors of buprenorphine By observing the results, It was concluded that buprenorphine is a suitable drug for postoperative analgesia after caesarean section with minimal side effects.

Keywords: Bupivacaine, buprenorphine, caesarean section, analgesia

INTRODUCTION

Among obstetrical emergencies, caesarean section is the most common operative procedure carried out throughout the world. [1,2] Patients presenting for emergency lower segment caesarean section (LSCS) pose a multitude of challenges to the attending obstetrician and the anaesthesiologist. [3] In many instances due to the intensity of labour pains these patients have disturbed hemodynamic parameters. An overworked autonomic nervous system can result in exaggeration of responses to various stress stimuli, including the stress of anaesthesia. [4,5] The incidence of lowering in blood pressure is quite high among patients who present for emergency caesarean section. [6,7]

Obstetric anaesthetists are faced with the unique situation of providing anaesthesia for caesarean sections, where anaesthetists have to provide care for both the mother and the unborn baby. A team approach is vital to ensure optimal outcome while ensuring that the labour process is a safe and pleasant experience for the parturient. There are many indications for general anaesthesia, some of which are failed regional anaesthesia, conditions where regional anaesthesia is contraindicated, maternal request and life-threatening foetal compromise; [8] when there might not be adequate time to perform

a regional technique. Airway problems are more common in pregnancy than in the general population due to anatomical and physiological changes during pregnancy. [9]

Pulmonary aspiration is one of the concerns of general anaesthesia in obstetric patients. Risk factors for increased risk of aspiration include a prolonged gastric emptying time in labour, increased intra-abdominal pressure due to the gravid uterus and relaxation of the lower oesophageal sphincter due to hormonal changes. To reduce this risk, prophylaxis against acid aspiration is administered prior to anaesthesia. [10]

Buprenorphine is a mixed agonist - an antagonist narcotic with high affinity at both Mu (μ) and kappa (k) opiate receptors. [11] It is an effective analgesic, similar to morphine, in nearly all-clinical situations. Buprenorphine is compatible with the cerebrospinal fluid (CSF) and produces no adverse reactions when administered intrathecally. Central neuraxial opioids, intrathecal as well as epidural, offer the perceived benefit of selective analgesia without sensory or motor blockade. However, side effects such as potentially catastrophic, delayed respiratory depression have prompted further research to develop non-opioid analgesics, with less worrisome side effects. [12] Intrathecal clonidine is being extensively evaluated as an alternative to neuraxial opioids for control of pain and has proven to be a potent analgesic, free of at least some of the opioid-related side effects. [13,14]

Various literatures suggested the use of narcotics in the regional anaesthesia. In this study, we are using inj. Buprenorphine as analgesic in spinal anaesthesia. The aim of the study was to compare intrathecal bupivacaine (0.5%) and buprenorphine (3mcg/kg) with bupivacaine (0.5%) an hour prior to surgery.

MATERIALS AND METHODS

One Hundred cases of LSCS of ASA-I, between age group 25-30 patients were taken for the study. First Fifty patients were given, 2ml of plain bupivacaine-Heavy 0.5%. Another fifty patients were given 2ml of Bupivacaine-heavy along with 0.5ml (3mcg/kg) of Buprenorphine pre-operatively, for all patients, BP, Pulse, SPO_2 monitored. Bladder catheterised. All patient were started on IV Ringer Lactate, Ondansetron 4mg IV, Ranitidine 50 mg IV half-an-hour prior to surgery.

The height, blood pressure, pulse rate, respiratory rate and weight were noted before procedure. I.V. line was secured with 20G cannula. Premedication was given in the form of ondansetron 4mg and ranitidine 50 mg to both the groups. After preloading with 1000 ml of Ringer lactate infusion, patients were placed in left lateral position and lumbar puncture was performed in the L_3 -L_4 space using midline approach with 25G spinal needle. As soon as free flow of C.S.F. was obtained, the solution was injected. Injections were made over 10-15 seconds. After withdrawing the needle, patient was turned supine with approximately 10-degree tilt head low with shoulder on pillow and left uterine displacement was done. Patients were supplemented with O_2 (6 L/min) via a facemask until delivery of baby. After subarachnoid injection, blood pressure and pulse rate were monitored immediately & subsequently at 2 min interval for first 10 min and then every 10 min for rest of the surgical procedure.

Onset of cephalad spread of analgesia was determined as loss of sensation to pinprick. Intraoperative hypotension was considered to be present whenever systolic blood pressure decreased to less than 90mm of Hg or <20% of the baseline whichever appeared first and treated with ephedrine. Bradycardia was to be treated with atropine i.v. 0.02 $mg.kg^{-1}$ if heart rate decreased to < 60/min, any fall in respiratory rate less than ten per minute was noted. The attending paediatrician assessed the neonatal Apgar scores at 1 and 5 min of delivery of the baby. Vital parameters such as pulse rate, systolic blood pressure, respiratory rate and SpO_2 were monitored

half hourly for first four hours and then hourly in post operative period. Post-operative analgesia was evaluated using Magill's classification [0-no pain, 1- slight pain, 2-discomfort, 3-unbearable pain, 4-excruciating pain].

Rescue analgesia in the form of diclofenac sodium I.M. was given at the Magill's score of 3, effective analgesia time was the time taken between the injection of intrathecal drug and onset of unbearable pain. Side effects and complications like nausea, vomiting, pruritus, respiratory depression were noted and treated. The analysis of results was done for statistical significance.

Given spinal anaesthesia with proper draping under strict aseptic precautions, 2ml of 0.5% Bupivacaine-heavy was injected into Subarachnoid space in sitting/right lateral position with 23 Guaze spinal needle at L3-L4 level. Intra-operatively, vital signs were monitored-NIBP, Pulse Rate, SPO2, ECG, Oxygen with Face mask @5LPM. IF there is any fall of BP below 10% of basal BP, inj. Ephedrine was given IV in titrated doses (6-12mg). All patients were preloaded with 500 ml of RL, paracetamol 750 mg suppository per rectally.

RESULTS

The mean values of different ranges of age, height and weight of the study population and control subjects were compared and depicted in table 1. The onset of analgesia was significantly earlier in Study group as compared to Control group, and the detailed interpretation of the onset of analgesia was incorporated in table 2.

Table 1: Demographic data of the patients included in this study

Variables	(Range with mean)	
	Study population	Control subjects
Age (in years)	23 – 40 (31.5)	23 – 36 (29.5)
Weight (Kg)	59 – 74 (66.5)	61-72 (66.5)
Height (Cms)	154-163 (158.5)	156-171 (163.5)

[Figure in parenthesis denoted mean value of the ranges]

Table 2: Description about the analgesia among case and control

Onset of analgesia (minutes)	Study population	Control subjects
0 – 2	41 (82)	0
3 – 5	4 (8)	26 (52)
6 – 8	5 (10)	22 (44)
9 and above	0	2 (4)

[Figure in parenthesis denoted percentages]

BP, Relaxation, onset of analgesia, Nausea and vomiting, duration and intensity of Analgesia, sedation, pruritus, shivering were monitored. Patients who were given plain buprenorphine and with Buprenorphine, onset of action, there was no difference (2-5 mins). Inj. Buprenorphine with bupivacaine, intensity of blockade is more. Fall of BP (10-20%) more in buprenorphine- Bupivacaine (Group B) when compared to Group A (Plain Bupivacaine) which requires inj. Ephedrine (Table 3).

Among the subjects, 10% of Group B having nausea and vomiting, 2% of Group B had mild itching. Post operative shivering was less in Group B. Duration of analgesia was 4 hours in Group A, 16-18 hours in Group B. Mild Sedation was observed in Group B.

Table 3: Comparative analysis of variables among group A and B

Variables	Group A (Plain Bupivacaine - heavy)	Group B (Bupivacaine - Heavy with Buprenorphine)
Onset of Action	2-5 minutes	2-5 minutes
Fall of BP	10%	20%
Relaxation	Less	High
Nausea/Vomiting	5%	10%
Pruritis	Nil	Mild
Sedation	Nil	Mild
Duration of Analgesia	4 hours	16-18 hours
Intensity of blockade	Less	More
Shivering	More	Less

DISCUSSION

The drug Buprenorphine has an action of increasing the sensory block without affecting motorblock and haemodynamic alterations. [15] In this study also the data supports the same where the onset of analgesia was significantly earlier due to addition of buprenorphine mainly due to high lipid solubility and highest affinity for opiate receptors of buprenorphine. [16,17]

Various studies have demonstrated that addition of intrathecal clonidine to bupivacaine, even in very small doses, significantly improves the onset and duration of sensory and motor block, with relative haemodynamic stability. [18-20] In our study also the addition of clonidine to bupivacaine improved the onset and duration of analgesia in comparison to bupivacaine alone, but the duration of analgesia was significantly lower in comparison to buprenorphine combined with bupivacaine. The rapid onset and short duration of analgesia and lack of side effects with lower doses of epidural buprenorphine combined with bupivacaine, in our study, suggests that the drug may be particularly useful in situations where a prompt onset and / or limited duration of analgesia is indicated, patient-controlled epidural analgesia is used and side effects such as sedation are not desirable. [4]

The major side effects of buprenorphine seen in this study were drowsiness, though sedation can be considered desirable in postoperative period. Though drowsy, all patients were easily arousable. [6] 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 analgesic technique but this was not observed in any of the patients in our study as buprenorphine is lipid soluble drug due to rapid absorption into the spinal venous plexus there is minimal increase in spinal fluid concentration thus minimal risk of respiratory depression associated with rostral spread, according to Stoelting the patients receiving intrathecal opioids should be under close surveillance for adequacy of breathing but suggests that low dose neuraxial administration of narcotics as in our study does not obligate observation in an intensive care environment. [5,9]

CONCLUSION

Spinal analgesia is one of the commonest analgesia followed for LSCS because it requires little skill, easily available, minimal drug exposure to baby, less sophisticated, less cost and patient is awake with normal airway reflexes, early bonding with the baby and early feeding. Hence this technique is followed. So, Addition of buprenorphine to the local anaesthetic will improve the patient's compliance, prolonged post operative analgesia is useful for the patient. Hence, this technique is useful for patients undergoing LSCS.

REFERENCES

1. Sukhminder JSB, Sukhwinder KB, Jasbir K, Amarjit S, Anita S, Surjit SP. Prevention of hypotension and prolongation of postoperative analgesia in emergency cesarean sections: A randomized study with intrathecal clonidine. Int J Crit Illn Inj Sci. 2012;2:63–69.
2. Jenkins JG, Khan MM. Anaesthesia for Caesarean section: A survey in a UK region from 1992 to 2002. Anaesthesia. 2003;58:1114–1118.
3. Agarwal A, Kishore K. Complications and Controversies of Regional Anaesthesia: A Review. Ind J Anaesth. 2009;53:543–553.
4. Ngan KWD, Khaw KS, Lee BB, Lau TK, Gin T. A dose–response study of prophylactic intravenous ephedrine for the prevention of hypotension during spinal anesthesia for cesarean delivery. Anesth Analg. 2000;90:1390–1395.
5. Rout CC, Rocke DA, Levin J, Gouws E, Reddy D. A reevaluation of the role of crystalloid preload in the prevention of hypotension associated with spinal anesthesia for elective cesarean section. Anesthesiology. 1993;79:262–269.
6. Tercanli S, Schneider M, Visca E, Hösli I, Troeger C, Peukert R. Influence of volume preloading on uteroplacental and fetal circulation during spinal anaesthesia for Caesarean section in uncomplicated singleton pregnancies. Fetal Diagn Ther. 2002;17:142–146.
7. Sean BY, Sng BL, Alex STH. Anaesthesia for lower-segment caesarean section: Changing

perspectives. Ind J Anaesth. 2010;54: 409–414.
8. Banks A, Levy D. General Anaesthesia for operative obstetrics. Anaesthesia Intensive Care Med.2007;8:317–319.
9. Munnur UB, de Boisblanc, Suresh MS. Airway problems in pregnancy. Crit Care Med. 2005;33:259–268.
10. McGlennan A, Mustafa A. General Anaesthesia for Caesarean Section. CEPD reviews. 2009;9:148–151.
11. Kiran A, Navneet A, Vijender A, Ashok A, Mahender S, Kanupriya A. Comparative analgesic efficacy of buprenorphine or clonidine with bupivacaine in the caesarean section. Ind J Anaesth. 2010;54:453–457.
12. Gadsden J, Hart S, Santos AC. Post-cesarean delivery analgesia. Anesth Analg. 2005;101:62–69.
13. Neves JF, Monteiro GA, Almeida JR, Sant'anna RS, Saldanha RM, Moraes JM. Postoperative analgesia for cesarean section: Does the addiction of clonidine to subarachnoid morphine improve the quality of the analgesia? Rev Bras Anesthesiol. 2006; 56: 370–376.
14. Neogi M, Bhattacharjee DP, Dawn S, Nilay CN. A comparative study between clonidine and dexmedetomidine used as adjuncts to ropivacaine for caudal analgesia in paediatric patients. J Anaesth Clin Pharmacol. 2010;26:149–153.
15. Saxena AK, Arva S. Current concepts in neuraxial administration of opioids and non- opioids: An overview and future prospective. IJA 2004;48:13-24.
16. Capogna G, Celleno D. Spinal buprenorphine for postoperative analgesia after caesarean section. Acta Anasthesiol Scand. 1989;33:236-238.
17. Shah FR, Halbe AR, Panchal JD, Goodchild CS. Improvement in postoperative pain relief by the addition of midazolam to an intrathecal injection of buprenorphine and bupivacaine. Eur J Anesthesiol 2003;20:904-910.
18. Sethi BS, Samuel M, Sreevastava D. Efficacy of analgesic effects of low dose intrathecal clonidine as adjuvant to bupivacaine. J Anaesth. 2007;51:415–419.
19. McCartney CJ, Duggan E, Apatu E. Should we add clonidine to local anaesthetic for peripheralnerve blockade? A qualitative systematic review of the literature. Reg Anesth Pain Med. 2007;32:330–338.
20. Popping DM, Elia N, Marret E. Clonidine as an adjuvant to local anaesthetics for peripheral nerve and plexus blocks: A meta-analysis of randomized trials. Anesthesiol. 2009; 111: 406–415.

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