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Original Research Paper

Anaesthesiology

EVALUATION OF EFFICACY OF INTRATHECAL SUFENTANIL WITH LOW DOSE BUPIVACAINE IN LOWER SEGMENT CESAREAN SECTION

Dr. Muthu Vijayasankar M.D, Associate Professor, Tamilnadu Government Multi Super speciality Hospital, Chennai, Tamilnadu.

Dr. Sankaran Chockalingam* M. D, Senior Assistant Professor, Thirunalveli Medical College and Hospital, Tamilnadu. *Corresponding Author

ABSTRACT

Background: Spinal anesthesia for cesarean section is the preferred technique over general anesthesia due to various advantages. Bupivacaine is the common drug which is used in those surgeries. We want to evaluate the effectiveness of low dose Bupivacaine with Sufentanil and low dose Bupivacaine alone.

Study design: It is a prospective randomised study conducted in 80 patients undergoing cesarean section. Patients are randomised into 2 groups.

Group I: Inj bupivacaine (0.5%) heavy 1.5cc + 0.1cc of normal saline

GROUP II: Inj bupivacaine (0.5%) heavy 1.5cc + sufentanil 5μg(5). Local anesthetic effect, hemodynamics, post operative analgesia, complications and fetal outcome are compared. Statistical significance was brought out by Student's t – test.

Results: All the patients who received 1.5ml of hyperbaric bupivacaine with sufentanil were comfortable during the intra operative period(12). About 52.5% of the patients who received bupivacaine alone had intraoperative discomfort significantly.

Conclusion: It has been found out by this study that addition of 5μg of sufentanil to low dose (7.5mg) of 0.5% of bupivacaine intrathecally in cesarean section provides improved quality of surgical anaesthesia and analgesia

KEYWORDS :

INTRODUCTION:

The aim of anesthesiology as a science is the removal of pain temporarily, started initially with pain relief for surgeries, extending now on to postoperative pain relief, chronic pain and cancer pain. Spinal anaesthesia plays a major role in alleviating pain intraoperatively extending sometime into postoperative period also. Spinal anesthesia for cesarean section has always enjoyed popularity as it eliminates the complication of pulmonary aspiration and avoids the problem of difficult airway observed with general anesthesia. The other advantages of this technique are its simplicity, rapidity in onset and dependability. The advantages of neuraxial opioids over neuraxial local anaesthetics are that, it produces prolonged, intense, selective, segmental analgesia without motor blockade and sympathetic dysfunction. Opiods and local anesthetics administered together have a potent synergistic analgesic effect(1). Intrathecal opioids enhance analgesia from sub therapeutic dose of local anaesthetic and make it possible to achieve successful spinal anaesthesia using otherwise inadequate doses of local anaesthetic(2). Hence, the present study has been undertaken to combine "sufentanil" an opioid and "bupivacaine" a long acting local anaesthetic for intrathecal administration to provide anaesthesia for cesarean section.

AIM OF THE STUDY :

To evaluate the effect of intrathecal sufentanil in improving the quality of anesthesia with 0.5% hyperbaric bupivacaine in low dose for lower segment cesarean section, to evaluate the efficacy of intrathecal sufentanil in providing postoperative pain relief for lower segment cesarean section, to assess the duration of pain relief, to assess the incidence of side effects.

MATERIALS AND METHODS :

The study was conducted in 80 patients undergoing elective and emergency cesarean section after getting consent and explaining the procedure details to the patients. Term parturients aged 18 to 35 years classified under ASA physical status I and II, I_E and II_E who were termed fit for subarachnoid block were selected. Patients with coexisting medical diseases were excluded. Patients who were converted to general anesthesia were excluded later. After preoperative assessment, the pregnant patients were premedicated with Inj. Metaclopromaide 10mg & Inj. Ranitidine 50mg – intramuscularly 45 minutes before induction of anesthesia. Patients were randomly allotted into two groups. GROUP I: Inj bupivacaine (0.5%) heavy 1.5cc + 0.1cc of normal saline. GROUP II: Inj bupivacaine (0.5%) heavy 1.5cc + sufentanil 5μg

Procedure details: In the preoperative visit, patients were explained of the procedure details. Then baseline preoperative pulse rate and blood pressure were recorded. All patients were preloaded with 15-20ml/Kg of normal saline/ ringer lactate. Patients were put in lateral position and with strict aseptic precautions lumbar puncture was done with Quincke Babcock's standard spinal needle – 23 G. After ensuring free flow of cerebrospinal fluid, the drug was injected as per the group assigned. The assigned amount of sufentanil(5,6,7) and normal saline were taken in sterile tuberculin syringe(8). After injection patient was put up in supine position with left lateral tilt and 100% oxygen given through mask until delivery of the baby.

Parameters observed : Time of subarachnoid injection, Hemodynamics, Bradycardia, Maximal level of Sensory block, Nausea and vomiting, Pruritus, Two segment regression time, Sedation score, Fetal outcome, Total duration of analgesia are observed. In the post operative period total duration of analgesia was taken as that period from the time of induction (subarachnoid block) till patient's first requirement for analgesic medication. Pain was evaluated using linear Visual Analogue Scale(3). Also in the post operative period every mother and baby were followed up for any complication like respiratory depression, postoperative nausea and vomiting, pruritus(4), urinary retention and hypotension. Statistical significance was brought out by Student's t – test.

OBSERVATION AND RESULTS :

In this randomised single blinded study, conducted in 80 patients, the subjects were allocated into 2 groups GROUP I: Inj bupivacaine (0.5%) heavy 1.5cc + 0.1cc of normal saline GROUP II: Inj bupivacaine (0.5%) heavy 1.5cc + sufentanil 5μg(5).

DEMOGRAPHIC DATA

Both groups were comparable in age, height and duration and nature of surgery.

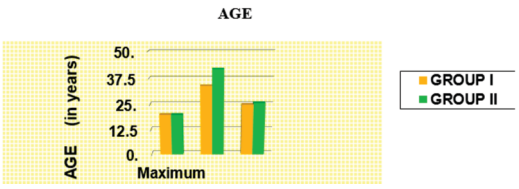

Figure 1. Comparison of Age

There was no statistically significant variation in age of the patients in both the group. Both the groups were comparable.

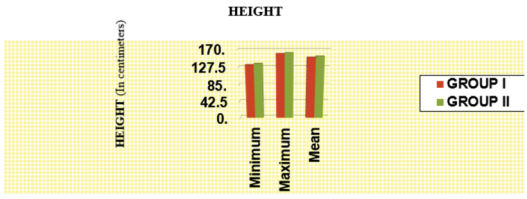

Figure 2. Comparison of height

There was no statistically significant variation in height of the patients in both the groups. Both the groups were comparable.

Maximal level of sensory blockade

SENSORY LEVEL	GROUP I	GROUP II
T2	-	7
T3	-	1
T4	10	22
T5	1	1
T6	22	9
T7	1	-
T8	5	-
T9	-	-
T10	2	-

Maximal sensory level achieved for pin prick sensation T6 in Group I and T4 in Group II. Highest level of blockade achieved was T4 in Group I&T2 in Group II. Lowest level of blockade achieved was T10 in Group I and T6 in Group II. A significant variation noted in maximal level of sensory blockade in both the groups.

Figure 3. Two segment regression time

Two segment regression time duration of analgesia as measured by two segment regression time were 44.75min in Group I with standard deviation of 10.12, 64.25min in group II with standard deviation of 13.51. A significant variation noted in two segment regression time in both the groups.

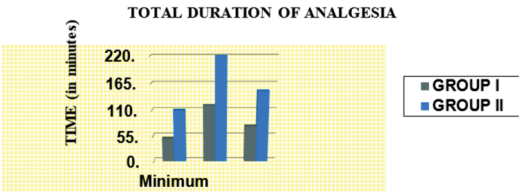

Figure 4. Total duration of anesthesia

Total duration of analgesia was 76.5 minutes in group I with standard deviation of 19.12 (Around one hour and fifteen minutes). 150.37 minutes in group II with a standard deviation of 25.5, (Around two hour and thirty minutes).

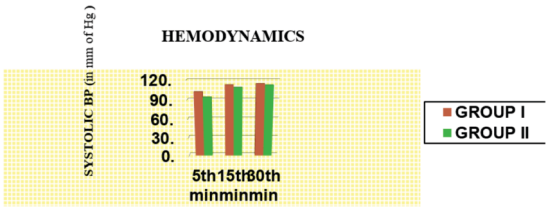

Figure 5. Hemodynamics

With regard to blood pressure, a fall in blood pressure more than 20% from the baseline value was considered hypotension. In Group I, 5% of patients had hypotension. In Group II, 17, 5 % of patients had hypotension. The hypotension in the study group required either intravenous fluids or injection ephedrine and oxygen supplementation. None of them required any further intervention. With regard to pulse rate, a fall in pulse rate below 60 per minute was considered bradycardia. About 5% of patients had bradycardia in Group II and it was treated with inj. Atropine 0.6 mg intravenously. None of them required any further intervention. No bradycardia noted in Group I patients.

Sedation

Intraoperative sedation was excellent in Group II patients. In Group II 47.5 %of patients had sedation score of 2. 2.5% of patients had sedation score of 3. In Group I all patients had sedation score of 1.

Nausea and vomiting

In Group II 15% of patients had nausea and vomiting. Eventually all responded to Inj.Metaclopromaide 10mg intravenously. In group I no patients had nausea or vomiting.

Pruritus

In Group II 40% of patients had pruritus. All responded to inj. Diphenhydramine. In group I no patient had pruritus.

Respiratory depression and urinary retention

No respiratory depression and urinary retention was noted in both the groups.

Intraoperative discomfort

In group II 100% of the patients were comfortable. In group I 52.5% of the patients had intraoperative discomfort(15). **We had to necessarily manage them with analgesics and intravenous anaesthetics.**

Fetal outcome

Apgar was calculated at 1 minute and 5 minutes after deliver of baby. There was no neonatal respiratory depression noted. Apgar score was comparable in both the group. It did not show statistically significant variation among the two groups. The score was 6.9 ±0.659 at the 1st minute and 8.725 ± 0.75 at the 5th minute in the sufentanil group. The score was 7.22 ± 0.65at the1st minute and 8.95 ± 0.75 at the 5th minute in the control group. None of the babies had any further neurological complications.

DISCUSSION:

80 patients undergoing cesarean section with the physical status of ASA I, II, I_E & II_E were taken up for the study. They were randomly allocated into two groups, 40 patients in each group. Variables like age, height were standardized in both groups. Group I (control group) received 1.5 cc of 0.5% bupivacaine with 0.1 ml of normal saline intrathecally(13). Group II (study group) received 1.5 cc of 0.5 % bupivacaine

with 5 g of sufentanil intrathecally. The quality of intra operative surgical anaesthesia was excellent in (100 %) of patients in sufentanil group as compared to 47.5 % in control group. All the patients who received 1.5ml of hyperbaric bupivacaine with sufentanil were comfortable during the intra operative period(12). About 52.5% of the patients who received bupivacaine alone had intraoperative discomfort significantly. They had to be necessarily maintained with adjuvant analgesic or intravenous anaesthetics. Addition of opioids aid in relieving the discomfort that could be caused by visceral handling. This is well brought out in other studies done by Peach. M.J. et al in 1994 & M.S. Batra et al.

Total duration of analgesia: The total duration of analgesia evaluated was significantly prolonged in sufentanil group(11); 150.38± 25.5 minutes compared to 76.5±19.12 minutes in control group. The requirement for the first dose of analgesia was significantly prolonged in sufentanil group. **This value was statistically significant as calculated by student's t-test. (p<0.001).** The results of our study goes in consistent with the study by Braga Ade F,Braga F.S.et al at School of Medical Sciences,Campinas,Sao Paolo,Brazil.(Eur.J.Anaesthesiol.2003 Aug;20(8):631-5)

2-segment regression time: 2-segment regression of anesthesia took longer;64.25±13.52 min in sufentanil group(14) as compared with 44.75±10.12 in control group. This was proved statistically significant. **This value was statistically significant as calculated by student's t-test. (p<0.001)**

Hemodynamic variables: The incidence of hypotension was about 17.5% in the study group compared with 5% in control group. The hemodynamics after 5 minutes was 93.5±16.41 mm of Hg in sufentanil as compared with 101.75±18.5 in control group.

Nausea & Vomiting: Opioids produce nausea and vomiting by direct stimulation of chemoreceptor trigger zone(10). This effect is dose related and can be treated with anticholinergic or phenothiazines, those are antagonistic at dopamine receptor. Route of opioid administration does not influence the occurrence of vomiting. The incidence of vomiting in our study is 15%.

Pruritus: This is a common side effect especially with obstetric population. Incidence from previous studies showed result of 0-100%. This effect is dose dependent as shown by GilMcmorland, 1990, (personal communication), this effect is centrally mediated due to cephalad migration of the opioid to brain stem and fourth ventricle. It is self limiting, can also be antagonized by anti-histamines. No patients required treatment in our study. 40% of patients in our study had pruritus, which was dose related. Consistent with the study conducted by Braga Ade et al concluded pruritus was the most common side effect and had the significantly higher incidence when a dose of sufentanil 7.5mic was used(Eur J Anaesthesiol.2003 Aug;20(8):631-5)

Sedation: Intra operative sedation was excellent in sufentanil group. In Control Group patients required sedative supplementation whereas no sedation was required in the sufentanil group. About 47.5 % had sedation score of 2& 2.5% had sedation score of 3.

Fetal outcome: Apgar was calculated at 1 minute and 5 minutes after deliver of baby. There was no neonatal respiratory depression noted. Apgar score was comparable in both the group.It did not show statistically significant variation among the two groups. The score was 6.9±0.659 at the1st minute and 8.725±0.75 at the 5th minute in the sufentanil group. The score was7.22±0.65at the1st minute and 8.95±0.75 at the 5th minute in the control group. None of the babies had any further neurological complications.

So far varied numbers of studies have been conducted showing the efficacy of sufentanil in providing comfortable intraoperative period and prolonged post operative pain relief with minimal complication.This study delineates that the acceptable dose range without much morbidity in hospitals with moderate post operative care and without high dependency unit with 5 g of sufentanil Intrathecally. It has been found out by this study that 5 g of Intrathecal sufentanil with 1.5ml of 0.5% hyperbaric bupivacaine provides

An improved quality of intraoperative surgical anesthesia. Increase in the duration of two segment regressions (64.25 ± 13.51). Increase in the total duration of analgesia (150.375 ± 25.50). The occurrence and intensity of side effects were so minimal and not significant. The benefit associated with administration of intrathecal sufentanil in a dose of 5µg outweighs the disadvantages of it.

CONCLUSION

It has been found out by this study that addition of 5µg of sufentanil to low dose (7.5mg) of 0.5% of bupivacaine intrathecally in cesarean section provides improved quality of surgical anaesthesia and analgesia without significantly increasing maternal and fetal side effects than using bupivacaine alone.

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