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Original Research Paper

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COMPARATIVE STUDY OF INTRATHECAL MORPHINE WITH BUPIVACAINE / INTRATHECAL BUPIVACAINE ON POSTOPERATIVE ANALGESIA FOR CESAREAN SECTION

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ABSTRACT

BACKGROUND: Postoperative analgesia enables a faster rehabilitation, and reduces hospital stay. Intrathecal morphine provides slow onset and long-duration spinal analgesia. The procedure is simple, quick, and with a relatively low risk of technical complications or failure.

AIM: To evaluate the quality of analgesia and the severity of side effects of low dose intrathecal morphine with low dose Bupivacaine for cesarean section.

METHODOLOGY:The study is an open randomized controlled study. 80 ASA physical status I and II term parturients undergoing cesarean delivery with spinal anesthesia were included in the study. Patients were randomized in 2 groups. All pregnancy induced medical illness and cases with other medical diseases were excluded from the study.

Group 1 (Study Group) received 1.8ml of intrathecal Bupivacaine 0.5% (H) with Morphine 0.1 mg (0.1ml).

Group 2 (Control Group) received 1.8ml of intrathecal Bupivacaine 0.5% (H) with 0.1ml sterile water.

Patients were followed up postoperatively until rescue analgesic was given. VAS score was used to assess pain. Once VAS score was 4, rescue analgesic was given. Patients received intravenous Paracetamol and intravenous Tramadol for analgesia. The time taken from spinal anesthesia till the rescue analgesia was recorded as duration of analgesia.

CONCLUSION: Study group had a longer duration of analgesia when compared to control group.

KEYWORDS : Intrathecal Morphine, Cesarean Section, Postoperative Analgesia, Spinal Anaesthesia.

INTRODUCTION

Postoperative analgesia enables a faster recovery, improves the patient's level of satisfaction, and reduces hospital stay. In obstetrics, postoperative analgesia is important because postpartum women with pain have difficulty in walking and may adopt antalgic positions that hinder the initiation of breastfeeding. Moreover, endocrine changes and stress resulting from pain may interfere with lactation.

Intrathecal morphine produces excellent perioperative and postoperative analgesia in patients undergoing cesarean delivery .Intrathecal morphine provides slow onset and long-duration spinal analgesia. The procedure is simple, quick with a relatively low risk of technical complications or failure. However, it may cause side effects such as nausea, vomiting, pruritus, sedation, and respiratory depression.

The quality of analgesia and incidence of side effects may vary according to the intrathecal dose of morphine used. The optimal dose capable of providing better analgesia with the lowest incidence of side effects has not yet been defined.

The main objective of this study is to evaluate the quality and duration of postoperative analgesia and the severity of side effects of low dose intrathecal morphine with bupivacaine for cesarean section.

MATERIALS AND METHODS

After obtaining ethical committee permission, an open randomized prospective controlled study was conducted on 80 patients undergoing elective cesarean section under spinal anesthesia.

Inclusion criteria were patients who have given consent to participate in the study, patients belonging to ASA physical status class I and II between ages 20 -30 years and patients undergoing elective cesarean section under spinal anesthesia.

Exclusion criteria were patient's refusal, contraindication to spinal anesthesia, emergency cesarean delivery, preeclampsia/ eclampsia, allergy to drugs used in the protocol.

PAC was done and patients were kept nil orally for 8 hours. All patients were pre medicated with Inj. Ranitidine 50 mg IV and Inj. Metoclopramide 10mg IV 30 min before surgery. Routine monitoring with electrocardiography, peripheral oxygen saturation (SpO2), and noninvasive arterial pressure (BP) was performed throughout the surgery. For preloading, 500 ml of Hartmann's solution (Ringer's lactate) was given via intravenous 18 G cannula.

Patients were randomly divided into 2 groups of 40 each (n =40) using computer generated randomization table.

Group 1: (Study Group) received 1.8 ml of intrathecal Bupivacaine 0.5% (H) with Morphine 0.1 mg (0.1ml).

Group 2: (Control Group) received 1.8ml of intrathecal Bupivacaine 0.5% (H) with 0.1ml sterile water.

Spinal anesthesia was administered under aseptic conditions to each patient using a midline approach.

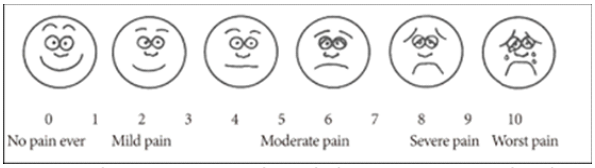
Patients were placed in the lateral decubitus position. After local infiltration with 2% lignocaine, a 25-gauge Quincke spinal needle was inserted into the L3-L4 intervertebral disc space. On aspiration of clear cerebrospinal fluid the drug was injected intrathecally.

Patients were given Inj. Oxytocin 15 U after baby extraction.

Patients were followed postoperatively until rescue analgesic was given. Heart rate, BP, oxygen saturation as measured by pulse oximetry (SpO2), requirement for supplemental analgesics, and occurrence of any side effects like nausea, vomiting, pruritis, and respiratory depression [defined as <10 breaths/min or SpO2 - 93%] were recorded both intraoperatively and postoperatively.

VAS score was used to assess pain. During PAC, patients were educated to use the visual analog scale (VAS; 0-10 cm), with 0 as "no pain" and 10 as "worst pain imaginable". (Figure 1). Patients were assessed every half hour for pain in postoperative period. Once VAS score was 4 rescue analgesic, IV Paracetamol 1 gm and IV Tramadol 100 mg was given. Patient. The time needed for first rescue analgesic was recorded.

FIGURE 1: VAS SCORE



Nausea and pruritus were each graded using a 3-point scale, where 0 = none, 1 = mild (requiring no treatment), 2 = moderate (responsive to treatment).

Postoperative vomiting was assessed using a different 4-point scale, where: 0 = none, 1 = 1-2 episodes, 2 = 3 to 4 episodes, and 3 = > 4 episodes.

Inj. Ondansetron 4mg IV given when vomiting scale was 1. Inj. Diphenhydramine 25 mg IV was given when pruritus scale was 2.

Data were statistically analyzed using SPSS version 10.0 (SPSS INC, Chicago, IL). Results on continuous measurements are presented on Mean ± SD and results on categorical measurements are presented in Number (%) Significance is assessed at 5% level of significance. Statistical analysis was done by applying student 't' test and Fisher's Exact test.

RESULTS

There was no differences among the groups with respect to demographic data (Table 1).

TABLE: 1 DEMOGRAPHIC CHARACTERISTICS

	GROUP 1	GROUP 2
AGE	23 ± 6	26 ± 3
WEIGHT	56 ± 7	60 ± 4
HEIGHT	153 ± 8	157 ± 3
ASA 1/2	23/17	25/15

The results for postoperative duration of analgesia is shown in Table 2. Study group had a prolonged duration of analgesia (14.25 ± 3.32 hours) when compared with control group (2.33 ± 0.47 hours). In the morphine group 62.5 % patients had duration of analgesia between 10-15 hours, 25% had between 15-20 hours, 12.5 % had more than 20 hours. This could be because of differing patient sensitivity to morphine and differing threshold to pain. Duration of analgesia was longer in bupivacaine with morphine group than in the plain bupivacaine group with a p value <0.0001.

TABLE 2: DURATION OF ANALGESIA

GROUP	MEAN±SD
GROUP 1	14.25 ± 3.32
GROUP2	2.33 ± 0.47

Table 3, 4, 5 shows the incidence of side effects in both groups. There was increased incidence of nausea, vomiting and pruritus in Bupivacaine + Morphine group. None of the patient developed clinical evidence of severe respiratory depression at any time. 20% of patients had nausea requiring treatment while 37.5% and 17.5% patients had vomiting and pruritus respectively which required treatment.

TABLE 3: INCIDENCE OF NAUSEA

	0 (None)	1 (Mild)	2 (Moderate)	3(Severe)
GROUP 1	20	12	8	-
GROUP 2	35	3	2	-

TABLE 4: INCIDENCE OF PRURITIS

	0 (None)	1 (Mild)	2 (Moderate)	3(Severe)
GROUP 1	23	10	7	-
GROUP 2	40	-	-	-

TABLE 5: INCIDENCE OF VOMITING

	0 (None)	1 (1-2 episode)	2 (3-4 episode)	3(>4 episode)
GROUP 1	25	12	3	-
GROUP 2	36	4	-	-

DISCUSSION

Morphine is the most frequently used and extensively studied hydrophilic opioid, administered for intrathecal use. Intrathecal morphine provides slow onset and long-duration spinal analgesia. Subarachnoid anesthesia is a popular technique for cesarean delivery because it is easy to perform, and spinal local anesthetic agents produce adequate relaxation of abdominal muscles. It is well known that the combination of Intrathecal Morphine and hyperbaric Bupivacaine is a simple and effective method for controlling postoperative pain in patients undergoing cesarean delivery. Some authors have reported problems with side effects such as nausea and vomiting, urinary retention, sedation, pruritus, and respiratory depression, depending on the dose. Thus, a number of studies have focused on determining the lowest effective Intrathecal Morphine dose for cesarean delivery.

Cardoso compared 25, 50, and 100 µg of intrathecal morphine and reported analgesia statistically better in the group receiving 100 µg. Ganem et al. used 50 and 100 µg of intrathecal morphine and also reported similar analgesia between groups.

Girgin N K et al conducted a study to evaluate the quality of analgesia and the severity of side effects of intrathecal morphine administered for a dose range of 0.1 to 0.4 mg for post cesarean analgesia with low dose bupivacaine. Time to first PCA-morphine demand was longer in each of the 4 groups that received Intrathecal Morphine than in the control group. There was no difference between groups in nausea and vomiting, but pruritus increased in direct proportion to the dose of intrathecal morphine (linear regression, P = 0.0001). Abboud et al studied groups of cesarean delivery patients who received 0.25 mg or 0.1 mg of Intrathecal Morphine and found that both experienced excellent analgesia of long duration (27.7 ± 4.0 and 18.6 ± 0.9 hours, respectively). Samii et al. reported the same duration when using 0.2 mg of morphine intrathecally. Abouleish et al. noted 27 ± 7.3 hours as the average time to first requirement of postoperative opioids in a group of cesarean delivery patients who received 0.2 mg of intrathecal Morphine.

We found in our study that intrathecal bupivacaine with morphine had a prolonged duration of analgesia (14.25±3.32 hours) when compared with intrathecal plain bupivacaine (2.33 ± 0.47 hours) in patients undergoing caesarean section.

Milner et al reported side effects such as nausea and vomiting, urinary retention, sedation, pruritus, and respiratory depression, depending on the dose administered.

Pruritus is a common and troublesome side effect of intrathecal opioid administration after cesarean delivery. In obstetric patients, it may be more frequent due to the interaction with estrogen receptors (µ). Opioid dose is very important relative to this side effect. Pruritus incidence rates of 60% to 65% have been reported after administration of 0.1 to 0.2 mg of Intrathecal Morphine for cesarean delivery. Karaman et al. used 0.2 mg of Intrathecal Morphine for cesarean delivery and observed a 62.9% incidence of pruritus. In their groups of cesarean delivery patients (who received from 0.1 - 0.5 mg of Intrathecal Morphine), Palmer et al found that pruritus severity increased in direct proportion to Intrathecal Morphine dose. In our study, 17.5% of patients who received intrathecal morphine had pruritus and diphenhydramine requirements.

In our study, patients who received intrathecal morphine had a significant incidence of nausea and vomiting than patients who received Intrathecal plain Bupivacaine. Cardoso et al. found only a trend towards a higher incidence of nausea and vomiting with increased dose of intrathecal morphine ($p > 0.05$). Ganem et al. reported incidence of nausea and vomiting statistically similar between patients who received 50 or 100 µg of intrathecal morphine. Palmer et al. and Girgin et al. compared increasing doses of intrathecal morphine and reported that the incidence and severity of nausea and vomiting did not vary with the dose used. Nortcliffe et al used 0.1 or 0.2 mg of spinal morphine for analgesia in cesarean delivery and observed 67% and 60% incidence rates of nausea and vomiting, respectively.

The incidence of nausea and vomiting after intrathecal morphine may be related to the dose of morphine used. These side effects also have been reported in control groups of cesarean delivery parturient who did not receive intrathecal morphine, which indicates that they can also be induced by the surgical procedure itself or by Intravenous morphine. Abouleish et al used 0.2 mg of intrathecal morphine for patients undergoing cesarean delivery and found that this group experienced intraoperative vomiting significantly less frequently than the control group, which received no intrathecal morphine.

Delayed respiratory depression is the most feared side effect of intrathecal opioids. Rostral spread of morphine in the subarachnoid space to the cisterns and then to the pons is thought to be responsible for the diminished respiratory drive. Clinical reports suggest that delayed respiratory depression is associated with intrathecal injection of morphine at doses more than 1.0 mg. No evidence of respiratory depression was seen with various low doses (range 0-0.4 mg) of intrathecal morphine in patients undergoing cesarean. In this study none of the patients had any incidence of respiratory depression.

CONCLUSION

We found out that intrathecal bupivacaine with morphine had a prolonged duration of analgesia when compared with intrathecal plain bupivacaine in patients undergoing caesarean section.
Patients who received intrathecal morphine had an increased incidence of nausea, vomiting and pruritus. There was no incidence of respiratory depression in both groups.

REFERENCES

1. Werner MU, Søholm L, Rotbøll-Nielsen P, et al. Does an acute pain service improve postoperative outcome? Anesth Analg. 2002; 95:1361-72.
2. Kehlet H, Holte K. Effect of postoperative analgesia on surgical outcome. Br J Anaesth. 2001; 87:62-72.
3. Pérez-Escamilla R, Maulén-Radovan I, Dewey KG. The association between cesarean delivery and breast-feeding outcomes among Mexican women. Am J Public Health. 1996; 86:832-6.
4. Abouleish E, Rawal N, Fallon K, Hernandez D. Combined intrathecal morphine and bupivacaine for cesarean section. Anesth Analg 1988; 67:370-4.
5. Abboud TK, Dror A, Mosaad P, et al. Mini-dose intrathecal morphine for the relief of post-cesarean section pain: safety, efficacy, and ventilatory responses to carbon dioxide. Anesth Analg 1988; 67:137-43.
6. Dahl JB, Jeppesen IS, Jørgensen H, et al. Intraoperative and postoperative analgesic efficacy and adverse effects of intrathecal opioids in patients undergoing cesarean section with spinal anesthesia: a qualitative and quantitative systematic review of randomized controlled trials. Anesthesiology. 1999; 91:1919-27.
7. Wu YW, Seah YS, Chung KT, Liu MD. Postoperative pain relief in primigravida caesarean section patients—combination of intrathecal morphine and epinephrine. Acta Anaesthesiol Sin1999; 37:111-4.8.Milner AR, Bogod DG, Harwood RJ. Intrathecal administration of morphine for elective caesarean section. A comparison between 0.1 mg and 0.2 mg. Anaesthesia 1996; 51:871-3.
9. Cardoso MM, Carvalho JC, Amaro AR, et al. Small doses of intrathecal morphine combined with systemic diclofenac for postoperative pain control after cesarean delivery. Anesth Analg. 1998; 86:538-41.
10. Girgin NK, Gurbet A, Turker G, Aksu H, Gulhan N. Intrathecal morphine in anesthesia for cesarean delivery: Dose-response relationship for combinations of low-dose intrathecal morphine and spinal bupivacaine. *J Clin Anesth* 2008; **20**:180–185.
12. Samii K, Feret 1, Harari **A,** Viars P. Selective spinal analgesia; Lancet 1979; 1:1142.
13. Abouleish E, Rawal N, Fallon K, Hernandez D. Combined intrathecal morphine and bupivacaine for cesarean section. Anesth Analg 1988; 67:370-4.
14. Stoelting RK, Hillier SC. Pharmacology & physiology in anesthetic practice. 4th ed. Philadelphia: Lippincott, Williams & Wilkins; 2006. p. 90-2.
15. Palmer CM, Emerson S, Volgoropolous D, Alves D. Dose-response relationship of intrathecal morphine for postcesarean analgesia. Anesthesiology 1999; 90:437-44.
16. Sarvela J, Halonen P, Soikkeli A, Korttila K. A double-blinded, randomized comparison of intrathecal and epidural morphine for elective cesarean delivery. Anesth Analg 2002; 95: 436-40.
17. Karaman S, Kocabas S, Uyar M, Hayzaran S, Firat V. The effects of sufentanil or morphine added to hyperbaric bupivacaine in spinal anaesthesia for caesarean section. Eur J Anaesthesiol 2006; 23: 285-91.
18. Nortcliffe SA, Shah J, Buggy DJ. Prevention of postoperative nausea and vomiting after spinal morphine for caesarean section: comparison of cyclizine, dexamethasone and placebo. Br J Anaesth2003; 90:665-70.
19. Cousins MJ, Mather LE. Intrathecal and epidural administration of opioids. Anesthesiology 1984; 61:276-310.
20. Yaksh TL. Spinal opiate analgesia: characteristics and principles of action. Pain 198; 11: 293-346.