

Intrathecal Morphine in combination with Bupivacaine: A comparative study following caesarean section

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ABSTRACT

Post operative pain is very unpleasant. Adequate analgesia during post operative period gives good patient satisfaction. To assess the adequacy of post operative analgesia in patients undergoing caesarean section. This prospective study was carried out in Lumbini Medical College, Palpa in the year, and April 2011 to October 2011. A total of 60 caesarean section cases of ASA grading I or II were selected for the study. All patients received an intrathecal injection of 0.5% (2.5ml) hyperbaric Bupivacaine with 100 µgm and 200 µgm of preservative free morphine. Patients were monitored for 12 hours for adequacy of analgesia. Statistical analysis was done using SPSS (21) software. The median age of the patients was 22.75 (SD= 4.309). The duration of analgesia was prolonged with the patients who had 200 µgm of morphine and less with the 100 µgm of morphine which was statistically not significant (p = 0.09). The incidence of pruritus, nausea and vomiting was more with 200 µgm of morphine as compared to 100 µgm of morphine and was statically not significant (p value 0.09 and 0.373 respectively). Intrathecal morphine provides satisfactory analgesia. By decreasing the dose than what is recommended we can safely achieve adequate analgesia.

Keywords: Analgesia, hyperbaric bupivacaine, intrathecal morphine, spinal.

INTRODUCTION

Cesarean delivery is a common challenge for both the obstetricians and the anesthesiologists. The evaluation of effects of regional anesthesia on neonates has revealed that it is associated with high APGAR score in comparison with general anaesthesia.¹ Intrathecal opioids are often used for postoperative pain control in Cesarean section.¹ The use of Intrathecal morphine is associated with unpleasant side effects such as pruritus, nausea, vomiting, urinary retention and respiratory depression.² In general, most of the side effects of intrathecal opioid are dose-dependent.² Side effects are less common in patients chronically exposed to intrathecal, or systemic opioids.³ Higher the dose, higher the side effects have been seen.³ The use of intrathecal Morphine is reported to have better analgesia in post operative period after Cesarean Section which reduces the cost of analgesia and provides satisfaction to the patients.⁴

METHOD

This prospective study was carried out in Lumbini Medical College, Palpa in the year April 2011 to October 2011 after Institutional Research Board approval. Informed consent were taken from each patient. Sixty caesarean section cases of ASA class I or II was included in this study. They were divided into two groups randomly. Group 1 (M₁) received an intrathecal injection of 0.5% (2.5ml) hyperbaric Bupivacaine with 100 µgm of preservative free Morphine and group 2 (M₂) received an intrathecal injection of 0.5%

(2.5ml) hyperbaric Bupivacaine with 200 µgm of preservative free Morphine. All the patients who were contraindicated to undergo regional anaesthesia were excluded from the study.

Patients were hydrated with 0.5 to 1.0 litre of Ringer Lactate solution before administration of the subarachnoid block (SB). SB was performed in the sitting position at L3 - L5 inter space. The quince 25 gauge needle was inserted through the space. After free flow of clear cerebrospinal fluid had been demonstrated, 12.5mg hyperbaric Bupivacaine (0.5%) with 100µgm or 200µgm preservative-free morphine, mixed in the same syringe, were injected. Afterwards, patients were immediately placed in a supine position. Supplemental oxygen was delivered by face mask @ 5 l/min till the delivery of baby. The level of sensory block was assessed by loss of cold sensation by spirit swab till it reached T4 ± 2 dermatomal levels bilaterally.

Patients were monitored every 2 hours for 12 hours after surgery. The incidences of pruritus, nausea, vomiting and pain (requiring analgesia) was documented through direct questioning. Assessment and treatment of pruritus and nausea vomiting was carried out immediately.

Nausea and vomiting was treated with 25 mg Promethazine I/V. All the other adverse effects in the perioperative period were recorded. In order to prevent breakthrough pain during the first 12 hrs after surgery injection diclofenac sodium 75mg IM was used.

RESULTS

Most of the patients were between age 15-24yrs (70%) but very few were above 35(6.66%). Only 4 (23.33%) were between 25-34 yrs (Table-1).

Table-1: Demography

Age range in years	Number of patients.
15 - 24	42 (70%)
25 - 34	14 (23.33%)
> 35	4 (6.66%)
Total	60

The duration of analgesia was prolonged with 200 μg (M_2) of preservative free morphine in comparison with 100 μg (M_1) as shown in Table-2 and was statistically not significant. The chi square value is 2.4 and p value is 0.09 (which is statistically not significant) Table-2.

Table-2: Duration of Analgesia with 100 μg (M_1) and 200 μg (M_2) of intrathecal Morphine in hours

Group	<12 hour	>12 hour	Total
Group I (M_1)	n=18 (60%)	n=12 (40%)	30
Group II (M_2)	n=12 (40%)	n=18 (60%)	30

p value = 0.09

The incidence of nausea and vomiting is more with 200 μg (M_2) of preservative free morphine in comparison with 100 μg (M_1) although there is no statistical significant relation with each other. The chi square value is 0.373 and p value is 0.381 (which is statistically not significant) Table-3.

Table-3: Incidence of nausea and vomiting with 100 μg (M_1) and 200 μg (M_2) of intrathecal Morphine

Drug	Present	Absent	Total
M_1	n= 6 (20%)	n=24 (80%)	30
M_2	n= 8 (26.66%)	n= 22 (73.33%)	30

p value is= 0.381.

Pruritus is seen more with 200 μg (M_2) of preservative free Morphine in comparison with 100 μg (M_1) Morphine. However, there was no statistical correlation, the chi square value is 2.411 and p value is 0.09, which is statistically not significant (Table-4).

Table-4: Incidence of pruritus with 100 μg (M_1) and 200 μg (M_2) of intrathecal Morphine

Drug	Present	Absent	Total
M_1	n= 11(36.66%)	n =19(63.33%)	30
M_2	n =17(56.66%)	n= 13(43.33%)	30

p value = 0.09

DISCUSSION

The addition of preservative-free Morphine to intrathecally injected local anesthetic provides effective, long-lasting postoperative analgesia under spinal anaesthesia.⁵ Intrathecal Morphine inhibits pain transmission in the substantia gelatinosa. The combination therapy with Bupivacaine avoids opioid administration during the entire post-operative period.³ However, a common side-effect of intrathecal Morphine administration is the development of pruritus, nausea, vomiting and respiratory depression.^{1,3} The duration of analgesia of intrathecal Morphine is dependent on dose of drug. Higher the dose longer the analgesia with higher incidence of side effects has been seen.^{4,6} Many other therapies have been administered to control post operative pain in caesarean section cases.⁷ Trotter *et al* failed to show a reduction in post-operative pain after Caesarean section using 20 ml Bupivacaine 0.5% subcutaneously.⁷ In contrast, Genta *et al* found that wound infiltration with 20 ml Bupivacaine 0.5% reduced pain scores and analgesic requirements for up to 12 hr after surgery.⁸ Although the efficacy of the individual analgesics has been studied after Caesarean delivery. Their relative contribution towards overall pain relief in the multi-modal study group is unknown.⁹ Our study reveals that the patient who had 0.2 mg of intrathecal Morphine had >12 hrs of analgesia in 60% of cases. Whereas, in patients with 0.1mg Morphine had analgesia duration of >12 hrs in 40% of cases (p value 0.09). Remaining (50%) who had analgesia duration of <12 hr had inj Diclofenac 75 mg intramuscularly as a rescue analgesic.

The most feared side effect of intrathecal opioids is respiratory depression. Higher the dose betters the analgesia but worse the respiratory depression. Respiratory depression was found significantly after 0.2mg to 0.4mg of intrathecal morphine and it was profound with 0.6 mg.¹⁰ Our study reveals that the analgesic effects was good and prolonged with 0.2mg of Morphine than 0.1mg of intrathecal morphine with no cases recorded of respiratory depression. Delayed respiratory depression which develops progressively in 12 to 24 hours after use of spinal morphine has limited its use in higher dose.¹¹

Some study have reported 40% of respiratory depression with 0.2mg intrathecal morphine.¹⁰ Further increase to 0.4 and 0.6mg of intrathecal morphine resulted in respiratory depression of 60% and 80% respectively with desaturations ($\text{SpO}_2 < 85\%$).¹⁰ In these patients > 95% of cases had satisfactory pain control.¹⁰

Another most troublesome side effect of intrathecal morphine is nausea and vomiting. The incidence of nausea and vomiting is 30% following 0.2 mg of

intrathecal morphine.¹²⁻¹⁵ Our study reveals 26.66% incidence of nausea and vomiting following 0.2 mg of intrathecal Morphine and it was 20% with 0.1 mg of intrathecal Morphine which was statistically not significant (p value 0.381).

Pruritus is another troublesome situation in patients receiving intrathecal morphine. It may be generalized but is more likely to be localized to the face, neck, or upper thorax.¹⁶ It is higher in intrathecal route than others. The incidence varies widely from 0 to 100%.¹⁷ Studies have observed that up to 80% of patients had complained of pruritus. Severe pruritus is rare, occurring in only about 1% of patients.¹⁷ Pruritus induced by intrathecal and epidural opioids is likely due to cephalic migration of the drug in cerebrospinal fluid and subsequent interaction with the trigeminal nucleus located superficially in the medulla.^{17,18} In our study there was higher incidence of pruritus with 0.2 mg of intrathecal Morphine than 0.1 mg of intrathecal morphine. (56.66 % and 36.66 % respectively), but was not statistically significant (p value 0.09). Higher the dose, higher the incidence of pruritus was found.

Another less common complication of intrathecal Morphine is retension of urine. Since all our patients had urinary catheter in place for 12 hours they were not studied for retension of urine.

200 µg of intrathecal Morphine is adequate to provide satisfactory analgesia. However, low incidences of Morphine related side effects is seen with 100 µg of morphine when used in combination with 0.5% hyperbaric Bupivacaine intrathecally.

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