

A Comparative study of intrathecal hyperbaric Bupivacaine with or without Morphine for Post-Operative Analgesia in Hysterectomy

Basnet U¹

¹Department of Anesthesiology, Paropakar Maternity and Womens' Hospital, Thapathali, Kathmandu

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Aims: The aim of the study is to compare the effect of addition of morphine with bupivacaine and bupivacaine alone in intrathecal anesthesia for the quality and the duration of analgesia in hysterectomy.

Methods: Prospective randomized analytical study was conducted in patients undergoing hysterectomy under spinal anesthesia over period of one year. Patients were randomized into two groups: hyperbaric bupivacaine (15mg) only or hyperbaric bupivacaine (15mg) plus morphine (0.2mg). The mean duration for the request of first analgesia in post-operative period, mean visual analogue scale (VAS) score at the time of request of analgesia and common adverse effects were compared.

Results: The post-operative analgesia was prolonged (260.32 Vs. 154.34 minutes) along with low VAS pain scale (5 vs. 7.5) in combination group but the respiratory depression was significantly high.

Conclusions: The addition of morphine to hyperbaric bupivacaine prolongs the total duration of sensory analgesia, causes significantly greater frequencies of respiratory depression and causes no significant increase in other complications like hypotension, bradycardia, nausea and vomiting and pruritus, in comparison to patients receiving intrathecal hyperbaric bupivacaine only.

Keywords: adverse effects; hyperbaric bupivacaine; morphine; post-operative analgesia; spinal anesthesia

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INTRODUCTION

Pain is generally considered an important postsurgical complication, which may result in serious morbidities if left unaddressed.¹ Hysterectomy is associated with severe or moderate postoperative pain. Postoperative pain management remains a significant challenge after abdominal surgery.² It is also a main challenge for anaesthesiologists and even with the help of multimodal analgesia techniques patients still remain undertreated.³

The usual method of the pain control in half of the patients often does not provide an adequate analgesia and postoperative pain can delay patient's recovery.⁴ Anesthetic technique appears to be effective in postoperative pain.⁵

Spinal blocks are major regional techniques with a long history of effective use for a variety of surgical procedures and pain relief. Spinal anesthesia (SA) is one of the most versatile regional anesthesia techniques available today.⁶

Intrathecal opioid administration is an attractive analgesic technique since the opioid is injected directly into the cerebrospinal fluid, close to the structures of the central nervous system where opioid acts. Morphine is the prototype opioid agonist to which all other opioids are compared. Analgesia is the most prominent when morphine is administered before painful stimulus occurs.⁷

Since 1979 intrathecal morphine has been used for postoperative pain management.⁸ Doses of intrathecal morphine ranging from 0.1 to 0.25 mg have been used to reduce side-effects and complications. In current study, we tested hypothesis that SA with hyperbaric bupivacaine 0.5% in addition to 0.2mg intrathecal morphine is superior to hyperbaric bupivacaine 0.5% only to reduce postoperative pain and analgesic consumption after elective hysterectomy surgery.

METHODS

This randomized prospective comparative study was conducted in department of anesthesia, Nepalgunj Medical College, Teaching Hospital, Kohalpur, over a period of one year (from 1st November 2012 to 31st October 2013) after ethical approval obtained from

CORRESPONDENCE

Dr Ujjwal Basnet,
Registrar of Anesthesiology,
Cell:+977-9841364705,
email: ujjwalbasnet05@gmail.com

the ethical committee, written informed consent obtained from the patients. This study was conducted in 100 patients of ASA physical status of I and II of age group between 20 to 60 years undergoing routine abdominal or vaginal hysterectomy. The patients were divided randomly into two equal groups using envelop technique - Group A: 50 cases with hyperbaric bupivacaine (15mg) and Group B: 50 cases with hyperbaric bupivacaine (15mg) and Morphine (0.2mg). Patient who refused to participate, sensitivity to study drugs, patients on anticoagulant or antiplatelet therapy or with bleeding diathesis or coagulopathy, haemodynamic instability, raised intracranial pressure, local infection at back; severe spinal deformity and emergency surgery were excluded from the study.

Following a detailed pre-anesthetic examination, all patients were admitted to the hospital at least a day before surgery had undergone pre-anaesthetic physical check-up and biochemical examination which was noted in the proforma. The patients were kept fasting from 24.00hrs the night prior to surgery. All the patients received Pantaprazole 40mg and diazepam 5mg orally at 22:00hrs the night before surgery and the same dose in the morning of surgery day at 6:00 hrs.

Patient was brought to pre-anaesthetic room and IV line was opened with 18 gauge cannula and fluid preloading was done with 1litre Ringer lactate over 20 minutes. Patient was attached to ECG, non-invasive blood pressure (NIBP) monitor, and pulse oxymeter on OT table. Patients were randomly allocated, using closed envelope technique, to receive either heavy bupivacaine alone (15mg) or heavy bupivacaine (15mg) and morphine 0.2mg Under strict aseptic preparation, lumbar dural puncture was performed at L3/4 inter space with 25G sterile disposable Quincke's type spinal needle, using standard midline approach in the sitting position. Free flow of CSF was confirmed in each quadrant during the 360 degree rotation of the needle on removal of the stylet. Intrathecal administration of the drugs was done at the rate of 0.2 ml/second. At the end of the injection, a small sterile dressing was applied and the patient immediately turned into horizontal supine position, with a pillow under the head and neck. For intra operative monitoring and management following parameters were recorded: quality of spinal anesthesia

by using bromage scale of motor block, intraoperative VAS pain score from the time of surgical incision at 10 minutes interval till the end of surgery, duration of surgery, NIBP, pulse rate, respiratory rate, ECG and SPO₂ - baseline values and then every 10 minutes interval till the end of surgery and adverse effects occurring in perioperative period.

Intraoperative fluid management was done in relation to body weight of the patient, vital signs and intraoperative losses. At the end of the surgery, the patient was shifted to the postoperative ward for clinical monitoring of vital signs, appropriate fluid therapy and other treatment. Postoperatively vital signs (pulse, NIBP, SpO₂ respiratory rate) were measured at 10 minutes interval up to 100 minutes from initiation of surgery.

At 24 hour postoperatively, the patients were evaluated for the duration of effective analgesia (time from SA to the first request of analgesics) and the VAS pain score at that time. Pruritus, PDPH (headache within first 24 hours postoperative), nausea and vomiting if present were noted.

Data were entered in Excel Master Sheet with coding of the variables and analyzed using Statistical Package for Social Sciences (SPSS software version 20.0). Frequencies, percentages, means with standard deviations were calculated. Paired sample t-test: used to compare the means between the two groups; p-value was taken as significant at 0.05.

RESULTS

The age wise distributions of the cases in both groups were comparable, without any statistically significant difference [Table-1].

Table-1: Age group comparison

Age group (years)	Group A	Group B	Total
20-30	3	3	6
31-40	16	14	30
41-50	21	14	35
51-60	10	19	29
Total	50	50	100

There was no statistically significant difference in age, weight, ASA physical status on either group [Table-2].

Table-2: Mean age among the two study groups

	Group A		Group B		Total		p-value
	Mean	SD	Mean	SD	Mean	SD	
Age	44.56	8.33	46.42	9.74	45.49	9.03	0.800
Weight	53.16	7.45	49.90	7.06	51.53	7.25	0.769

Cases at ASA grade I were 76 and 70, and ASA II were 24 and 30 in group A and B respectively.

In group A, the mean duration for the request of first analgesia in post operative period was significantly less ($p < 0.05$) than in group B [Figure-1].

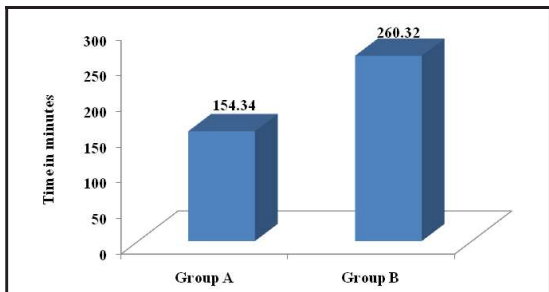


Figure-1: Indication for cesarean section

In group A, the mean VAS score at the time of request of analgesia was 7.50 with standard deviation of 1.14 whereas in group B, the mean VAS score at the time was 5.00 with standard deviation of 1.60. The difference was statistically significant ($p < 0.05$) [Figure-2].

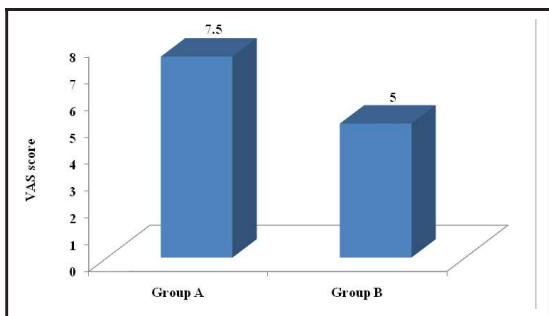


Figure-2: Mean value of visual analogue score at first analgesia

Intra-operative vitals sign, heart rate, respiratory rate and mean arterial blood pressure (MAP) were comparable in both groups. Hypotension, bradycardia, nausea and vomiting were the common adverse effects encountered in both the groups; but there was no statistically significant difference. Pruritus and respiratory depression were not observed in either of the group [Figure-3].

In post-operative period: hypotension, nausea and vomiting, pruritus were present but there was no statistically significant difference. None of the patients had bradycardia but respiratory depression was observed in 6 patients out of 100 cases and all of them were from group B that was statistically significant ($p = 0.013$) [Figure-4].

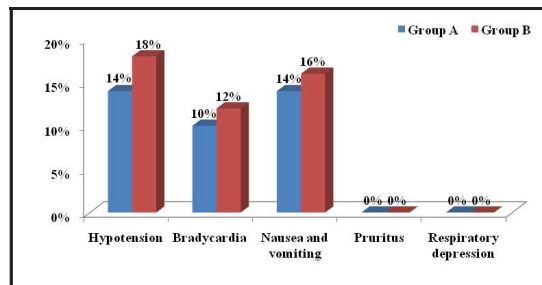


Figure-3: Intra operative complications

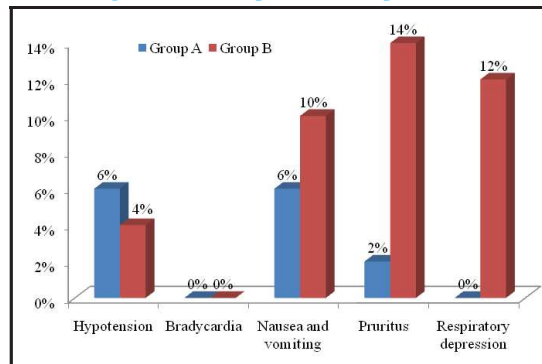


Figure-4: Post-operative complications

DISCUSSION

Opioids and local anaesthetics administered together intrathecally have been shown to have a synergistic analgesic effect.⁹

The duration for the request of first analgesia in post-operative period was 362 vs 209 minute in patient receiving 0.2mg intrathecal bupivacaine with morphine and patient receiving intrathecal bupivacaine only, this finding was similar to other studies done by Singh et al¹⁰, Tridevi et al¹¹, Nakamura et al¹² and Sharma et al¹³.

In this study, the mean VAS pain score at the time of first request of analgesia was 7.5 receiving intrathecal bupivacaine whereas it was 5 in patients receiving intrathecal bupivacaine and morphine. This difference was statistically significant ($p < 0.05$). This is comparable with the study done by Marion et al.¹⁴

The incidence of respiratory depression was significantly high among the patient who received intrathecal morphine (6 out of 50 patients), which was statistically significant ($p < 0.05$) in this study. The administration of intrathecal opioids may provide benefits in augmenting intraoperative anaesthesia, but carries a risk of respiratory depression.^{15,16}

In this present study, total 8 patients had nausea and vomiting out of 100 cases. Among them 5 patients

were from the group who received 0.2mg intrathecal morphine. All of them had more than one episode of nausea and vomiting. This finding was similar to the study done by others.¹⁷⁻¹⁹

Pruritus was experienced only in the morphine group which was similar study done by Hein et al²⁰ and Wodlin et al.²¹ There was no statistical difference in the change of vital signs post-operatively in my study. In contrary to this, a study done by Karman et al²², post-operative mean arterial blood pressure was

significantly lower in morphine group with p value less than 0.05. But they used intrathecal morphine at dose of 5 microgram/kg.

CONCLUSIONS

The addition of 0.2mg morphine to 15mg of bupivacaine in comparison to 15mg bupivacaine only prolongs the total duration of sensory analgesia; causes significantly greater frequencies of respiratory depression; and causes no significant increase in other complications like hypotension, bradycardia, nausea and vomiting, and pruritus.

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