Original Research Article

Comparative study of postoperatively analgesia by intrathecal bupivacaine plus midazolam vs bupivacaine alone in the patients underwent LSCS

Pooja Daramwar[1], Suyog Tannirwar[2*]

{[1]Assistant Professor, Department of Anaesthesia} {[2]Assistant Professor, Department of Paediatrics} Ulhas Patil Medical College and Hospital, Jalgaon Khurd, Jalgaon, Maharashtra, INDIA.
Email: drpoojad11@gmail.com , sbtannirwar@gmail.com

Abstract

Background: Spinal anesthesia for cesarean delivery is the best anesthetic technique as it is simple to perform with rapid onset of anesthesia and complete muscle relaxation. Bupivacaine is the most commonly employed local anaesthetic for subarachnoid block, but has limited duration of action. Adjuvant drugs added to bupivacaine intrathecally improve the duration and quality of the blockade and prolong the postoperative analgesia. In present study, we compared postoperatively analgesia by intrathecal bupivacaine plus midazolam vs bupivacaine alone in the patients underwent LSCS at our tertiary hospital. **Material and Methods:** This study was prospective, comparative, randomised study conducted in the pregnant women posted for elective caesarean section. 60 pregnant women scheduled for elective caesarean section were randomly divided into group I and group II by envelope method. The group I received 10 mg bupivacaine and the group II received 10 mg bupivacaine combined with 2 mg of preservative-free midazolam. **Results:** In present study 60 pregnant women were enrolled. 30 patients each were allotted to group I (10 mg bupivacaine) and group II (10 mg bupivacaine combined with 2 mg of preservative-free midazolam) Baseline characteristics of pregnant women such as age, weight, height, pulse rate, systolic BP, diastolic BP were comparable in both groups and difference was not statistically significant. In present study early onset time of sensory block, reduced time to achieve complete sensory block and prolonged duration of effective analgesia was noted in group II as compared to group I, and the difference was statistically significant. Complications such as bradycardia, hypotension, nausea and vomiting were noted in present study. Group I had slightly increased number of complications than group II, difference was not statistically significant. **Conclusion:** Addition of midazolam in intrathecal bupivacaine for caesarean section prolongs duration of postoperative analgesia with no increase in the incidence of complications.

Keywords: bupivacaine, midazolam, postoperative analgesia, caesarean delivery.

***Address for Correspondence:**
Dr Suyog Tannirwar, Assistant Professor, Department of Pediatrics, Dr Ulhas Patil medical College and hospital, Jalgaon khurd, Jalgaon, Maharashtra, INDIA.
Email: sbtannirwar@gmail.com

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INTRODUCTION

Pain is a complex and multifaceted phenomenon, which is influenced by various parameters. A control of these pathophysiologic processes by administering adequate postoperative analgesia along with intraoperative anesthesia may lead to improvement in morbidity and patient satisfaction.[1,2] Spinal anesthesia for cesarean delivery is the best anesthetic technique as it is simple to perform with rapid onset of anesthesia and complete muscle relaxation. Lower incidence of failed block, less

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drug doses, minimal neonatal depression and decreased incidence of aspiration pneumonitis are added advantages of spinal anesthesia.[3,4] Bupivacaine is the most commonly employed local anaesthetic for subarachanoid block, but has limited duration of action. Adjuvant drugs added to bupivacaine intrathecally improve the duration and quality of the blockade and prolong the postoperative analgesia.[5] Several investigators have shown that intrathecal or epidural administration of Midazolam produces a dose dependent modulation of spinal nociceptive processing in animals and humans and is not associated with neurotoxicity, respiratory depression or sedation.[6] In present study, we compared postoperatively analgesia by intrathecal bupivacaine plus midazolam vs bupivacaine alone in the patients underwent LSCS at our tertiary hospital.

MATERIAL AND METHODS

This study was prospective, comparative, randomised study conducted in the pregnant women posted for elective caesarean section. Study period was 1 year (from January 2020 to December 2020) in Department of Anaesthesia, Ulhas Patil Medical College and Hospital, Jalgaon Khurd, Jalgaon. Study permission was taken from institutional ethical committee.

Inclusion criteria

- Low risk, pregnant women (ASA grade I/II), posted for elective Caesarean section

Exclusion criteria

- Pregnant women with medical disorders such as heart disease, renal disease, liver disease, psychiatric diseases
- Bad obstetric history, obstetric complications in present pregnancy, evidence of foetal compromise and anomalies.
- Patients with contraindication to spinal anaesthesia.
- Not willing to participate in study.

Study was explained to patients in local language and written informed consent was taken for participation. 60 pregnant women scheduled for elective caesarean section were randomly divided into group I and group II by envelope method. The group I received 10 mg bupivacaine and the group II received 10 mg bupivacaine combined with 2 mg of preservative-free midazolam. A detailed pre-anaesthetic evaluation and all relevant investigations were done and posted for elective caesarean section. Under all aseptic precautions, through midline approach, the lumbar puncture was done at L2-L3 or L3-L4 intervertebral space with 23G disposable Quincke's spinal needle. Patients' hemodynamic parameters including maternal pulse rate, non-invasive blood pressure, oxygen saturation, and respiratory rate measured periodically and were recorded. Standard postoperative care was provided. The duration of effective analgesia was taken from the time of intrathecal drug administration to the time of first supplementation with rescue analgesic. The values of the two groups were compared and expressed as mean ± SD. Statistical analysis was done by using Student's paired t-test for quantitative and Chi-square test for qualitative parameters. The p value of <0.05 was considered as statistically significant.

RESULTS

In present study 60 pregnant women were enrolled. 30 patients each were allotted to group I (10 mg bupivacaine) and group II (10 mg bupivacaine combined with 2 mg of preservative-free midazolam) Baseline characteristics of pregnant women such as age, weight, height, pulse rate, systolic BP, diastolic BP were comparable in both groups and difference was not statistically significant.

Table 1: Baseline Information and Vitals of Study Groups

Characteristics	group I (mean ± SD)	group II (mean ± SD)	p value
Age (years)	24.21 ± 3.4	23.8 ± 4.1	0.63
Weight (kgs)	63.2 ± 10.4	64.1 ± 9.5	0.35
Height (cms)	154.7 ± 6.3	155.1 ± 7.2	0.52
Pulse Rate (per min)	80.2 ± 10.6	82.6 ± 11.3	0.59
Systolic BP (mm Hg)	117.5 ± 20.2	119.1 ± 19.6	0.12
Diastolic BP (mm Hg)	71.8 ± 9.9	70.4 ± 11.2	0.15

In present study early onset time of sensory block, reduced time to achieve complete sensory block and prolonged duration of effective analgesia was noted in group II as compared to group I, and the difference was statistically significant. Complications such as bradycardia, hypotension, nausea and vomiting were noted in present study. Group I had slightly increased number of complications than group II, difference was not statistically significant.

Table 2: Comparison of sensory parameters in two groups.

Characteristics	group I (mean ± SD)	group II (mean ± SD)	p value
Mean onset time of sensory block (min.)	5.25 ± 2.22	3.01 ± 2.1	0.018
Time to achieve complete sensory block	9.1 ± 3.4	6.1 ± 3.1	0.039
Mean duration of effective analgesia	141.6 ± 24.2	183.4 ± 25.2	0.041
Complications			0.063
Bradycardia	1	1	
Hypotension	2	1	
Nausea and vomiting	1	1	

DISCUSSION

The technique of subarachnoid block is quite simple and single injection results in ideal operating conditions with complete analgesia, profound muscular relaxation, decreased blood loss and minimal ventilatory disturbances. Duration of analgesia could increase through the use of additive compounds (e.g., epinephrine, opioids, neostigmine, midazolam and clonidine) in local anesthetics. Furthermore, these compounds are able to diminish other postoperative complications, such as shivering.[7,8] According to the literature, intrathecal administration of midazolam with local anesthetics is effective in regional and neuraxial anesthesia for postoperative pain control. Midazolam has been shown to have remarkable analgesic effects with limited side effects.[9] Other investigators have also shown that intrathecal-administered midazolam when added to bupivacaine significantly improved the duration and quality of spinal anesthesia;[10] produced a more effective and longer analgesia in perianal and lower extremity surgeries;[11] prolonged the duration of spinal blockade in orthopedic patients and provided postoperative early recovery of motor function in orthopedic and diabetic mellitus patients undergoing foot debridement.[12] Post cesarean delivery patients are at higher risk for thromboembolic events which may also be precipitated by immobility from inadequate pain control or excessive sedation from opioids. Moreover, these women need to ambulate, to be alert and energetic enough to care for, interact with and breastfeed their new born. Early breastfeeding is important immediately after childbirth to promote and improve mother bonding and enhances puerperal changes to regain pre-pregnancy state.[13] Increasing the duration of analgesia prevents several postoperative complications, such as atelectasis, urinary retention, prolonged hospital stay and increased healthcare costs. Therefore, replacement of conventional analgesic methods with new pain-relieving compounds is of paramount importance.[8] In study by Karbasfrushan A *et al.*,[14] pregnant women were consecutively assigned into either bupivacaine (10 mg) plus intrathecal midazolam (2 mg/ml) (BM) (n=62) or bupivacaine plus normal saline (BNS) (n=62). In comparison with the BNS group, mothers in the BM group reported a significant relief in pain (15 min and 120 min) after the surgery. The average time until the first dose of additional analgesic, per mother's request was 142.18±55.19 min in the BNS vs 178.06±77.33 min in the BM group. Combination of bupivacaine plus intrathecal midazolam was an effective anesthetic technique to provide improvement in pain. The onset of sedation was faster in the BM group compared with the BNS group. The duration of effective analgesia, and the time for regression of sensory analgesia was the same in both groups. Similar findings were noted in present study. Dodawad R *et al.*,[15] randomly allocated 60 pregnant women in Group BC and Group BM. Both groups received 10 mg (2 mL) of 0.5% hyperbaric bupivacaine. Group BC received 0.4 mL of distilled water, while group BM received 0.4mL(2 mg) of midazolam intrathecally. Postoperative analgesia was significantly longer in the midazolam group compared to the control group (201.5 minutes vs. 357.6 minutes). The mean onset times of the sensory and motor blocks were significantly faster ($P < 0.01$) in the midazolam group compared to the control group. The mean times to attain the maximum sensory level and motor blocks were also significantly faster in the midazolam group compared to the control group ($P < 0.05$). The incidence of hypotension was 6.6% in the midazolam group and 36.6% in the control group, which was highly significant. Intrathecal midazolam 2 mg provides significantly longer and effective postoperative analgesia with no side effects.[15]Midazolam is from benzodiazepine group of drugs, used as a preoperative sedative or as a sleep medication during operations, and as a sedative drug during delivery, with analgesic effects.[16] Other studies have also found that adding midazolam to bupivacaine significantly increases the duration of postoperative analgesia.[17] Various researchers have evaluated the effectiveness of intrathecal midazolam in postoperative analgesia in normal caesarean patients and noted beneficial effects of addition of midazolam to bupivacaine.[18,19]

CONCLUSION

Addition of midazolam in intrathecal bupivacaine for caesarean section prolongs duration of postoperative

analgesia with no increase in the incidence of complications. Intrathecal bupivacaine plus midazolam should be used instead of intrathecal bupivacaine alone for elective caesarean section.

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