Section: Anesthesiology

Original Research Article

STUDY OF COMPARATIVE EVALUATION OF THE EFFECT OF BUPIVACAINE AND ROPIVACAINE IN CESAREAN DELIVERY WITH SPINAL ANESTHESIA

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ABSTRACT

Background: Cesarean section is the most frequent obstetric operation that is performed in cases when a vaginal delivery would put the fetus or mother at risk. Hence, the present study was conducted for comparing the Effect of Bupivacaine and Ropivacaine in Cesarean Delivery with Spinal Anesthesia.

Materials & Methods: 50 patients who were planned for a spinal anesthetic elective cesarean delivery were randomized into two study groups: one for ropivacaine and the other for bupivacaine. The process of administering spinal anesthesia was done while seated. Five-minute intervals were used for the assessment of the sensory block levels. The pinprick test was used to gauge the degree of sensory blockage. A visual analog scale (VAS) was used to measure the patients' pain intensity. It ranged from 0 (no discomfort) to 10 (severe pain). Data were presented as frequency, percentages, mean, or standard deviation wherever applicable. Chi square test was used to assess categorical variables between the groups.

Results: Both the study groups were comparable in terms of age-wise distribution. Compared to the ropivacaine group, the bupivacaine group had sensory block onset much more quickly. Compared to the bupivacaine group, the ropivacaine group experienced total sensory blockade substantially faster. Non-significant results were obtained while comparing the pain among two study groups.

Conclusion: In comparison to bupivacaine, ropivacaine produced a similar and successful clinical profile with a shorter duration of sensory block for elective cesarean sections; nevertheless, the onset time of ropivacaine's sensory blockage was much greater than that of bupivacaine. As a result, ropivacaine may be used during cesarean sections instead of bupivacaine.

Keywords: Bupivacaine, Ropivacaine, Caesarean.

INTRODUCTION

Caesarean section is the most frequent obstetric operation that is performed in cases when a vaginal delivery would put the fetus or mother at risk. Several procedures are offered depending on the indication and the degree of urgency. After laparotomy, the uterus can be incised by a variety of techniques, usually low transverse uterine incision is selected. At times, a low transverse hysterotomy is selected but provides inadequate room for delivery. In such cases incision is extended such as J-extension, U-extension, and T-extension.[1,2]

Moramarco et al studied the outcomes after preterm classical or low transverse caesarean section. Cases among those of 28 to 31-week gestation had increased risks of endometritis, transfusion, and ICU admission with the classical incision. They found that preterm classical caesarean section is not associated with significantly increased risks; however, data are scarce.[3,4] Bupivacaine, alone or in combination with narcotics, is the most common analgesic medication used for caesarean delivery in

spinal anesthesia. Ropivacaine is a long-acting amide local anesthetic being alike to bupivacaine in structural and pharmacodynamics. Ropivacaine has a greater degree of separation between the motor and sensory blockade than bupivacaine and it is used to relieve epidural pain during labor or for caesarean section.[5-8] Hence; the present study was conducted for comparing the effect of bupivacaine and ropivacaine in caesarean delivery with spinal anesthesia.

MATERIAL AND METHODS

The present study was conducted for comparing the effect of bupivacaine and ropivacaine in cesarean delivery with spinal anesthesia. 50 patients who were planned for a spinal anesthetic elective cesarean delivery were randomized into two study groups: one for ropivacaine and the other for bupivacaine. The process of administering spinal anesthesia was done while seated. Five-minute intervals were used for the assessment of the sensory block levels. The pinprick test was used to gauge the degree of sensory blockage. A visual analog scale (VAS) was used to measure the patients' pain intensity. It ranged from 0 (no discomfort) to 10 (severe pain). Data were presented as frequency, percentages, mean, or standard deviation wherever applicable. Chi square test was used to assess categorical variables between the groups.

RESULTS

Both the study groups were comparable in terms of age-wise distribution. Compared to the ropivacaine group, the bupivacaine group had sensory block onset much more quickly. Compared to the bupivacaine group, the ropivacaine group experienced total sensory blockade substantially faster. Non-significant results were obtained while comparing the pain among two study groups.

Table 1: Demographic data

Variable	Ropivacaine group	Bupivacaine group	p-value
Mean age (years)	31.2	30.9	0.12
Mean BMI (Kg/m2)	27.3	28.1	0.46
Mean gestational age (weeks)	35.6	36.1	0.74

Table 2: Comparison of sensory block

Variable	Ropivacaine group	Bupivacaine group	p-value
Onset of sensory block	2.53	1.39	0.001*
Time to complete sensory block	149.2	184.3	0.001*

***: Significant**

Table 3: Comparison of VAS

Time interval	Ropivacaine group	Bupivacaine group	p-value
Immediately after surgery	1.96	1.58	0.755
2 hours after surgery	1.12	1.21	0.445

DISCUSSION

Caesarean section (CS) is a common surgical procedure worldwide, with 21.1% of parturients have undergone a CS. The rate is increasing steadily, and it is expected that this rate will rise to 28.5% in 2030. Unlike vaginal delivery, the CS must be performed under anesthesia. Spinal anesthesia has many advantages in caesarean section, including reducing the risk of aspiration of the contents of the stomach, avoiding the debilitating factors of analgesics, and the ability to stay awake. The proper level of anesthesia for caesarean section is the fourth thoracic nerve root (T4). A higher level of anesthesia is associated with increased risk of sympathetic paralysis and mother's hemodynamic instability. Some of the disadvantages of spinal anesthesia (with topical analgesics) include shortness of postoperative analgesia, headache, damage to the pectoral nerves, nausea, urinary retention, backache, cardiac arrest, hematoma in the spinal canal with or without neurological complications, epidural abscess, and hemodynamic disorders such as hypotension and bradycardia.[9-11] Hence; the present study was conducted for comparing the effect of bupivacaine and ropivacaine in caesarean delivery with spinal anesthesia.

Both the study groups were comparable in terms of age wise distribution. Compared to the ropivacaine group, the bupivacaine group had sensory block onset much more quickly. Compared to the bupivacaine group, the ropivacaine group experienced total sensory blockade substantially faster. Non-significant results were obtained while comparing the pain among two study groups. Wang H et al investigated the efficacy of ropivacaine and bupivacaine in caesarean section and vital signs and the hemodynamics of the lying-in women. A total of 480 lying-in women who were admitted to this hospital for treatment were divided into the experiment group and the control group, with 240 subjects in each group. In the experiment group, subjects received the local anesthesia by infusion of 1.5 mL ropivacaine (0.75%), while those in the control group also took the local anesthesia by infusion of 1.5 mL bupivacaine (0.75%). The excellent and good rates of the anesthesia in two

groups were 92.1% and 87.9%, showing no obvious difference; in the experiment group, the average arterial pressures and systolic pressures at 5 min and 10 min after combined spinal and epidural analgesia (CSEA) were all elevated when comparing to the control group; in the experiment group, the onset time was obviously extended, while duration of sensory and motor block and the duration of motor block were all shorter than those in the control group. During anesthesia, the incidence rate of the adverse reactions in the control group was 2.50%, significantly higher than 0.83% in the experiment group.[11]

Olapour A et al aimed at comparing clinical efficacy and safety between ropivacaine and bupivacaine during caesarean section. Patients were randomly allocated to receive either ropivacaine 1% (n = 33) or bupivacaine 0.5% (n = 32). Duration of sensory block was shorter in the ropivacaine group than bupivacaine group. Ropivacaine also produced a shorter duration of motor blockade than bupivacaine. There is no difference between the two groups in terms of systolic and diastolic blood pressure, but the heart rate of patients in the bupivacaine group is significantly higher than the ropivacaine group. The results suggested that ropivacaine and bupivacaine are two efficient drugs in anesthesia in the caesarean section, ropivacaine is a better choice due to little influence on the hemodynamics and shorter duration of sensory block and motor block which are useful for the recovery and also safe to the patients.[12] Geng G et al studied the change of maternal pulmonary function when ropivacaine and bupivacaine were used in spinal anesthesia for caesarean section, 40 ASA physical status I and II parturient scheduled to undergo caesarean section were randomly divided into bupivacaine and ropivacaine groups. Bupivacaine 9 mg and ropivacaine 14 mg were intrathecal injected respectively. FVC, FEV1 and PEFR were measured with spirometry before anesthesia and 2 h after intrathecal injection. Anesthesia level, the degree of motor block and VAS were also recorded. Results: The final level of sensory blockade was not different between groups. Forced vital capacity was significantly decreased with bupivacaine (3.0 ± 0.4 L to 2.7 ± 0.3 L, $P < 0.05$) and ropivacaine (2.9 ± 0.4 L to 2.5 ± 0.4 L, $P < 0.05$) while there were no difference between two groups. Forced expiratory volume during the first second and Peak expiratory flow rate were not decreased in each group. The degree of motor block in group R was less than group B at 2 h after intrathecal injection. Decreases in maternal pulmonary function tests were similar following spinal anaesthesia with bupivacaine or ropivacaine for caesarean section.[13]

CONCLUSION

In comparison to bupivacaine, ropivacaine produced a similar and successful clinical profile with a shorter duration of sensory block for elective cesarean sections; nevertheless, the onset time of ropivacaine's sensory blockage was much greater than that of bupivacaine. As a result, ropivacaine may be used during cesarean sections instead of bupivacaine.

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