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A COMPARATIVE STUDY TO ASSESS THE EFFICACY OF 0.75% HYPERBARICROPIVACAINE WITH OR WITHOUT INTRATHECAL BUPRENORPHINE ADJUVANT IN PARTURIENTS UNDERGOING ELECTIVE LSCS

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ABSTRACT **Introduction:** Postoperative analgesia after cesarean section poses unique clinical challenges to anesthesiologist. Intrathecal buprenorphine is a promising drug for postoperative analgesia. **Aim:** To evaluate and compare the effectiveness of 0.75% Hyperbaric Ropivacaine with or without the addition of Intrathecal Buprenorphine as an adjuvant in pregnant women undergoing elective lower segment cesarean section (LSCS). **Material and Methods:** It was a Randomized control study conducted on patients admitted to hospitals attached to Bangalore Medical College and Research Institute, Bangalore undergoing elective lower segment surgeries under subarachnoid block during January 2022 to June 2023. Sample size calculated was 21 patients each group i.e Group R: received 2ml of 0.75% hyperbaric ropivacaine with 0.1 ml normal saline. Group B: received 2 ml of 0.75% hyperbaric ropivacaine with 30 µg buprenorphine. **Result:** Group B demonstrated a significantly prolonged duration of postoperative analgesia compared to Group R. Additionally, buprenorphine group (Groups B) had significantly lower rescue analgesic requirement and Visual Analog Scale (VAS) scores. Notably, no major side effects were observed in any of the groups. **Conclusion:** The inclusion of buprenorphine with or along with intrathecal ropivacaine resulted in an extension of both the duration and quality of postoperative analgesia following a cesarean section, without any accompanying increase in adverse effects.

KEYWORDS : Ropivacaine, Buprenorphine, LSCS.

INTRODUCTION

Subarachnoid block (SAB) is a widely accepted method of regional anesthesia that is considered the gold standard for performing lower segment caesarean sections.[1] SAB is frequently used for cesarean deliveries due to its straightforward procedure, rapid onset, and consistent effectiveness. Achieving anesthesia up to the T4 dermatome level is necessary to ensure a comfortable experience for the mother during the cesarean section. Among the potential complications of neuraxial anesthesia, hypotension is the most commonly observed, posing a risk of reduced blood flow to the uterus and placenta for the attending medical professional.[2]

Ropivacaine is a type of local anesthetic drug that is classified as an amide. It is frequently utilized in regional anesthesia, specifically for nerve blocks and epidural anesthesia. Ropivacaine is highly regarded for its prolonged duration of action, enabling it to deliver effective pain relief over extended periods. One of its notable attributes is its slow onset and reduced lipid solubility. As a result, it exhibits a decreased risk of cardiotoxicity and central nervous system toxicity, as well as a lesser degree of motor blockade. These characteristics contribute to early mobilization and faster recovery for patients.[3]

Neuraxial opioids are commonly utilized as additional medications to enhance both intraoperative and postoperative pain relief. Drugs like Buprenorphine and Fentanyl have also been explored as adjuncts to local anesthetics.[4] Buprenorphine is classified as a mixed agonist-antagonist opioid and exhibits a strong affinity for both µ and K opiate receptors. Its advantageous characteristics include high lipid solubility and an extended duration of action, making it well-suited for intrathecal administration.[5] Given its lipophilic nature, this study aims to compare the efficacy, safety, and quality of anesthesia between these two drugs.

Therefore, the objective of this current study is to evaluate and compare the effectiveness of 0.75% Hyperbaric Ropivacaine with or without the addition of Intrathecal Buprenorphine as an adjuvant in parturients (pregnant women) undergoing elective lower segment cesarean section (LSCS).

MATERIALAND METHODS

It was an Randomized control study conducted on patients admitted to hospitals attached to Bangalore Medical College and Research Institute, Bangalore under going elective lower segmentcaes are an section surgeries under subarachnoid block during August 2022 to January 2023. Sample size calculated was 21 patients each in all two groups i.e

Group R (n=21) received 0 .75% hyperbaric Ropivacaine 2ml(15mg)+ 0.1 ml NSintrathecally (total volume-2.1 ml).

Group B: received 0 .75% hyperbaric Ropivacaine 2ml(15mg) + 0.1 ml (30mg) of Buprenorphine (total volume-2.1 ml).

Inclusion Criteria

1. Parturients of age group 18-35 years under going elective lower segmentcaes are an section under subarachnoid block.
2. Parturients willing to give written informed consent.

Exclusion Criteria

1. Patients undergoing emergency lower segment caesarean section under subarachnoid block.
2. Patients with medical and obstetric complications like anaemia, heart diseases, gestational hypertension, gestational diabetes, shock, septicemia and hypertension.
3. Patients with history of hypersensitivity to local anesthetic, Buprenorphine, Ropivacine.
4. Subjects having any absolute contraindications for spinal anaesthesia like increased ICP, severe hypovolemia, bleeding diathesis, localinfection.

Procedure

Body weight, height, and vitals were recorded. All patients were advised overnight fasting. Procedure was explained to the patient and visual analog scale (VAS) discussed. After clear CSF tap, the drug was injected into the subarachnoid space. Buprenorphine was taken in a syringe so as to add it precisely. Heart rate, blood pressure, and respiration were monitored every 2 min for 30 min and every 5 min thereafter. Surgery was started when the sensory level reached T4 level (assessed with pinprick) and this was taken as the time of onset of analgesia. Intraoperative fluid maintenance was done with normal saline. After delivery of the baby, 10 units of oxytocin was administered as an infusion in normal saline. Neonatal status was assessed by Apgar scores at 1 min and 5 min after delivery. Postoperative analgesia was assessed hourly using VAS. The duration of postoperative analgesia was calculated as the time interval between the completion of surgery to the appearance of pain corresponding to VAS score of 4. Other side effects such as postoperative nausea and vomiting (PONV) and pruritus were watched for. Unpaired t-test and Chi-square test were used to test the significance of difference between the groups. Peak sensory levels, maximum pain score, and side effects were analyzed using Chi-square test and the rest using unpaired t-test. $P<0.05$ was considered statistically significant.

RESULTS

Both groups exhibited comparable characteristics in terms of age, weight, height, and duration of surgery, as indicated by a p-value

greater than 0.05. The mean age for Group B was 24.1 years, for Group R it was 25.9 years. The mean weight for Group B was 58.3 kg, for Group R it was 59.15 kg.

The duration of surgery for Group B was 50.1 minutes, for Group R it was 48.6 minutes.

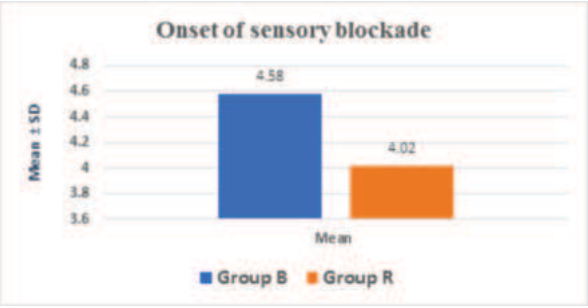
Table 1: Demographic Data And Duration Of Surgery

Parameters	Group B	Group R
Age (in years)	24.1±2	25.9±3
Weight (in kg)	58.3±4	59.15±4
Height (in cms)	150.1±5.6	149.3±5
Duration of Surgery (in mins)	50.1±13.3	48.6±10.3

Based on the data provided in Table 2, the mean duration of onset of analgesia for Group B was 4.58 minutes, for Group R it was 4.02 minutes. There was a significant difference in the onset of analgesia between Group R and Group B.

Table 2: Onset Of Analgesia Between Groups.

Parameters	Group B	Group R	p-value
Onset of analgesia (in mins)	4.58±0.64	4.02±0.62	0.006



According to the results presented in Table 3, no significant difference was observed between the groups, as indicated by a p-value greater than 0.05. In Group B, 4.76% of patients achieved peak sensory level at T2, while in Group R, 9.52% of patients achieved peak sensory level at the same time point. The majority of patients in Group B (66.67%) achieved peak sensory level at T6, whereas in Group R, 57.14% of patients reached this level at T6.

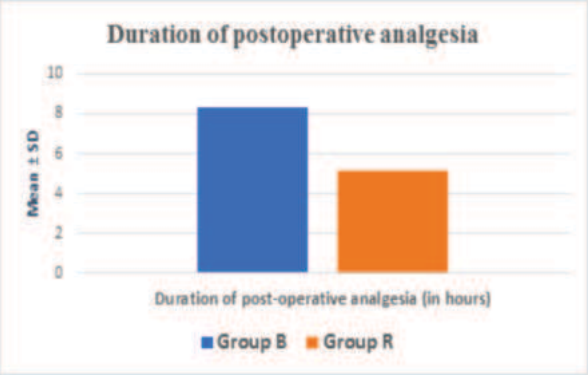
Table 3: Peak Sensory Level

Peak Sensory Level	Group B, n(%)	Group R n(%)	P-Value
T2	1(4.76)	2(9.52)	0.75
T4	6(28.57)	7(33.3)	
T6	14(66.67)	12(57.14)	
Total	21	21	

Based on the data presented in Table 4, the duration of postoperative analgesia was significantly longer in Group B compared to Group R. Additionally, there was a significant difference in postoperative analgesia between Group B and Group R.

Table 4: Duration Of Postoperative Analgesia Between Groups

Parameters	Group B	Group R	p-value
Duration of post-operative analgesia (in hours)	8.29±5.18	5.19±4.3	0.04



According to the findings in Table 5, the maximum pain scores were notably lower in Group B compared to the Group R. Furthermore, Group B exhibited lower pain scores in comparison to Group R.

Table 5: Maximum Pain Score

Maximum pain score attained over 24 hours	Group B, n(%)	Group R n(%)	p-value
One	0(0)	0(0)	0.23
Two	3(14.29)	1(4.76)	
Three	3(14.29)	4(19.05)	
Four	9(42.86)	14(66.67)	
Five	6(28.57)	2(9.52)	
Six	0(0)	0(0)	
Total	21	21	

DISCUSSION

Providing effective postoperative pain relief following a cesarean section presents specific challenges for anesthesiologists. The chosen method should facilitate early mobility of the mother to prevent thromboembolic events and allow for bonding with the newborn, while avoiding any negative effects on both the mother and baby. When using spinal anesthesia (SAB) with local anesthesia (LA) alone, the duration of postoperative analgesia is limited. However, this limitation can be addressed by incorporating opioid adjuvants. Buprenorphine, a potent and lipophilic agonist-antagonist opioid with a long-lasting effect, is an excellent choice for postoperative pain management.[6,7] Compared to morphine, buprenorphine's high lipid solubility and molecular weight restrict its upward spread, thereby reducing the occurrence of adverse effects. Various doses of buprenorphine, ranging from 30 µg to 150 µg, have been utilized as adjuvants to LA in SAB.[8,9,10]

The average length of postoperative pain relief was found to be 6.29 hours in the Group B and 4.19 hours in the Group R. There was a significant increase in the duration of pain relief in Group B. Notably, the Group B exhibited a considerably longer duration of analgesia compared to Group R. The need for rescue pain medication was significantly lower in the Group Bcompared to theGroup R.

CONCLUSION

Our research findings indicate that the utilization of a low-dose hyperbaric form of Ropivacaine in cesarean sections is both safe, user-friendly and helps in early mobilization.This approach offers satisfactory pain relief, motor block, and stable hemodynamics. By using the dosage of buprenorphinewe observed a significant extension in the duration of analgesia without an accompanying rise in adverse effects. Therefore, the inclusion of buprenorphine alongside intrathecal Ropivacaine is a secure and effective technique for postoperative pain management following cesarean sections.

REFERENCES

1. Gropper MA, Eriksson LI, et al. Miller's anesthesia international edition, 2 volume set. 9th ed. Philadelphia, PA: Elsevier - Health Sciences Division; 2019.
2. Barash P, Cullen B F et al. Clinical Anaesthesia. Philadelphia:Lippincott 2017; 2862-63.
3. Kindler CH, Paul M, Zou H, Liu C, et al. Amide local anesthetics potently inhibit the human tandem pore domain background K+ channel TASK-2 (KCNK5). J PharmacolExpTher. 2003 Jul;306(1):84-92.
4. McNameeDA, McClelland AM, et al. Spinal anaesthesia: Comparison of plain Ropivacaine 5mg ml^{-1} with Bupivacaine 5 mg ml^{-1} for major orthopaedic surgery. Br J Anaesth 2002;89:702-06
5. KorulaS, VarmaS, GeorgeGet al. A comparative study of intra the calandepiduralbu prenorphine using combined spinal-epidural technique for caesareansection. Indian J Anaesth. 2010;54(3):205.
6. Vadivelu N, Anwar M. Buprenorphine in postoperative pain management. AnesthesiolClin. 2010;28:601-9.
7. Raffa RB, Haidery M, Huang HM, Kalladeen K, Lockstein DE, Ono H, et al. The clinical analgesic efficacy of buprenorphine. J Clin Pharm Ther. 2014;39:577-83.
8. Samal S, Rani P, Chandrasekar LJ, Jena SK, Mail ID. Intrathecal buprenorphine or intrathecal dexmedetomidine for postoperative analgesia: A comparative study. Health. 2014;2:9-14.
9. Capogna G, Celleno D, Tagariello V, Loffreda-Mancinelli C. Intrathecal buprenorphine for postoperative analgesia in the elderly patient. Anaesthesia. 1988;43:128-30.
10. Celleno D, Capogna G. Spinal buprenorphine for postoperative analgesia after caesarean section. ActaAnaesthesiol Scand. 1989;33:236-8.