

Original Research Article

Comparison of levobupivacaine and bupivacaine on duration of analgesia and hemodynamics stability in patient undergoing caesarean section under subarachnoid block

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Abstract

Background & Methods: The aim of the study is to study the Comparison of levobupivacaine and bupivacaine on duration of analgesia and hemodynamics stability in patient undergoing caesarean section under subarachnoid block. After informed consent was obtained, 100 women scheduled for elective Caesarean delivery, at more than 37 weeks' gestation, were enrolled into this prospective randomized study. Patients refusing regional anesthesia, and having contraindications to spinal anesthesia are excluded.

Results: There has been no statistical difference between groups in terms of their demographic characteristics and the duration of the operation. During the study period only in one case we experienced technical difficulty and could not perform spinal anesthesia. Both groups had achieved sufficient level of anesthesia and intraoperative analgesia and did not require additional analgesics Intraoperatively. The onset of sensory block and the time for the sensory block to reach T10 was similar in both groups ($p > 0.05$). The time taken for the sensory block to reach maximum level was shorter in Group L and its maximum sensory block level was higher ($p < 0.05$). The time to regression by two dermatomes for the sensory block and its regression time to T12 were longer in Group L ($p < 0.05$).

Conclusion: We conclude that single-shot spinal anesthesia performed with both local anesthetic drugs provides fast and effective induction of surgical anesthesia for elective cesarean section. however we found duration of analgesia is more prolong in levobupivacaine and is more hemodynamically stable as compare to bupivacaine .

Keywords: levobupivacaine, bupivacaine, hemodynamics & caesarean.

Study Design: Observational Study.

1. Introduction

Worldwide, bupivacaine is the most popular local anaesthetic for spinal anaesthesia in parturients undergoing elective Caesarean delivery[1]. However, compared to other local anaesthetics, it has considerable adverse effects on the cardiovascular and central nervous system[2]. Enantiomers may have the same desired pharmacological properties, but fewer side effects. Levobupivacaine, the S(-)-enantiomer of bupivacaine, recently introduced for obstetric spinal and epidural anaesthesia, has been shown to provide a more selective neuraxial blockade than racemic bupivacaine[3]. Often, intrathecal opioids, such as fentanyl or sufentanil, are combined with local anaesthetics, thereby markedly enhancing quality and duration of postoperative analgesia after Caesarean delivery as well as providing better parturient comfort without affecting neonatal outcome significantly[4].

Spinal anaesthesia is the most commonly performed anaesthetic technique for caesarean section[5]. Levobupivacaine, an enantiomer of bupivacaine, being less cardiotoxic has a better safety profile over conventionally used bupivacaine. Studies on use of intrathecal levobupivacaine have suggested extended duration of analgesia[6].

Spinal adjuvants have been demonstrated to improve the quality of spinal anaesthesia. Fentanyl has been proven to be a safe drug when administered intrathecally for caesarean section by several studies[7]. The aim of study is to Compare levobupivacaine and bupivacaine on duration of analgesia and hemodynamics stability in patient undergoing caesarean section under subarachnoid block

2. Material and Methods

Present study was conducted at Sri Aurobindo Institute of Medical Science, Indore, M.P. for 01 Year. After informed consent was obtained, 100 women scheduled for elective Caesarean delivery, at more than 37 weeks' gestation, were enrolled into this prospective randomized study. Patients refusing regional anesthesia, having contraindications to spinal anesthesia, those with a body weight over 100 kg, shorter than 1.50 m and taller than 1.75, those who received medications other than perinatal vitamin and iron preparations, having systemic diseases, expectant mothers with fetal anomaly, placenta previa, ablation placenta were excluded from the study. Subarachnoid block (SAB) is instituted at L3 – L4 or L4-L5 intervertebral space in right Lateral position using 25-G quincke's needle.

Inclusion Criteria:

1. At Term, Elective caesarean Section
2. Valid informed consent
3. Pregnant women with the height ranging between 150 – 170 cms
4. Pregnant women with the weight ranging between 50 – 90 kg

Exclusion criteria:

1. Age < 18 years, gestational age < 34 weeks, ASA physical status \geq III, urgent or emergency Caesarean delivery, known allergy to local anaesthetics or opioids, contraindications to spinal anaesthesia, foetal indications for Caesarean delivery and multiple gestation.

3. Result

Table 1: Demographic Data

Parameters	Group L(levobupivacaine)	Group B (Bupibacaine)
Age	27.81±4.39	28.57±7.83
Weight (Kg)	68.18±9.61	76.49±2.51
Height (m)	1.62±0.36	1.61±1.90
Gestation (week)	37.54±1.28	38.39±0.83
Surgical time (min)	44.64±5.28	42.39±1.47

There has been no statistical difference between groups in terms of their demographic characteristics and the duration of the operation. During the study period only in one case we experienced technical difficulty and could not perform spinal anesthesia. Both groups had achieved sufficient level of anesthesia and intraoperative analgesia and did not require additional analgesics.

Table 2: Sensory Block

Parameters	Group L	Group B
Time to onset of sensory block (min)	1.46±0.52	2±0.39
Time for the sensory block to reach T10 (min)	4.4±1.03	4.6±1.48
Time for the sensory block to reach maximum level (min)	11.96±1.97	13.16±2.58
Maximum sensory level	4.18.97	3.57±0.97

The onset of sensory block and the time for the sensory block to reach T10 was similar in both groups ($p > 0.05$). The time taken for the sensory block to reach maximum level was shorter in Group L and its maximum sensory block level was higher ($p < 0.05$). The time to regression by two dermatomes for the sensory block and its regression time to T12 were longer in Group L ($p < 0.05$).

Table 3: Motor Block

Parameters	Group L	Group B
Time to onset of motor block (min)	2.37±1.51	4.3±0.87
Time for motor block to reach maximum level	7.4±3.77	10.7±2.48
Maximum motor level	4.37.71	3.11±2.44

The time to onset of motor block in Group L was shorter than Group B ($p < 0.05$). Complete motor block was obtained within 20 minutes in every patient in both groups. Motor block developed faster and lasted longer with the hyperbaric levobupivacaine ($p < 0.05$).

Table 4: Side effects observed in the groups

Parameters	Group L (N=50)	Group B (N=50)
Hypotension	05	12
Bradycardia	04	10
Headache	12	08
Backache	02	02
Nausea	06	11
Vomiting	03	06
Itching	02	02

Hypotension and bradycardia were more common in the B group. In addition, nausea was noticed more frequently in the B group ($p < 0.05$).

Table No. 5: Haemodynamic Parameter

Parameters	Group L	Group B
Heart Rate (min)	52.2	63.5
BP Mean	53.9	58.7
Systolic BP (mm Hg)	71.2	78.1
Diastolic BP (mm Hg)	49.7	51.9

We have seen bradycardia & hypotension in 10-12 patients in Group B and 4-5 patients in Group L.

4. Discussion

Cesarean section (CS) is an operative technique by which a fetus is delivered through an abdominal and uterine incision. [8]. It is one of the most common surgeries in the world, which has been increased in the last 21 years. The 2016 EDHS program found that the rate of cesarean delivery in Ethiopia is around 2% even if it varies across the seven administrative regions of Ethiopia, of all Addis Ababa had the highest rate of cesarean section which accounts for around 21.4%.

Gulen Guler et al[9] also showed similar results with 5 out of 30 for group Levobupivacaine and 11 out of 30 for group Bupivacaine showed hypotension, which was significant ($p < 0.05$) with more need for ephedrine. Herrera R et al in their study of haemodynamic effect on patients aged 65 yrs for sub arachnoid anaesthesia showed similar results with the incidence of hypotension was statistically significantly higher ($p < 0.05$) in group BUPI (38.3%) compared to group LEVO (13.3%). Our results were also similar, where they found hypotension more in the group of bupivacaine. A study observed hypotension in 5 out of 35 in Levobupivacaine group, and 1 out of 35 in Bupivacaine, though not significant. In the study we did not observe much changes at

heart rate in both groups except for 4 patients in Levobupivacaine group who had bradycardia and were treated with atropine[11].

09 out of 30 patients in bupivacaine group and 2 out of 30 patients in levobupivacaine group had bradycardia, which was statistically significant ($p < 0.05$). Incidence was high may be because of fentanyl, which was used as adjuvant intrathecally in their study. In study of spinal anaesthesia for ortho paedic surgery did not find any significant changes in heart rate. Heart rate (HR) decreased at 30 minutes after anaesthesia onset (5% in group BUPI versus 9% in group L). Caesarean sections also found APGAR scores at 1 min and 5 min and umbilical cord gas analysis showed no significant difference between the two groups which were similar to our study[12].

Incidence of side effects like nausea, vomiting, bradycardia, itching, were more in bupivacaine group though all got treated with no sequelae. Gulen Guler et al in also found incidence of nausea and vomiting higher in bupivacaine group whereas headache, itching and others had similar incidence in both groups. Incidences of side effects were more in bupivacaine group. M. Mantaualou et al[13] found little differences in incidence of side effects in both the groups which were not significant. In regional anaesthesia for caesarean sections, nausea and vomiting can occur due to a few factors. Decrease in cerebral blood flow can be a cause for it. Other reasons are related to the level where block reaches. In our study the doses we administered developed adequate blocks, and caused less hypotension and bradycardia.

5. Conclusion

We conclude that single-shot spinal anesthesia performed with both local anesthetic drugs provides fast and effective induction of surgical anesthesia for elective cesarean section. However we found duration of analgesia is more prolonged in levobupivacaine and is more hemodynamically stable as compared to bupivacaine.

6. References

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