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The Comparison of the Effectiveness of Different Doses of Intrathecal Hyperbaric Levobupivacaine and Morphine Added to Bupivacaine in Cesarean Operations

Kevser Kala[1], Meral Somer[1], Deniz Turan[2] and Serdar Epözdemir[2*]

[1] Ankara Zekai Tahir Burak Women's Health Education and Research Hospital, Anesthesia and Reanimation Clinic, Ankara, Turkey

[2] Istanbul Medipol University Camlica Hospital, Anesthesia and Reanimation Clinic, İstanbul, Turkey

***Corresponding author:** Serdar Epözdemir

Istanbul Medipol University Camlica Hospital, Anesthesia and Reanimation Clinic, İstanbul, Turkey

Tel: 5327798350

epzdemir@yahoo.com

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Abstract

The most important intervention in obstetric surgery is cesarean and it constitutes approximately 25% of all deliveries with an increasing incidence. While the safety and optimal conditions of only one person are tried to be provided in a normal surgical anesthesia. The safety of the mother and the fetus affected by any changes that occur in the mother during cesarean period must also be ensured. This gives a special feature to cesarean anesthesia. Despite the increasing number of cesarean cases, maternal mortality rate is gradually decreasing due to developments in anesthesia. One of the most important reasons for this is that regional anesthesia is preferred instead of general anesthesia. The reasons why regional anesthesia has been preferred more in recent years include the patient's desire, awareness, not losing spontaneous breathing and risk of aspiration, not causing uterine atony, not causing respiratory depression in the newborn, providing early mobilization in the postoperative period and shortening the duration of hospital stay.

Keywords: Cesarean anesthesia; Uterine atony; Opioids; Apgar scoring

Introduction

The most important intervention in obstetric surgery is cesarean and it constitutes approximately 25% of all deliveries with an increasing incidence. While the safety and optimal conditions of only one person are tried to be provided in a normal surgical anesthesia. The safety of the mother and the fetus affected by any changes that occur in the mother during cesarean period must also be ensured. This gives a special feature to cesarean anesthesia [1,2]. Despite the increasing number of cesarean cases, maternal mortality rate is gradually decreasing due to developments in anesthesia. One of the most important reasons for this is that regional anesthesia is preferred instead of general anesthesia [3]. The reasons why regional anesthesia has been preferred more in recent years include the patient's desire, awareness, not losing spontaneous breathing and risk of aspiration, not causing uterine atony, not causing respiratory depression in the newborn, providing early mobilization in the postoperative period and shortening the duration of hospital stay [4,5].

Spinal anesthesia technique, which is one of the regional anesthesia techniques and is the most frequently used anesthesia technique in cesarean operations, requires low doses of local anesthetics and there is a low risk of toxicity, the effect starts quickly and a reliable and high quality block is provided [6-8]. Adjuvants are frequently added to local anesthetics in order to increase the quality of anesthesia, to reduce its side effects and to prolong anesthesia duration in patients undergoing spinal anesthesia. The most commonly used adjuvant agents are opioids. Subarachnoid opioids in pregnant women provide dose-dependent analgesia without causing significant changes in autonomic and motor function [9,10].

In our study, we aimed to compare the maternal hemodynamic effects of bupivacaine and its S isomer levobupivacaine added to its S isomer levobupivacaine, its effects on motor and sensory block, postoperative pain, intraoperative and postoperative side effects and complications, as well as the effects of Apgar scoring and umbilical blood gas in the newborn.

Material and Methods

This study was planned as prospective, randomized and double

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blind. Our study was conducted on 200 patients in ASA I-II risk group, who were planned to undergo elective cesarean section in Zekai Tahir Burak hospital after approval of the ethics committee. Written informed consent was obtained from all cases participating in the study, explaining the procedure to be applied and possible complications. Having a cesarean section under general anesthesia with a history of multiple pregnancies, preeclampsia and eclampsia or an expected fetal anomaly, under 18 and over 40, body weight over 100 kg, height below 150 cm, gestational age below 36 weeks, multiple pregnancies, preeclampsia and eclampsia Patients who wanted to, did not want to participate in the study even if they had a regional anesthesia preference, had a known allergic condition to local anesthetics or opioids to be used, and had contraindications for spinal anesthesia (such as bleeding coagulation disorder, systemic infection, infection at the intervention site) were not included in the study.

200 cases to be included in the study were randomly divided into four groups. To GROUP LM1 (n=50) 2 ml 0.5% hyperbaric levobupivacaine (10 mg)+100 mcg morphine to GROUP LM2 (n=50) 2 ml 0.5% hyperbaric levobupivacaine (10 mg)+200 mcg morphine To GROUP BM1 (n=50) 2 ml 0.5% hyperbaric bupivacaine (10 mg)+100 mcg morphine and to GROUP BM2 (n=50) 2 ml 0.5% hyperbaric bupivacaine (10 mg)+200 mcg of morphine was administered intrathecally. Hyperbaric levobupivacaine was obtained by adding dextrose. All medicines were prepared for single use under sterile conditions. In the LM1 group, 4 ml of 0.75% levobupivacaine (Chirocaine®, Abbott Laboratories) was taken from 1.6 mL of 30% dextrose and 0.4 ml of distilled water, and a total volume of 3 ml was prepared with 100 mcg (1 ml) of morphine. In BM1 group, 2 ml of 0.5% hyperbaric bupivacaine (Marcaine®; Zentiva) solution was taken and a total volume of 3 ml solution was prepared with 100 mcg (1 ml) of morphine. In the LM2 group, 4 ml of 0.75% levobupivacaine was taken from 1.6 ml of 30% dextrose and 0.4 mL of distilled water, and a total volume of 3 ml was prepared with 200 mcg (1 ml) of morphine. In BM2 group, 2 ml of 0.5% hyperbaric bupivacaine solution was taken and a total volume of 3 ml solution was prepared with 200 mcg (1 ml) of morphine.

In pregnant women who were included in the study, whose motor and sensory examinations were completed before the procedure and whose fasting period of at least 6 hours was completed, 50 mg iv ranitidine was given half an hour before the operation and after being taken to the operating room, 10 ml/kg Ringer's lactate was given as an iv infusion within 15 minutes, 6-A maintenance infusion was started at a rate of 8 ml/kg/hour. O_2 application was started at 4 L/min with a face mask. Heart Rate (HR), Mean Arterial Pressure (MAP) and Peripheral O_2 Saturation (SpO_2) were monitored and control values were recorded in all cases.

After the patients were placed in a sitting position, skin antisepsis was provided at the puncture site under sterile conditions. For spinal block, infiltration anesthesia with 2 ml of 2% lidocaine was applied under the skin and under the skin, choosing the most appropriate L2-3, L3-4 or L4-5 intervertebral spaces. When the intrathecal distance was identified and the free CSF flow was observed, the solution prepared for spinal anesthesia was administered within 30 seconds. Immediately after the procedure, the patients were placed in the supine position and a 20° tilt position was placed on the operating table to prevent hypotension due to aortacaval compression. HR, MAP and SpO_2 every 2 minutes for the first 10 minutes after drug administration to the intrathecal distance, every 5 minutes after the first 10 minutes until the end of the first hour, then every 10 minutes until the end of the operation. Dermatomal extension of the sensory block in cranial direction with the pin prick test and degrees of motor block with the modified Bromage Scale were recorded in **Table 1**. During the operation, when the OAB decreased more than 20% compared to the basal value, 10 mg iv bolus ephedrine was administered. The total amount of ephedrine used was recorded. When the heart rate was <50 beats/min, it was accepted as bradycardia and 0.5 mg iv atropine was administered.

Time from spinal distance from local anesthetic injection to skin incision, uterine incision time and baby hatching times were recorded. PH, PCO_2, PO_2, HCO_3, BE values were determined by umbilical cord blood gas analysis. Evaluation of the newborn was made by the pediatrician by recording the Apgar score at the 1st and 5th minutes. The time of occurrence of hypotension, the amount of ephedrine and atropine used were recorded. In addition, intraoperative and postoperative side effects between the groups were also examined

In this study, statistical analyzes were made with the SPSS 15.0 package program. Descriptive statistical methods (mean, standard deviation), repeated measurements of multiple groups, analysis of variance, Newman Keuls multiple comparison test for subgroup comparisons, independent t test for comparison of paired groups, chi-square test for comparison of qualitative data were used in the evaluation of the data. The results were evaluated at the significance level of $p<0.05$.

Results

As seen in **Table 2**, when analyzed in terms of demographic data and duration of surgery, there was no statistically significant difference in terms of the groups.

Heart rate values of the cases are given in **Table 3**. When the distribution of the measurement times of the heart rate values of the groups is examined; there was no significant difference between bupivacaine and levobupivacaine. In terms of subgroups, heart rate in group LM2 was statistically significantly higher than LM1 at the 50th minute.

The arterial pressure values of the cases are given in **Table 4**. When the distribution of the measurement time of the arterial pressure

	Bromage Scale.
0	He has no paralysis. The patient fully flexes the foot and knee.
1	It can only move the knee and foot. He cannot lift his leg straight.
2	Cannot bend the knee, only move the foot.
3	There is complete paralysis.

Table 1: Modified bromage scale.

	Group LM1 (n=50)	Group LM2 (n=50)	Group BM1 (n=50)	Group BM2 (n=50)	P
Age (years)	28,7 ± 5,0 (18-40)	28,9 ± 5,0 (18-40)	29,4 ± 5,1 (18-40)	29,5 ± 5,0 (18-40)	0,842
Height (cm)	161,6 ± 5,7 (150-176)	161,4 ± 5,5 (150-173)	161,2 ± 5,7 (150-173)	159,14 ± 6,5 (150-175)	0,125
Weight (kg)	77,5 ± 10,5 (55-98)	76,6 ± 11,8 (54-100)	80,1 ± 10,7 (63-100)	80,2 ± 14,2 (54-100)	0,322
Pregnancy period (week)	38,6 ± 0,8 (36-40)	38,5 ± 1,1(36-40)	38,8 ± 0,6 (36-40)	38,3 ± 1,17 (36-40)	0,850
Surgery time (min)	34,1 ± 9,0 (19-63)	34,4 ± 14,1 (14-83)	35,4 ± 11,9 (17-82)	35,5 ± 11,9 (15-67)	0,913
Total time (min)	41,0 ± 9,5 (23-68)	41,2 ± 14,3 (20-89)	42,3 ± 12,1 (26-88)	42,9 ± 12,3 (25-77)	P value

Table 2: Demographic characteristics of the groups and duration of surgery [(Mean ± SD) (Min Max)].

Measurement Times Group	Group LM1 (n=50)	Group LM2 (n=50)	Group BM1 (n=50)	Group BM2 (n=50)	P
Pre-Spinal	97 ±13,3 (67-132)	100,1 ± 18,9 (66-149)	98,3 ± 16,0 (63-141)	98,3 ± 16,4 (65-146)	0,811
Post-spinal	93,6 ± 17,1 (68-135)	97,4 ± 19,1 (53-143)	94,9 ± 18,3 (59-147)	99,3 ± 21,9 (56-151)	0,450
2.min	96,8 ± 20,2(60-138)	96,2 ± 21,0 (50-137)	96,3 ± 20,3 (53-154)	101,1 ± 22,4 (50-150)	0,604
4.min	93,2 ± 26,3 (47-140)	93,4 ± 24,2 (42-151)	90,4 ± 23,7 (40-157)	99,3 ± 21,5 (47-140)	0,307
6.min	95,1 ± 21,8 (40-136)	92,6 ± 21,3 (56-134)	93,8 ± 23,1 (45-147)	95,0 ± 20,4 (42-149)	0,930
8.min	90,3 ± 19,2 (59-133)	93,7 ± 21,7 (50-142)	90,6 ± 21,1 (62-140)	92,2 ± 23,8 (45-143)	0,856
10.min	91,5 ± 18,0 (60-139)	96,6 ± 21,8 (62-157)	88,4 ± 18,4 (61-128)	94,2 ± 20,4 (58-142)	0,195
15.min	95,4 ± 17,1 (61-136)	100,0 ± 21,8 (67-168)	97,8 ± 16,2 (57-126)	97,2 ± 18,4 (67-146)	0,660
20.min	98,7 ± 14,8 (68-128)	99,6 ± 15,3 (60-148)	97,7 ± 13,8 (65-139)	98,8 ± 18,6 (60-145)	0,950
25.min (n=50)/(n=49)	101,2 ± 13,9 (63-128)	100,0 ± 16,0 (63-142)	98,7 ± 13,1 (67-124)	97,5 ± 15,9 (68-145)	0,641
30.min (n=49)/(n=43)	100,6 ± 12,7 (73-128)	100,6 ± 14,6 (68-139)	98,0 ± 14,1 (66-132)	96,5 ± 15,9 (62-140)	0,430
35.min (n=45)/(n=35)	99,0 ± 15,1 (61-137)	98,2 ± 14,1 (63-129)	99,3 ± 13,4 (74-140)	96,6 ± 14,8 (68-135)	0,845
40.min (n=25)/(n=24)	99,6 ± 11,4 (82-127)	99,0 ± 14,5 (75-142)	97,7 ± 13,1 (69-125)	96,1 ± 15,1 (73-127)	0,779
45.min (n=20)/(n=17)	95,2 ± 9,6 (78-115)	100,4 ± 16,2 (72-134)	89,6 ± 13,0 (65-112)	95,7 ± 16,0 (65-123)	0,152
50.min (n=12)/(n=12)	85,9 ± 8,1 (75-102)	100,5 ± 17,6 (72-127)	88,4 ± 14,5 (60-107)	95,0 ± 12,0 (75-112)	0,047*
55.dk (n=8)/(n=10)	90,1 ± 12,2 (76-112)	99,4 ± 15,4 (73-121)	83,6 ± 12,8 (60-99)	91,4 ± 12,0 (73-111)	0,158
60.min (n=4)/(n=8)	89,7 ± 12,3 (82-108)	101,3 ± 16,0 (82-132)	86,4 ± 17,3 (60-103)	83,5 ± 8,7 (71-90)	0,187
70.min (n=0)/(n=3)		89,3 ± 13,0 (79-104)	86,5 ± 9,1 (80-93)	82,0 ± 4,2 (79-85)	0,762
80.min (n=0)/(n=2)		87,5 ± 9,1 (81-94)	90,0 ± 14,1 (80-100)		0,853

Table 3 : The distribution of heart rate (beats / min) values of the groups according to the measurement time [(Mean ± SD) (Min-Max)].

Measurement Times Group	Group LM1 (n=50)	Group LM2 (n=50)	Group BM1 (n=50)	Group BM2 (n=50)
Pre-Spinal	95,9 ± 10,3 (75-122)	96,8 ± 11,4 (72-125)	98,9 ± 14,7 (73-143)	103,8 ± 13,8 (73-130)
Post-Spinal	88,2 ± 10,1 (68-117)	89,6 ± 14,2 (52-126)	89,2 ± 13,1 (62-127)	94,9 ± 14,3 (56-121)
2.min	83,8 ± 11,7 (55-113)	77,7 ± 17,6 (41-114)	81,8 ± 15,1 (39-110)	82,3 ± 15,4 (43-118)
4.min	70,4 ± 15,4 (37-97)	70,4 ± 19,2 (39-129)	72,1 ± 16,8 (36-115)	73,8 ± 15,6 (40-118)
6.min	70,6 ± 16,7 (31-115)	69,6 ± 16,2 (34-98)	70,0 ± 15,4 (40-108)	69,8 ± 17,3 (43-119)
8.min	74,1 ± 14,2 (41-107)	75,8 ± 15,9 (46-120)	72,9 ± 13,6 (46-110)	74,4 ± 16,1 (42-118)
10.min	80,3 ± 12,0 (59-107)	80,8 ± 14,4 (49-114)	77,0 ± 13,5 (48-119)	76,6 ± 15,7 (39-123)
15.min	78,1 ± 12,5 (46-106)	77,7 ± 13,0 (48-117)	75,9 ± 12,2 (47-104)	81,1 ± 13,2 (58-123)
20.min	78,8 ± 11,8 (58-107)	74,2 ± 14,7 (36-112)	78,5 ± 11,2 (45-104)	76,5 ± 13,0 (43-107)
25.min (n=50) / (n=49)	73,6 ± 12,5 (49-118)	75,2 ± 15,1 (44-107)	74,9 ± 11,8 (54-112)	74,7 ± 13,5 (48-108)
30.min (n=49) / (n=43)	74,5 ± 12,3 (47-109)	75,5 ± 14,0 (53-110)	72,9 ± 10,8 (50-92)	75,2 ± 11,0 (55-109)
35.min (n=45) / (n=35)	73,0 ± 10,9 (47-101)	78,5 ± 14,7 (50-103)	74,0 ± 10,7 (49-93)	78,2 ± 8,6 (60-100)
40.min (n=25) /(n=24)	76,7 ± 10,5 (60-106)	78,5 ± 14,2 (54-107)	78,3 ± 13,3 (53-108)	78,7 ± 8,5 (59-99)
45.min (n=20) / (n=17)	80,2 ± 8,4 (64-98)	80,5 ± 13,7 (62-108)	77,7 ± 10,9 (63-98)	82,8 ± 11,2 (66-103)
50.min (n=12) / (n=12)	81,7 ± 8,8 (70-96)	76,7 ± 12,3 (60-104)	81,8 ± 9,7 (66-99)	85,0 ± 10,0 (71-101)
55.min (n=8) / (n=10)	78,5 ± 7,5 (72-91)	81,1 ± 12,4 (69-112)	82,5 ± 10,5 (66-94)	83,7 ± 11,4 (71-101)
60.min (n=4) / (n=8)	79,3 ± 11,3 (70-92)	83,2 ± 13,6 (65-105)	82,4 ± 10,0 (73-98)	93,2 ± 18,3 (71-116)
70.min (n=0) / (n=3)		81,0 ± 16,0 (65-97)	95,5 ± 10,6 (88-103)	102,0 ± 2,8 (100-104)
80.min (n=0) / (n=2)		83,5 ± 10,6 (76-91)	92 ± 11,3 (84-100)	
a: p <0.05 (comparison between groups); *: p <0.05 (comparison according to within-group control value)				

Table 4: Distribution of mean arterial pressure (mmHg) values of the groups according to the measurement time [(Mean ± SD) (Min-Max)].

values of the groups is examined; the mean arterial pressure in pre-spinal group BM2 was found to be significantly higher than LM1 and LM2. There was no significant difference in blood arterial pressure between Levobupivacaine and Bupivacaine subgroups compared to each other. After administration of levobupivacaine, blood arterial pressure was observed to be significantly lower than bupivacaine. Post-operative blood arterial pressure values were found to be statistically significantly higher than BM2 compared to LM1.

Measurement Times Group	Group LM1	Group LM2	Group BM1
Control	L1 (0- L1)	L1 (0- L1)	L1 (0- L1)
2.min	T12 (L1- T10)	T12 (0- L1)	T12 (0- L1)
4.min	T10 (L1 - T6)	T10 (T12 - T6)	T10 (L1-T6)
6.min	T7 (T12-T6)	T7 (T4-T10)	T8 (T12-T4)
8.min	T6 (T10-T4)	T6 (T10-T3)	T6 (T10-T4)
10.min	T6 (T8-T3)	T5 (T6-T3)	T6 (T8-T3)
15.min	T6 (T6-T3)	T4 (T6-T3)	T4 (T6-T3)
20.min	T4 (T6-T3)	T4 (T6-T3)	T4 (T6-T3)
25.min (n=50)/(n=49)	T4 (T6-T3)	T4 (T6-T3)	T4 (T6-T3)
30.min (n=49)/(n=43)	T4 (T6-T3)	T4 (T6- T4)	T4 (T6-T3)
35.min (n=45)/(n=35)	T4 (T6-T3)	T4 (T6- T4)	T4 (T6-T3)
40.min (n=25)/(n=24)	T6 (T6-T3)	T4 (T6- T4)	T4 (T6-T3)
45.min (n=20)/(n=17)	T5 (T6-T3)	T4 (T6- T4)	T6 (T6-T4)
50.min (n=12)/(n=12)	T5 (T6-T3)	T4 (T6- T4)	T6 (T6-T4)
55.min (n=8)/(n=10)	T5 (T6-T3)	T4 (T6- T4)	T6 (T6-T4)
60.min (n=3)/(n=8)	T4 (T6- T4)	T4 (T6- T4)	T6 (T6-T4)
70.min (n=0)/(n=3)		T4 (T6- T4)	T6 (T6-T6)
80.min (n=0)/(n=2)		T5 (T6- T4)	T6 (T6-T6)

Table 5: Dermatomal spreads of the sensory block in the cranial direction (Median)(Minimum-Maximum).

	Group LM1	Group LM2	Group BM1
Maximum sensory block level	T4 (T6-T3)	T4 (T6-T3)	T4 (T6-T3)
Time to reach maximum sensory block level (min)	11,9 ± 5,2 (6-25)	9,6 ± 3,2 (6-20)	10,6 ± 3,8 (4-20)
Time to reach	7,6 ± 2,25 (4-15)	6,9 ± 1,7 (4-12)	8 ± 2,4 (4-15)

Table 6: Maximum sensory block levels in groups [(Median) (Minimum-Maximum)], time to reach maximum sensory block level and T6 [(Mean ± SD.) (Minimum-Maximum)].

When the distribution of the cases according to the ephedrine needs of the groups and the distribution of the total ephedrine dose used were examined; there was no significant difference between groups (**Table 5**).

The time to reach T10 of the sensory block was similar in four groups, no significant difference was observed in terms of the time to reach the sensory level of bupivacaine and levobupivacaine. The sensory block ending time was found to be significantly shorter in the LM1 group compared to the BM2 group (**Table 6**).

When the maximum sensory block levels in the groups are examined; In group BM1, it was determined that the time to reach T6 was later (**Table 7**).

The onset of motor block was significantly faster in levobupivacaine than bupivacaine ($p<0.05$). The recovery time of motor block was also longer in bupivacaine than levobupivacaine and the difference between the groups was statistically significant ($p<0.05$) (**Table 8**).

Complete motor block was observed in more patients in the levobupivacaine group than in the bupivacaine group in the evaluation performed with time intervals with the Bromage Scale. A statistically significant difference was found between the groups in terms of the incidence of motor block ($p<0.05$) (**Table 9**).

When the maximum motor block degree initiation and motor block times in the groups are examined; It was determined that

Measuring times Group	Group LM1	Group LM2	Group BM1	Group BM2	P
Control	0 (0-1)	0 (0-1)	0 (0-1)	0 (0-1)	0,106
2.min	1 (0-2)	1 (0-2)	1 (0-3)	1 (0-2)	0,721
4.min	1,5 (0-3)	1 (1-3)	2 (0-3)	2 (1-3)	0,357
6.min	2 (1-3)	2 (1-3)	2 (1-3)	3 (1-3)	0,184
8.min	3 (1-3)	3 (1-3)	3 (1-3)	3 (1-3)	0,137
10.min	3 (1-3)	3 (2-3)	3 (1-3)	3 (2-3)	0,575
15.min	3 (1-3)	3 (2-3)	3 (1-3)	3 (2-3)	0,623
20.min	3 (1-3)	3 (2-3)	3 (1-3)	3 (2-3)	0,986
25.min (n=50)/(n=49)	3 (1-3)	3 (2-3)	3 (1-3)	3 (2-3)	0,972
30.min (n=49)/(n= 42)	3 (1-3)	3 (2-3)	3 (1-3)	3 (2-3)	0,973
35.min (n=45)/(n=35)	3 (1-3)	3 (2-3)	3 (1-3)	3 (2-3)	0,985
40.min (n=25)/(n=24)	3 (1-3)	3 (2-3)	3 (1-3)	3 (2-3)	0,592
45.min (n=20)/(n=27)	3 (1-3)	3 (2-3)	3 (1-3)	3 (2-3)	0,266
50.min (n=12)/(n=12)	3 (1-3)	3 (2-3)	3 (3-3)	3 (3-3)	0,336
55.min (n=8)/(n=10)	3 (1-3)	3 (2-3)	3 (3-3)	3 (3-3)	0,196
60.min (n=3)/(n=8)	2 (1-3)	3 (2-3)	3 (3-3)	3 (3-3)	0,113
70.min (n=0)/(n=3)		3 (2-3)	3 (3-3)	3 (3-3)	0,218
80.min (n=0)/(n=2)		2.5 (2-3)	3 (3-3)		0,423

Table 7: Distribution of degrees of motor block in groups over time. [(Median) (Minimum-Maximum)].

the motor block time was higher in group BM2, the time to reach the maximum motor block level was higher in group LM1. A significant difference was observed between Levobupivacaine and Bupivacaine subgroups in terms of duration of motor block relative to each other ($p<0.05$). This significance was due to the difference between LM1 and BM2. In Levobupivacaine and Bupivacaine subgroups, a significant difference was observed between the time to reach the maximum motor block level relative to each other ($p<0.05$). This significance was due to the difference between LM1 and BM2 (**Table 10**).

When the regression times of the sensory block to T10 and L1 in the groups are examined; It has been determined that the time to regress to T10 is higher in group BM2, and the time to regress to L1 is higher in group BM1. In Levobupivacaine and Bupivacaine subgroups, no significant difference was observed between the time to regress to T10 and the time to L1 relative to each other ($p> 0.05$).

It was determined that the Apgar scores [(n),(%)] at the 1st and 5th minutes of the new-born's in the groups and the body weight and umbilical blood gas parameters of the new-born indicated approximately the same values in Apgar 1st and 5 minutes. It was determined that new-born body weight was higher in group BM1, and the results obtained at pH, pO_2, pCO_2, and HCO_3 did not differ between the groups (**Table 11**).

There was no statistically significant difference between the groups in terms of intraoperative and postoperative side effects (**Table 12**).

The first analgesic need after spinal anesthesia between the groups is at BM1

It has been observed that it is more than LM2. The use of contramal in the BM1 group was statistically significantly higher than that of the LM2. When the need for oxamen was evaluated, no significant difference was observed between the groups (**Table 13**). When the comparison of VAS values between groups is examined; at the second hours, it was determined that group BM1 was significantly higher than LM2 and BM2. VAS values at

MBD		0 min	2 min	4 min	6 min	8 min	10 min	15 min	20 min	25 min	30 min
Group LM1 (n=50)	0	33	7	1	0	0	0	0	0	0	0
	1	17	39	24	13	9	5	4	2	2	2
	2	0	4	22	22	12	14	12	11	6	5
	3	0	0	3	15	29	31	34	37	42	42
Group LM2 (n=50)	0	41	4	0	0	0	0	0	0	0	0
	1	9	42	27	7	3	0	0	0	0	0
	2	0	4	20	30	16	14	12	11	10	9
	3	0	0	3	13	31	36	38	39	39	33
Group BM1 (n=50)	0	28	7	2	0	0	0	0	0	0	0
	1	22	34	18	7	3	2	1	1	1	1
	2	0	7	23	20	7	3	1	1	0	0
	3	0	2	7	23	40	45	48	48	49	46
Group BM2 (n=50)	0	28	4	0	0	0	0	0	0	0	0
	1	22	31	11	3	1	0	0	0	0	0
	2	0	15	26	13	7	3	2	1	1	1
	3	0	0	13	34	42	47	48	49	49	44
a: p<0.05 (comparison between groups MBD: Motor block degree											

Table 8: Distribution of the patients in the groups according to their degree of motor block in the first 30 minutes (n).

	Group LM1 (n=50)	Group LM2 (n=50)	Group BM1 (n=50)	Group BM2 (n=50)	P
Motor block time (h)	4,6 ± 1,1 (2-7)	4,7 ± 1,1 (2-6)	5,0 ± 1,0 (4-6)	5,3 ± 1,0 (2-6)	0,008* (LM1-BM2
Time to reach maximum motor block level (min)	9,8 ± 6,2 (2-25)	8,2 ± 3,7 (4-25)	7,6 ± 3,7 (2-25)	6,6 ± 2,8 (4-20)	0,003* (LM1-BM2)

Table 9: Maximum motor block degree initiation and motor block times in groups. [(Avg ± SD)(Minimum-Maximum)].

	Group LM1 (n=50)	Group LM2 (n=50)	Group BM1 (n=50)	Group BM2 (n=50)	P
Regression time to T10 (h)	3,8 ± 1,0 (2-6)	3,5 ± 0,8 (2-4)	3,7 ± 1,4 (2-6)	4,1 ± 1,0 (2-6)	0,061
Regression time to L1 (h)	6,3 ± 2,0 (4-12)	5,7 ± 1,6 (2-12)	6,8 ± 3,2 (4-12)	6,8 ± 2,3 (4-12)	0,065
a: p<0.05 (comparison between groups)					

Table 10: Regression times of the sensory block to T10 and L1 in the groups. [(Avg ± SD) (Minimum-Maximum)].

	Group LM1 (n=50)	Group LM2 (n=50)	Group BM1 (n=50)	Group BM2 (n=50)	P
First analgesic requirement (h)	8,5 ± 6,6 (2-24)	10,5 ± 7,8 (1-24)	6 ± 5,5 (2-24)	8,6 ± 7 (2-24)	0,012* (lm2-BM1)
First mobilization time (h)	6,9 ± 2,0 (4-13)	6,3 ± 1,1 (4-10)	7,5 ± 2,7 (5-20)	6,6 ± 1,3 (4-12)	0,015*(lm2-BM1)
First flatulence time (days)	1,7 ± 0,8 (0-3)	1,7 ± 0,6 (0-3)	1,7 ± 0,7 (0-3)	2,0 ±0,7 (0-3)	0,140
* p <0.05					

Table 11: First analgesic need of the groups, first mobilization and first burping times [(Avg ± SD) (Minimum-Maximum)].

	Group LM1 (n=50)	Group LM2 (n=50)	Group BM1 (n=50)	Group BM2 (n=50)
Contromal	45(90)	41(82)	46(92)	38(76)
	124 ± 108,5 (0-375)	90 ± 87,9 (0-300)	173,5 ± 127,9 (0-400)	92,5 ± 103,2 (0-375)
Oksamen	16(32)	16(32)	14(28)	20(40)

Table 12: Incidence and amount of analgesic use consumed in the postoperative period between the groups [(n), (%)] / [(Mean ± Sd.) (Minimum-Maximum)].

VAS	Group LM1 (n=50)	Group LM2 (n=50)	Group BM1 (n=50)	Group BM2 (n=50)
2.h	1,7 ± 1,6 (0-6)	1,1 ± 1,5 (0-5)	2,3 ± 1,8 (0-7)	1,2 ± 1,8 (0-7)
4.h	1,8± 1,5 (0-5)	1,3 ± 1,7 (0-5)	2,3 ± 1,6 (0-6)	1,6 ± 1,7 (0-5)
6.h	1,6 ± 1,7 (0-6)	1,2 ± 1,6 (0-6)	2,4 ± 1,7 (0-7)	2,4 ± 1,8 (0-5)
12.h	2,0 ± 1,9 (0-7)	1,5 ± 1,8 (0-5)	2,4 ± 1,8 (0-6)	2,1 ± 1,5 (0-5)
24.h	2,2 1,7 (0-7)	2,5 ± 1,9 (0-7)	2,1 ± 1,9 (0-8)	1,9 ± 1,5 (0-6)
a: p<0.05 (comparison between groups)				

Table 13: Comparison of VAS values between groups [(Mean ± SD) (Minimum-Maximum)].

4 and 6 hours were found to be statistically significantly lower at LM2 than BM1 and BM2.

Discussion

The intrathecal dose and effect profiles of levobupivacaine and bupivacaine have been tried to be determined by a small number of studies. Bremerich et al. [11], investigated the optimum intrathecal dose of hyperbaric levobupivacaine in spinal anesthesia during elective cesarean section; levobupivacaine at 10 and 12.5 mg doses did not find any statistically significant difference in terms of analgesia, sensory and motor block, and they recommended 10 mg levobupivacaine for patients undergoing elective caesarean surgery with spinal anesthesia. Therefore, we used 10 mg of hyperbaric levobupivacaine in our study.

The use of low-dose anesthetics and opioids in spinal anesthesia is advantageous in terms of rapid onset of action and low toxicity [12]. Carpenter et al. [13], in their study comparing the effects of levobupivacaine and bupivacaine in spinal anesthesia, reported that hemodynamic data were similar and there was no difference in side effects. In the study conducted by Mısırlıoğlu [14], although a decrease was observed in the mean arterial pressure and heart rate of the patients in both groups after intrathecal application, it was determined that there was no significant difference in terms of hemodynamic response. In our study, no statistical difference was found between the CADs of the groups. In the evaluation of arterial blood pressure, Group LM1 and Group LM2 were found to be statistically higher than BM1.

Liao et al. [15] reported that the time to onset of sensory block was 9.8 ± 4.2 min in the levobupivacaine group, the duration of sensory block was 83.1 ± 16 min, and the duration of sensory block onset in the bupivacaine group was 10.2 ± 3.5 min, They found the duration of sensory block as 87.9 ± 28.1 minutes, and stated that there was no statistically significant difference between them. In our study, the time for sensory block to reach T10 was similar in four groups, but no significant difference was observed in terms of the time to reach the sensory level of bupivacaine and levobupivacaine. Sensory block termination time was found to be significantly shorter in the LM1 group compared to the MM2 group.

Kopacz et al. [16] compared epidural 20 ml of 0.75% levobupivacaine and bupivacaine in patients undergoing lower abdominal surgery. The sensory block formation time in T10 dermatome was found to be the same in both groups; the exact fit of the sensory block was detected longer in the levobupivaca. There was no significant difference between the two groups in the occurrence of relaxation in the rectus abdominis muscle; As a result of the study, no significant difference was found between

the two local anesthetics in both sensory block formation and the degree of motor block.

Shimai et al. [17], in spinal anesthesia applications with hyperbaric bupivacaine 0.5%; showed that the sensory block returned later than the motor block, and reported that the amount of bleeding may be less, as the sympathetic block continues following spinal anesthesia.

Sympathectomy, which develops due to the block level at the T4 level required for cesarean operations, may have a greater effect on the development of hypotension than fluid replacement. In the study of Günaydın et al. [18], it was determined that the maximum sensory block level reached in all pregnant women in sitting position in spinal anesthesia was T3 in both groups and this level included T4, which was considered sufficient for surgical anesthesia during cesarean section.

Glasser et al. [19] reported that the time to onset of sensory block in the levobupivacaine group was 11 ± 6 minutes, sensory block 2-segment regression time was 152 ± 48 minutes, in the bupivacaine group, the time to initiation of sensory block was 13 ± 8 minutes, and sensory block 2-segment regression time was 155 They found it to be ± 50 minutes, and stated that there was no statistically significant difference between them. In our study, the time for sensory block to reach T10 was similar in four groups, but no significant difference was observed in terms of the time to reach the sensory level of bupivacaine and levobupivacaine.

Sensory block termination time was found to be significantly shorter in the LM1 group compared to the MM2 group. Burke et al. [20] administered intrathecal 15 mg 0.5% levobupivacaine in a study they performed on 20 patients who will undergo lower extremity surgery and found the motor block onset time as an average of 5 minutes and the motor block time as an average of 266 minutes.

Lee et al. [21] performed spinal anesthesia with 2.6 mL 0.5% isobaric levobupivacaine and bupivacaine in 50 patients undergoing urological surgery and did not find a statistically significant difference between the two groups for the duration of motor block onset and motor block.

In another study of 60 patients by Lacassie et al. [22], 0.25% levobupivacaine and 0.25% bupivacaine were given to the first patients from epidural, and the two groups were compared in terms of motor blockade; The other patients in the groups were given the local anesthetic dose increasing by 0.025% until the degree of motor block was 4 according to the Bromage Scoring. Motor block occurred at a concentration of 0.27% in bupivacaine and 0.31% in levobupivacaine; When the potency of both local anesthetics was compared, the levobupivacaine/ bupivacaine ratio was 0.87. As a result of the study, it was shown that levobupivacaine is a more potent local anesthetic in terms of motor block.

In our study, the onset time of motor block was significantly faster in levobupivacaine than bupivacaine ($p<0.05$). The recovery time of motor block was also longer in bupivacaine than levobupivacaine, and the difference between the groups was statistically significant ($p<0.05$).

It may cause itching, nausea, vomiting, respiratory distress and urinary retention after intrathecal opioid administration [23]. Nausea and vomiting in cesarean operations may occur due to several factors. The first usually occurs due to hypotension and decreased cerebral blood flow due to the level reached by the block. Intrathecally used opioids may also have a dose-dependent nausea-vomiting effect [24]. Perioperative nausea and vomiting may occur as a result of stretching of the structures associated with the peritoneum during the operation due to insufficient blockage. The prevailing opinion is that anesthesia at the T4 level is sufficient. In our study, although nausea, vomiting and itching were the most common side effects, no significant difference was observed between opioid doses.

The incidence of headache after dura puncture varies depending on many factors such as age, gender, pregnancy, number of interventions, needle type and diameter [25] Obstetric patients are particularly at risk due to gender, age, and the widespread use of regional anesthesia [26]. Compared to cutting needles, DPSB is less common with pencil-point needles [27]. In a study comparing 27 G Quincke (cutting tip) and 27 G Whitacre (pencil tip) spinal needles, DPSB was found to be 2.7% and 0.37%, respectively [28]. In our study, in which the dura puncture was performed with a 27 G pen-tipped spinal needle, DPSB requiring treatment was not encountered in any case.

Coppejans and Vercauteren [29] combined 6.6 mg levobupivacaine or bupivacaine with 3.3 µg sufentanil and applied low-dose combined spinal-epidural anesthesia at cesarean section; They reported that the ephedrine requirement of all groups was similar, however, less hypotension was observed in the levobupivacaine group compared to the bupivacaine group (6% versus 20%). Bremerich et al. [11] and Glasser et al. [19] found no difference between the groups in terms of vasopressor and atropine use. In our study, no significant difference was observed between the groups in terms of the need for ephedrine and atropine use.

Although many methods and scoring systems have been used to evaluate the metabolic status of the newborn in recent years, a complete consensus has not been achieved, and APGAR and blood gas analysis remain important. In our evaluation with the APGAR scores, no statistically significant difference was found between the groups at the 1st and 5th minutes, and the APGAR scores were found over 7 except for one baby at the 5th minute. In both groups, there was no significant difference between the umbilical blood gas values in terms of pH, HCO_3, PaO_2, SpO_2.

When the comparison of VAS values between groups is examined; at 2 hours, it was determined that group MM1 was significantly higher than LM2 and MM2. At the 4th and 6th hours, the VAS value was found to be statistically significantly lower in LM2 than MM1 and MM2. When the incidence and amount of analgesic use consumed in the postoperative period between the groups were examined; It was determined that it was high in the contromal analgesic group MM1 and high in the group MM2 in the oxamen

analgesic group. When the VAS values between the groups were compared; It was determined that it was higher in group MM1 at 2, 4, 6, 12 hours, and it was higher in group LM2 at 24.

Conclusion

The intrathecal dose and effect profiles of levobupivacaine and bupivacaine have been tried to be determined by a small number of studies. Bremerich investigated the optimum intrathecal dose of hyperbaric levobupivacaine in spinal anesthesia during elective cesarean section; levobupivacaine at 10 and 12.5 mg doses did not find any statistically significant difference in terms of analgesia, sensory and motor block, and they recommended 10 mg levobupivacaine for patients undergoing elective caesarean surgery with spinal anesthesia. Therefore, we used 10 mg of hyperbaric levobupivacaine in our study.

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