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The Outcome of Low Dose of 0.5% Bupivacaine in Spinal Anesthesia during Lower Segment Cesarean Section (LUCS)

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Abstract **Original Research Article**

Background: The spinal anesthesia in a lower segment cesarean section continues to provide a challenge to the anesthetist in the form of either severe hypotension caused by a big bupivacaine dose or insufficient appropriate anesthesia level conditions caused by a little bupivacaine dose. ***Objective:*** In this study our main goal is to evaluate the efficacy of low dose of 0.5% Bupivacaine in spinal anesthesia during lower segment cesarean section. ***Method:*** This cross sectional comparative study was carried out at tertiary medical College from January 2020 to December 2020. Where a total of 100 pregnant women were included in the study? Patients, who agreed to the study, were randomized divided into two groups: Group A patients who received an intrathecal injection of 3 mL of bupivacaine 0.5%, n=50 and Group B patients who received an intrathecal injection of 2.5 mL of bupivacaine 0.5%, n=50. The method of randomization was by coin tossing. ***Results:*** During the study, majority were belonging to 26-33 years age group, 60% and 70% were multiparous. The satisfactory surgical sensory level was achieved in all cases in both groups with the following distribution. However, Only 19% cases in Group A were indicated to have ephedrine, whereas 89% in Group B were indicated to support their blood pressure with ephedrine. There were no differences between the two groups regarding the fluid intake (894 ± 126mL) in Group A versus 720 ± 212 mL in Group C with P > 0.05). Neonatal Apgar score was 9 in the first 1 min and increased to 10 at 5 min. In addition, group A nausea and vomiting cases seen in 19% cases whereas in group B it was 23%. ***Conclusion:*** We can say that, unlike low dose, a large dose of hyperbaric bupivacaine in the spinal anesthetic for a lower segment cesarean section will result in excellent surgical circumstances with little hypotension. Further study is needed for better outcome.

Keywords: Bupivacaine, spinal anesthesia, lower segment cesarean section (LUCS).

INTRODUCTION

Spinal anesthesia is now considered the standard procedure for cesarean surgeries. Similarly, the rising number of cesarean sections, particularly in Bangladesh, raises concerns about the issues involved and how to address them.

Conventionally, the most common complication is hypotension after in trathecal injection of bupivacaine, which ranges between 56% and 74% in prior investigations [1-3].

To address this issue, various research have been conducted to reduce the volume of bupivacaine, based on the notion that spinal anesthetic causes sympathectomy, which lowers blood pressure.

Unfortunately, all of these investigations discovered that reducing the dosage results in a lower block level, which leads to an unsatisfactory surgical situation as well as the patient's pain. Furthermore, it has no effect on the incidence of hypotension, suggesting that the reason of hypotension is multifactorial and may be strongly connected to uterine compression and increased intra-abdominal pressure [4-6].

Other researchers have investigated the effect of sitting position on hypotension using the second

theory of great vascular compression by the gravid uterus [7].

In this study our main goal is to compare the efficacy of low dose of 0.5% Bupivacaine in spinal anesthesia during lower segment cesarean section.

OBJECTIVE

To compare the efficacy of low dose of 0.5% Bupivacaine in spinal anesthesia during lower segment cesarean section.

METHODOLOGY

This cross sectional comparative study was carried out at Tertiary medical College from January 2020 to December 2020. Where a total of 100 pregnant women were included in the study.

Patients, who agreed to the study, were randomized divided into two groups: Group A patients who received an intrathecal injection of 3 mL of bupivacaine 0.5%, n=50 and Group B patients who received an intrathecal injection of 2.5 mL of bupivacaine 0.5%, n=50. The method of randomization was by coin tossing.

All collected data were coding and input in SPSS-25 for further analysis. Both descriptive and inferential statistics done. Descriptive statistics included, percent, mean, standard deviation; graph, tables, figures and inferential statistics.

RESULTS

In figure-1 shows age distribution of the study group where majority were belonging to 26-33 years age group, 60%. Followed by 25% belong to 18-25 years group and 15% belong to 34-39 years age group. The following figure is given below in detail:

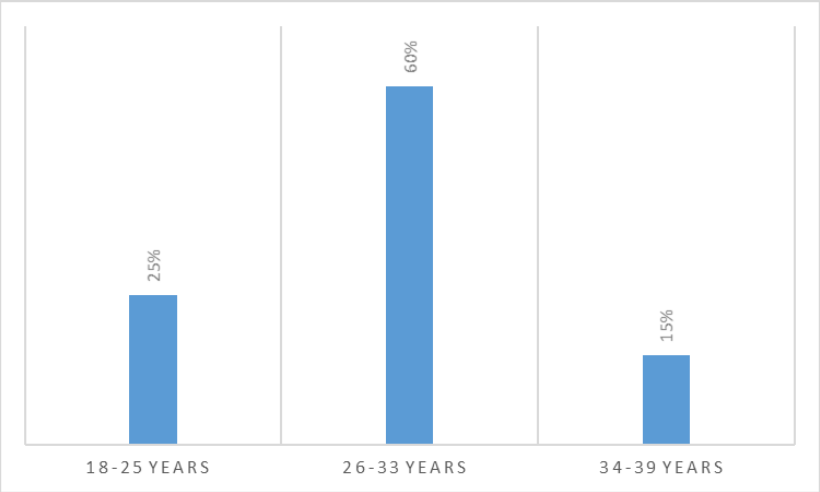

Figure 1: Age distribution of the patients

In table-1 shows demographic status of the patients where majority were literate, 70% and 72% were housewife. The following table is given below in detail:

Table1: Demographic status of the patients

Mean BMI	**31.51±4.9**
Educational status	%
Literate	70%
Illiterate	30%
Occupational status	%
Housewife	72%
Service holder	18%
Student	10%
Monthly family income (monthly)	%
<10000 Tk	20%
10001-20000 Tk	50%
>20000 Tk	30%

In figure-2 shows parity distribution of the study group where the peak incidence was among the multiparous (70%). The following figure is given below in detail:

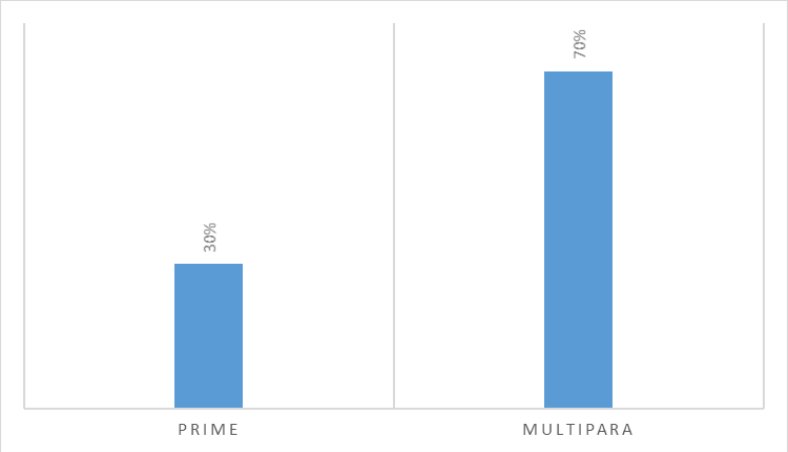

Figure 2: Parity in patients with ectopic pregnancy

In table-2 shows Sensory level among two groups where the satisfactory surgical sensory level was achieved in all cases in both groups with the following distribution. However, 90% cases were T4, and only 10% cases were T2 in Group C while all cases in Group B were at the T4 level. The following table is given below in detail:

Table 2: Sensory level among two groups

Sensory level	Group A, %	Group B, %
T2	0%	10%
T4	100%	90%

In table-3 shows distribution of the groups according to clinical and Neurologic and Adaptive Capacity Score where Only 19% cases in Group A were indicated to have ephedrine, whereas 89% in Group B were indicated to support their blood pressure with ephedrine. There were no differences between the two groups regarding the fluid intake (894 ± 126mL) in Group A versus 720 ± 212 mL in Group C with P > 0.05). Neonatal Apgar score was 9 in the first 1 min and increased to 10 at 5 min. The following table is given below in detail:

Table 3: Distribution of the groups according to clinical and Neurologic and Adaptive Capacity Score

	Group A, %	Group B, %	P value
Ephedrine	19%	89%	0.001
Fluids (mL) 894 ± 126	720±212	>0.05	>0.05
Apgar at 1 min	(8-9)	(9-9)	>0.05
Apgar at 5 min 10	(10-10)	(9-10)	>0.05

In figure-3 shows distribution of the study group according to clinical symptom where in group A nausea and vomiting cases seen in 19 % cases whereas in group B it was 23%. The following table is given below in detail:

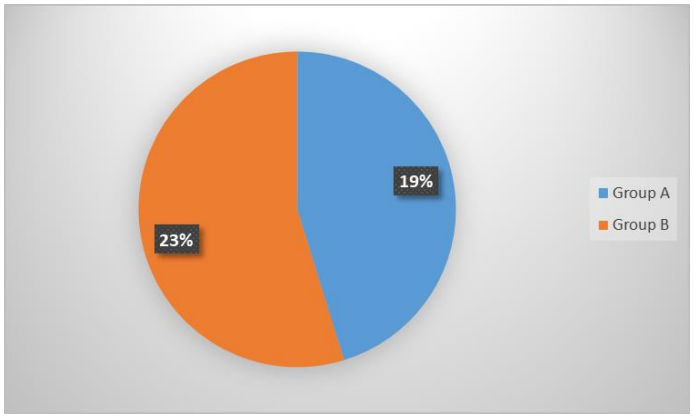

Figure 3: Distribution of the study group according to clinical symptom

DISCUSSION

Many studies were trying to reduce the volume or dose of bupivacaine claiming that the hypotension will be overcome [7, 8].

One stud reported that, the ED 95 of bupivacaine and found that 11.2 mg is enough to achieve a satisfactory sensory level and a pain-free surgery. They also found that the ED50 was 7.6 mg using a logistic regression model [9].

Most practitioners use doses between 7.5 and 15 mg of hyperbaric bupivacaine. Those who use the lower dose, aiming to decrease the incidence of side effects such as hypotension or nausea, have faced a cost of patients' un- satisfaction and visceral pain. The studies showed an increased incidence of patients with an inadequate surgical sensory block when using doses <10 mg up to 71% [10, 11].

Another report did a retrospective study on 1252 patients receiving either 8 mg or 10 mg and found that there was a higher rate of conversion to general anesthesia in a group who received 8 mg (the relative risk was 4.88 [95% CI 1.41–16.85]) [12].

In a review article done by two study done 15 reviewed articles concluded that doses <8 mg will result in more analgesic requirements such as a high rate of conversion to general anesthesia and less hypotension and nausea and vomiting [13, 14].

It is clear that a low dose is not a practical solution and that is why we used big doses in this study to overcome this limitation. However, someone can claim that a conventional dose or even a low dose in a large volume can be the solution [15].

In our study showed only 19% cases in Group A were indicated to have ephedrine, whereas 89% in Group B were indicated to support their blood pressure with ephedrine. There were no differences between the two groups regarding the fluid intake (894 ± 126) in Group A versus 720 ± 212 mL in Group C with P > 0.05). Neonatal Apgar score was 9 in the first 1 min and increased to 10 at 5 min. The latter, who tried isobaric bupivacaine, found disappointing results as there were no differences between both medications (isobaric and hyperbaric) regarding hemodynamic and the incidence of hypotension. Which was supported by other studies [16, 17].

CONCLUSION

We can say that, unlike low dose, a large dose of hyperbaric bupivacaine in the spinal anesthetic for a cesarean section will result in excellent surgical circumstances with little hypotension. Further study is needed for better outcome.

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