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A randomized prospective study comparing conventional dose to low dose of hyperbaric bupivacaine for spinal anaesthesia in elective caesarean section

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Abstract

Background: For caesarean sections, local anesthetics e.g. bupivacaine, chloroprocaine, levobupivacaine, lidocaine, ropivacaine, and tetracaine have been used generally in combination usually with opioids like morphine or fentanyl or its derivatives.

Aim and Objectives: Thus this study was conducted to compare the efficacy of two different doses of 0.5% hyperbaric bupivacaine (7.5mg and 10mg) in women undergoing caesarean section.

Materials and Method: The study was conducted in the Department of Anaesthesiology, Teerthanker Mahaveer hospital, TMU, Moradabad among 80 American Society of Anaesthesiologists (ASA) physical status I and II patients scheduled for elective caesarean section. The spinal anaesthetic haemodynamic parameters, i.e., Heart Rate, Non Invasive Blood Pressure, ECG, MAP and SpO₂ were monitored. The sensory and motor onset time and time to regression were recorded.

Results: Group B patients had significantly higher pulse rate post-spinal ($P < 0.05$); significantly lower pulse rate at 6, 8, 10, 16, 19, 25, 30, 35, 40, 45 and 60 minutes. Group B patients had significantly high systolic blood pressure post-spinal, at 2, 4, 6, 35, and 50 minutes. Group B patients took significantly more time to attain maximum motor and sensory block than group A. APGAR scores of the neonates born to the patients of the two groups were compared. Group B patients had significantly high mean diastolic and MAP post-spinal, 2, 4, and at 6 minutes.

Conclusion: Low dose (7mg) Bupivacaine shows better hemodynamic stability whereas the conventional dose (10mg) showed a faster onset/duration of sensory block and a prolonged motor block.

Keywords: Bupivacaine, caesarean section, local anesthetics, pulse rate, sensory block

Introduction

“Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage”, as defined by International Association for Study of Pain [1]. Regional anesthesia is highly effective both for surgical procedure and postoperative pain management. It has lower adverse effects and sequelae than general anesthesia [2].

Spinal anesthesia is an established technique for caesarean section and is routinely used for elective operative delivery and is also commonly used for unplanned/emergency caesarean section [3].

In developed as well in developing countries such as ours, the use of regional anesthesia for caesarean section is very common. It includes epidural or spinal anesthesia that enables consciousness during surgery. Due to the greater ease of administration, decreased systemic toxicity, quicker onset of action and start of operation, spinal anesthesia is favored over epidural anesthesia for elective and emergency caesarean procedures [4].

Although it is a safe and effective technique, it has some side effects, the most common being hypotension and bradycardia. Spinal-induced hypotension remains the most important side effect with a reported incidence between 20 and 100% [5].

In caesarean section, the drugs that are used for spinal anesthesia comprise primarily local anesthetics of the amide or the ester class [6]. For caesarean sections, local anesthetics e.g. bupivacaine, chloroprocaine, levobupivacaine, lidocaine, ropivacaine, and tetracaine have been used generally in combination usually with opioids like morphine or fentanyl or its derivatives [7, 8].

Bupivacaine is an amide anesthetic, which is administered at 10-15mg in 0.5-0.75% concentrations^[9]. Its onset of action is slow, which lasts nearly 5-10 minutes, and as dependent on baricity, there is low incidence of hypotension^[10]. It can also be attained in hyperbaric 7.5% solution. Because of the long duration of action as well as good quality of motor block in comparison with tetracaine, it is commonly used^[11]. As reported by many clinical studies, transient neurologic symptoms (TNS) are virtually absent with spinal bupivacaine^[12-14]. Lui SS *et al.*^[15] reported that for spinal bupivacaine, dose-response data on clinical anesthetic characteristics show that small doses can be utilized for ambulatory anesthesia. Specifically, it is significant to opt for small doses of bupivacaine ($\leq 10\text{mg}$) for avoiding prolonged detrusor block; inability to void; as well as excessively prolonged time till discharge in comparison to equipotent doses of lidocaine^[16].

One of the disadvantages of spinal anesthesia is the inability to extend the block in case the original block height is considered inadequate or if time taken by the surgery is longer as compared to what is predicted. Thus, it is important to make sure adequate block prior to start of surgery, because failure in doing this can lead to discomfort of patient, transitioning to general anesthesia, and probable medicolegal implications^[17].

Earlier higher doses in the range of 2.0 to 3.0 ml were being used for caesarean delivery but such large doses of intrathecal bupivacaine are associated with severe hypotension and delayed recovery of motor block^[18].

There has been a successful attempt to reduce this dose. If the extent of the block depends on the height and weight of the patient, a dose of hyperbaric bupivacaine adjusted for these variables should provide an optimal dermatomal level of anesthesia without excessive maternal hypotension^[19].

Thus this study was conducted to compare the efficacy of two different doses of 0.5% hyperbaric bupivacaine (7.5mg and 10mg) in women undergoing caesarean section.

Material and Method

Study Area

The study was conducted in the Department of Anaesthesiology, Teerthanker Mahaveer hospital, TMU, Moradabad among 80 American Society of Anaesthesiologists (ASA) physical status I and II patients scheduled for elective caesarean section were enrolled for the study.

Inclusion and Exclusion Criteria

The study included American Society of Anaesthesiologists (ASA) grade I & II patients undergoing elective C-section with BMI 18-24 kg/m². The study excluded patients with Sepsis at the site of injection or any pre-existing systemic diseases, spine deformities or history of laminectomy and Intrauterine growth restriction, in labour or with twin pregnancy, signs of foetal distress and any other obstetric complication.

Sample Size

Based on the study by Mebazaa MS *et al.*^[20], 34 patients in each group were required ($\alpha = 0.05$ and $\beta = 0.20$). We

enrolled 40 patients in each group and they were divided into two groups by randomisation.

Study Design

This study was a prospective double blind randomized comparative study. Two different doses of Hyperbaric Bupivacaine (7.5mg and 10mg) was administered to two groups of patients undergoing elective caesarean sections.

Methodology

The detailed demographic, personal history, examination details and the findings were recorded in the study proforma. We administered Spinal anaesthesia to patients in sitting position using a 25G Quincke spinal needle in L3-L4 or L4-L5 interspace after infiltrating skin with lignocaine (2 ml, 2%). On noticing the free flow and aspiration of Cerebrospinal Fluid, Injection Bupivacaine 0.5% was injected in the subarachnoid space.

In group A, the normal dose of Injection Bupivacaine 0.5% heavy 10mg (2ml) was given. In group B, low dose of Injection Bupivacaine 0.5% heavy 7.5mg (1.5ml) was given. The maximum level of sensory block and the time to achieve this level was noted. Motor blockade was assessed by a modified Bromage scale.

The onset time of sensory or motor blockade was defined as the interval between intrathecal administration and time to achieve maximum block height or a modified Bromage score of 3, respectively. The surgical incision was allowed after achievement of adequate paraesthesia.

Evaluation

The spinal anaesthetic haemodynamic parameters, i.e., Heart Rate, Non Invasive Blood Pressure, ECG, MAP and SpO₂ were monitored throughout surgery and maintained within 80-120% of baseline values. Haemodynamic parameters were recorded immediately after administering spinal anaesthesia, followed by every 2 minutes for the first 10 minutes of administering spinal anaesthesia, followed by every 3 minutes till the next 30 minutes, followed by every 5 minutes till the completion of surgery.

Statistical Analysis

The data was entered in MS EXCEL spreadsheet and analysis was done using Statistical Package for Social Sciences (SPSS) version 25.0. The categorical variables were presented in number and percentage (%) and continuous variables were presented as mean \pm SD and median.

The quantitative variables were compared using Independent t test between the two groups. The qualitative variables were correlated using Chi-Square test. A p value of <0.05 was considered statistically significant.

Results

Demographic Data

Age, BMI and ASA were compared between the two groups and both the group patients had comparable mean age (24.78 vs 23.78 years, $P=0.075$); had comparable mean BMI (22.07 vs 21.39 kg/m², $P=0.089$); and had comparable ASA grades ($P>0.05$). (Table 1)

Table 1: Comparison of demographic characteristics between groups

Demographic characteristic		Group		Total	p-value
		A (n=40)	B (n=40)		
Age distribution (years)	21-25	30 (75.00%)	23 (57.50%)	53 (66.25%)	0.098
	26-30	10 (25.00%)	17 (42.50%)	27 (33.75%)	
	Mean±SD	23.78±2.17	24.78±2.63	24.28±2.44	0.075
	Median (IQR)	24(22-25.500)	25(22 - 27)	24(22 - 26)	
Body mass index (kg/m ²)	Mean±SD	21.39±1.71	22.07±1.37	21.73±1.58	0.089
	Median(IQR)	22.05 (19.700-22.900)	22.55 (21.350 - 23.050)	22.45(20.100-23)	
	Median(IQR)	9.7(9-10.250)	9.55(8.950 - 10)	9.6(9-10.200)	
ASA	1	29 (72.50%)	28 (70.00%)	57 (71.25%)	0.549
	2	10 (25.00%)	12 (30.00%)	22 (27.50%)	
	3	1 (2.50%)	0 (0.00%)	1 (1.25%)	

Haemodynamic Parameters

The mean pre-operative pulse rate was comparable among the two groups (81.65 vs 84.48, P=0.095). Compared to Group A, Group B patients had significantly high pulse rate post-spinal; significantly lower pulse rate at 6, 8, 10, 16, 19, 25, 30, 35, 40, 45 and 60 minutes (P<0.05). However it was comparable at other times (P>0.05). (Table 2)

The mean pre-operative systolic blood pressure was comparable among the two groups (121.72 vs 121.95, P=0.888). Compared to Group A, Group B patients had significantly high SBP post-spinal, at 2, 4, 6, 35, and 50 minutes (P<0.05). However it was comparable at other

times (P>0.05). (Table 2)

The mean pre-operative diastolic blood pressure was comparable among the two groups (79.58 vs 80.05, P=0.719). Compared to Group A, Group B patients had significantly high DBP post-spinal, 2, 4, and at 6 minutes (P<0.05). However it was comparable at other times (P>0.05). (Table 2)

The mean pre-operative MAP was comparable among the two groups (93.62 vs 94.02, P=0.752) Compared to Group A, Group B patients had significantly high MAP post-spinal, 2, 4, and at 6 minutes (P<0.05). However it was comparable at other times (P>0.05). (Table 2)

Table 2: Comparison of motor and sensory block between groups

		Group A (n=40)		Group B (n=40)		P value
		Mean±SD	Median (IQR)	Mean±SD	Median (IQR)	
Motor Block	Time max block (mins)	5.52±0.98	5.5 (5-6)	7.7±1.2	7.58 (6.667-8.542)	<0.001*
	Duration of block (mins)	133.05±13.7	132 (120-140)	96.05±8.26	98 (90-100.500)	<0.001*
Sensory Block	Max block (mins)	4.91±0.45	4.92 (4.708-5.167)	6.28±1.00	6.29 (5.458-6.958)	<0.001*
	Regression (mins)	114.1±8.71	115.5 (110-119.500)	66.5±6.68	65.5 (61 - 71)	<0.001*

Motor and Sensory Block

Group B patients took significantly more time to attain maximum motor block than group A (7.7 vs 5.52 minutes, P<0.0001); and had significantly less duration of motor block (96.05 vs 133.05 minutes, P<0.0001). (Table 3)

Group B patients took significantly more time than group A to attain maximum sensory block (6.28 vs 4.91 minutes,

P<0.0001); and had significantly less duration of sensory regression (66.5 vs 114.1 minutes, P<0.0001) as shown in table 7. (Table 3)

The use of atropine was comparable among the two groups. 7.5% patients in Group A and 5% patients in Group B were administered Atropine. (P>0.05) Dose given between the two groups was comparable. (Table 4)

Table 3: Comparison of atropine and Dose of mephentermine given between groups

		Group A (n=40)	Group B (n=40)	Total	P value
Atropine given	No	37 (92.50%)	38 (95.00%)	75 (93.75%)	1.000
	Yes	3 (7.50%)	2 (5.00%)	5 (6.25%)	
	Total	40 (100.00%)	40 (100.00%)	80 (100.00%)	
Dose of mef given	6	18 (60.00%)	5 (83.33%)	23 (63.89%)	0.510
	12	9 (30.00%)	1 (16.67%)	10 (27.78%)	
	18	3 (10.00%)	0 (0.00%)	3 (8.33%)	
	Total	30 (100.00%)	6 (100.00%)	36 (100.00%)	

Table 4: Comparison of APGAR between groups

APGAR		Group		Total	P value
		A(n=40)	B(n=40)		
APGAR at 1 minute	<7	2 (5.00%)	1 (2.50%)	3 (3.75%)	1.000
	>=7	38 (95.00%)	39 (97.50%)	77 (96.25%)	
	Mean±SD	7.88±0.82	8.15±0.7	8.01±0.77	0.11475
	Median(IQR)	8(7 - 8)	8(8 - 9)	8(8-9)	
APGAR at 5 minutes	<7	0(0.00%)	0(0.00%)	0(0.00%)	-
	>=7	40 (100.00%)	40 (100.00%)	80 (100.00%)	
	Mean±SD	8.9±0.3	8.98±0.16	8.94±0.24	0.16853
	Median(IQR)	9(9-9)	9(9 - 9)	9(9 - 9)	

Apgar Scores

APGAR scores of the neonates born to the patients of the two groups were compared. The mean APGAR scores were comparable among Group A and B at 1 minute (7.88 vs 8.15, $P=0.11$) and at 5 minutes (8.9 vs 8.98, $P=0.16$). There was no significant difference in the neonatal APGAR scores at 1 minute and 5 minutes with different doses of Bupivacaine. (Table)

Discussion

In spinal anesthesia during cesarean section, an undesired consequence is considered to be maternal hypotension. Nausea, vomiting, as well as light-headedness are the nasty symptoms that are caused by it. It may also cause a reduction in uteroplacental blood flow and lead to fetal acidosis [73]. However recent literature favors use of SA in severely pre-eclamptic women, because they have been found to have less hypotension as compared to normotensive women.

Both groups in our study were comparable in terms of age, BMI, ASA grade, and Hb. In comparison to Group A, Group B patients had comparable mean age (24.78 vs 23.78 years, $P=0.075$); had comparable mean BMI (22.07 vs 21.39 kg/m², $P=0.089$); had comparable Hb% (9.55 vs 9.7, $P=0.368$); and had comparable ASA grades ($P>0.05$).

Other comparative studies also had no significant difference in the demographic variables among the groups.²¹⁻²⁷ Cenkowski *et al* [22], reported that the average age in the conventional dose group was 31 ± 3 versus 32 ± 6 years in the low dose group, Venkata *et al* [25], study group had comparable mean age of the patients (24 ± 2.1 vs 23 ± 1.5); comparable weight (68 ± 5.0 vs 64 ± 4.84); comparable height (156 ± 6.5 vs 158 ± 9.0); and comparable ASA status (I/II vs I/II) ($P>0.05$), Mebazaa *et al*. [20] as compared to conventional dose group (Group A), low-dose Group (Group B) had similar age (33 ± 6 vs 32 ± 5); similar weight (78 ± 10 vs 77 ± 9); similar height (161 ± 6 vs 158 ± 5) and similar other demographic variables and Kiran *et al*,²¹ comparable age among Groups A, B, and C (23.15 vs 24.8 vs 25.35); comparable weight (59.25 vs 58.35 vs 62.7), comparable height (157 vs 157 vs 160), and comparable Hb (9.73 vs 9.51 vs 9.82).

Effects on Hemodynamic Parameters

Cardiovascular effects of spinal anesthesia comprise of reduction in arterial blood pressure and central venous pressure (CVP) with only minor decrease in heart rate, stroke volume, or cardiac output.

Systolic Blood Pressure

In present study, the mean pre-op SBP was comparable among the two groups (121.72 vs 121.95, $P=0.888$). However, after the dose, Group A patients (10mg-conventional dose) had significantly lower SBP at post-spinal, 2, 4, 6, 35 and 50 minutes ($P<0.05$), and was comparable at other times.

Our findings were in line with other studies. Mebazaa *et al* [20], reported that preoperative SBP was comparable among both groups A (10mg bupivacaine) and B (7.5mg bupivacaine) ($P>0.05$) and after the dose, the incidence of low blood pressure was markedly higher in the group A than in group B ($P=0.03$).

In similar study by Venkata *et al* [25], mean SBP was similar in high dose and low dose groups. SBP was comparable in

both the groups, after administering dose. A reduction in blood pressure was observed at 3 and 5 minutes in both the groups. However, there was more than 25% reduction in BP in the control group from the baseline ($P<0.001$). Bogra J *et al*. [28], found that with the dose of bupivacaine, reduction in the SBP increases. It was after 25 minutes that maximum reduction in SBP was observed in all the groups.

Diastolic Blood Pressure

In our study, the mean pre-op DBP was comparable among the two groups (79.58 vs 80.05). However, after the dose, 10mg-conventional dose had significantly lower DBP at post-spinal, 2, 4, and at 6 minutes. So we found that lowering the dose to 7.5mg can prevent the Diastolic fall in the post-spinal period.

In the study by Venkata *et al*. [25], mean pre-op DBP was similar in control group (conventional dose: 10mg) and study group (low dose: 7.5mg). There was a significant reduction in DBP after 3 minutes and 5 minutes of spinal anesthesia in the control group. Seyedhejazi *et al*. [27] and Bogra *et al* [28], also reported comparable findings. The reason may be due to the more sympathetic blockade by higher conventional doses of bupivacaine as compared to low dose of 7.5mg.

Mean Arterial Pressure

In this study, the baseline pre-operative MAP was comparable among the two groups ($P=0.752$). As compared to high-dose group (Group A), low-dose group (Group B) patients had significantly high MAP post-spinal and at 6 minutes ($P<0.05$). However, it was comparable at other times ($P>0.05$).

In another study by Cenkowski *et al* [22], mean preoperative MAP was comparable among conventional dose and low-dose spinal group (97 ± 11 vs 97 ± 10). A positive group versus time effect was observed among patients in the conventional-dose spinal group with higher MAPs (group versus time effect, $P<0.001$). This was likely because these patients received a higher dose of phenylephrine. Alimian *et al* [24], reported that mean preoperative MAP was comparable in three groups (8mg, 9mg, 10mg). The trend of MAP was comparable in the 3 groups even after anesthetic dose ($P>0.05$).

In similar study by Jain *et al* [26], mean baseline MAP was comparable in low-dose and high-dose groups. Thus, lower doses of bupivacaine can result in less reduction of MAP. In high-risk pregnancies, the reduced changes in MAP and less vasopressor use can specifically be useful (e.g., coexisting cardiac disease, early onset preeclampsia) [26],

Pulse Rate

In our study, Low-dose group patients had significantly high pulse rate post-spinal but significantly lower pulse rate at 6, 8, 10, 16, 19, 25, 30, 35, 40, 45 and 60 minutes. Similar findings were reported in the previous studies by Kiran *et al*, [21] Group C (patients receiving 10mg bupivacaine) had a significantly greater incidence of bradycardia as compared to Groups A (7.5mg) and Group B (8.75mg), Mebazaa *et al*. [20], high and low-dose groups had similar preoperative pulse rate (92 vs 91, $P>0.05$). In another study by Cenkowski *et al*. [22], mean preoperative pulse rate was similar in both conventional dose and low-dose spinal group (88 ± 6 vs 83 ± 11).

In similar study by Venkata *et al*. [25], the mean preoperative

pulse rate was comparable in high dose and low dose groups. There was no significant difference between low dose and high dose groups with respect to heart rate at 5 minutes.

Bogra J *et al.* [28] reported that incidence of Bradycardia, after administration of anesthesia, was comparable among different groups. Bradycardia is the result of blockade of sympathetic cardioaccelerator fibers as well as reduced venous return to the heart.

Intraoperative Hypotension

During caesarean section, the most common problem is hypotension, which is related with maternal nausea and vomiting as well as the risk of fetal and neonatal acidosis. A combined approach is probably the best option, which includes vasopressors, colloid preloading, as well as low-dose CSE. Systolic blood pressures less than 85-90mm Hg or a decrease of more than 25%-30% from the preanesthetic value have been used to define hypotension.²⁹ The incidence of hypotension during spinal anesthesia for cesarean section can be as high as 70-80% with conventional local anesthetic doses [22].

In current study, lower dose group patients had much lower incidence of intra-operative hypotension (15% vs 72.5%). Kiran *et al* [21], reported that there was greater incidence of hypotension observed in high-dose group (10mg) as compared to lower dose (8.75mg and 7.5mg). Mebazaa *et al* [20], found that in low-dose group incidence of arterial hypotension was less (68 vs 88%; $P = 0.03$).

No difference was noted by Cenkowski *et al* [22], in the incidence of hypotension among different groups. This is in contrast to results of our study and most of the studies [2, 28]. Turhanoglu S *et al* [30], and Teoh H *et al* [31], also that showed improved hemodynamic stability in the low dose spinal groups. In addition, low-dose group was positioned in 10 degree Trendelenburg in their study, whereas conventional-dose group was not. This may have added to an increased sympathetic blockade as well as resulted in hemodynamic changes.

In study by Seyedhejazi M *et al* [27], the incidence of hypotension in group B (12mg) was higher than group A (8mg) ($p=0.006$). Ben-David *et al* [32], reported that in their study mini dose of 5mg bupivacaine along with 20µg fentanyl provided successful spinal anesthesia; less hypotension was noted in low-dose group as compared to high-dose (10mg) bupivacaine.

Sensory Block

In present study, Group B patients took significantly more time to attain maximum sensory block (6.28 vs 4.91 minutes); and had significantly less duration of sensory regression (66.5 vs 114.1 minutes). This was contrasting to the study by Kiran *et al* [21], the time to maximum sensory blockade did not differ significantly among the groups. The mean time to start of regression of sensory block was higher in high-dose group. The time taken for complete regression of sensory block was greater in 7.mg group.

Cenkowski *et al* [22], reported that low-dose spinal demonstrated significantly more block onset time with conventional-dose spinal group (153 minutes) as compared to 103 minutes in low-dose group ($P<0.0001$). Patients recovered sensory levels faster.

In similar study by Mebazaa *et al* [20], 10mg bupivacaine) patients took significantly more time to recovery of sensory

block than 7.5mg bupivacaine (132 min vs 108 min, $P<0.001$) In another study by Venkata *et al* [25, 72], the time required for the onset of sensory block till T10 dermatome and the target sensory block of T6 dermatome was significantly faster in study group (3.32 min \pm 0.8 min) than in conventional group (4.42 min \pm 0.41 min) with ($P < 0.001$). Bogra J *et al* [28] found that with increase in doses of bupivacaine, onset of sensory block to T6 takes place rapidly.

The variability of requirement of supplemental analgesia in relation to the level of sensory blockade has been emphasized by many authors, which indicated that visceral pain pathways can follow a varied route to upper thoracic cord. This explains the varied perception of visceral pain during exteriorization of uterus and traction on abdominal viscera irrespective of the level of sensory blockade [33].

Motor Block

In our study, compared to high-dose (Group A), the low-dose (Group B) patients took significantly more time to attain maximum motor block (7.7 vs 5.52 minutes); and had significantly less duration of motor block (96.05 vs 133.05 minutes). Kiran *et al* [21], reported similar findings mean time to achieve maximum motor blockade was not different but the duration of motor blockade increased significantly with the dose of bupivacaine.

In similar study by Mebazaa *et al* [2075], Group A (10mg bupivacaine) patients took significantly more time to recovery of motor block as compared to Group B. Block regression was faster in group B than in group A. This has been suggested to allow earlier mobilization and diminution in the post-anesthesia care unit length of stay.

Cenkowski *et al* [22], reported that low-dose spinals showed similar block-onset time. Significant differences were observed in the time to motor recovery. Patients in the conventional-dose spinal group achieved this at 132 minutes in comparison to 54 minutes in the low-dose group ($P<0.01$). Patients recovered motor function faster.

Bogra J *et al* [28] found that complete motor block was noted in approximately 90-100% patients; there was no significant change observed among different groups. On increasing the bupivacaine doses, longer time was taken by motor recovery. As compared to Group A (7.5mg) as well as B (8.75mg), there was higher duration of motor block in Group C (10mg). So, with better hemodynamic stability, pregnant women of low dose bupivacaine group can be made ambulatory at the earliest.

Effects on Apgar Score

A vasopressor used to relieve hypotension was associated with irregular acid base status in neonates, along with the negative impact of hypotension on the mother and fetus [22].

In our study, the mean APGAR scores were comparable among Group A and B: at 1 minute (7.88 vs 8.15) and at 5 minutes (8.9 vs 8.98). There was no significant difference in the neonatal APGAR scores at 1 minute and 5 minutes with different doses of Bupivacaine.

This was in concordance with the study by Mebazaa *et al* [20], there was no significant difference in the neonatal APGAR scores at 1 minute and 5 minutes between Group A (10mg) and Group B (7.5mg). In another study by Kiran *et al* [21], Cenkowski *et al* [22], Venkata *et al* [25], and Jain *et al* [26], there were no differences between groups in 1-or 5-min Apgar scores.

The limitations of our study were our study included only 80 patients and was a single center study. Secondly, fetal cord blood ABG was not done in our study to look for fetal acidosis status in neonates born to patients in both the groups. For this patient had to bear additional cost so was not done.

Conclusion

This study concluded that compared to the conventional dose (10mg), low dose (7.5mg) of Bupivacaine shows better hemodynamic stability in terms of less fall in Blood pressure, Pulse rate and mean arterial pressure with a significant less incidence of intra-op hypotension. However, conventional dose (10mg) showed a faster onset/duration of sensory block and a prolonged motor block. The neonatal outcomes in terms of APGAR scores are comparable with both the doses.

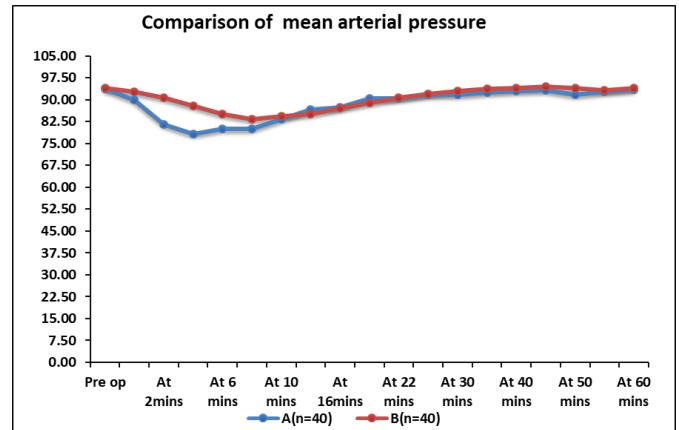


Fig 4: Comparison of mean arterial pressure between two groups

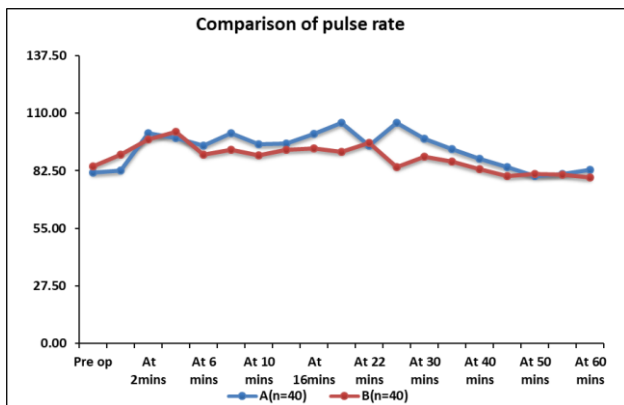


Fig 1: Comparison of pulse rate between two groups

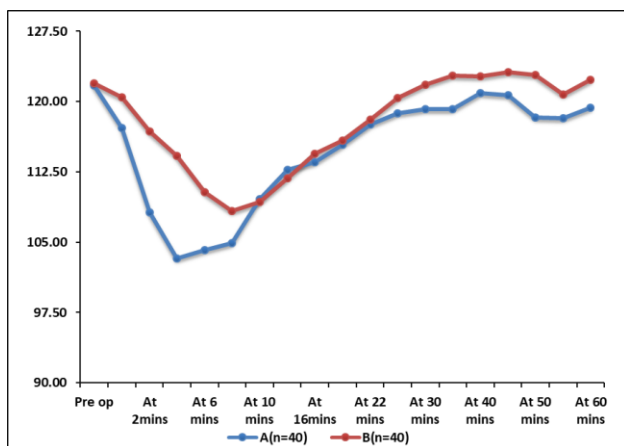


Fig 2: Comparison of SBP between two groups

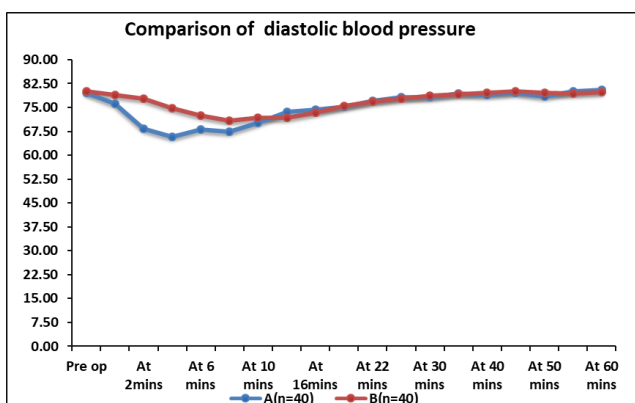


Fig 3: Comparison of diastolic Blood pressure between two groups

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