



Comparison of the Hypotension in Lateral Verses Sitting Positions during Induction of Spinal Anaesthesia for Caesarean Section

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Objective: To compare the hypotension in lateral verses sitting positions during induction of spinal anaesthesia for caesarean section.

Study Design: This is a Randomized control trial (RCT) study.

Setting: Study carried out at Department of Anaesthesiology, Surgical Intensive Care Unit and Pain Management, Civil Hospital, Dow University of health sciences Karachi, from December 2018 to June 2019.

Materials and Methods: All women age 18 to 45 underwent elective caesarian section having ASA I and II, singleton pregnancy on ultrasound with parity ≤ 3 were enrolled. Patients were

randomized to receive spinal anaesthesia in the lateral position (Group L) or the sitting position (Group S) through lottery methods. Using the L3-4 interspace, patients received intrathecal plain bupivacaine, 10mg or 12 mg according to their height, after which they were placed immediately in the supine position with left uterine displacement. Maternal blood pressure was measured with the help of Non-invasive BP apparatus. BP was recorded at baseline then every 5 min till 30 minutes by an anesthetist who was unaware of parturient group. Any single or more reading of SBP of <90 mmHg was considered as Hypotension.

Results: Mean age of the patients in lateral group was 31.49 ±10.87 years and mean age of the patients in sitting group was 31.80 ±10.77 years (p-value 0.869). Majority of the patients 35 (62.5%) with hypotension were presented with sitting position. Chi square test was applied and statistically significant difference was observed between groups (p-value 0.012).

Conclusion: We concluded that less frequency of hypotension was observed when spinal anaesthesia for caesarean section using plain bupivacaine in the lateral position.

Keywords: Hypotension; lateral verses sitting positions; spinal anaesthesia; caesarean section.

1. INTRODUCTION

Use of the spinal anaesthesia is usually due to the rapid onset of action in cesarean sections. In the spinal cord there is a rapid action, sensory and motor blockade, as well as a reduction in the risk of toxicity of local anesthesia [1,2].

Peri-operative hypotension is usually triggered by the loss of sympathetic tone, which can be triggered by the physiological factors that predispose pregnant women to hypotension [3]. It can also be initiated with various positions. Sitting or standing is the ideal position for spinal anesthesia. However, each position has its own advantages and disadvantages. In obstetrics, the use of bupivacaine is often unpopular and its unpredictable prevalence and large variability among patients compared to hyperbaric bupivacaine [4].

The sitting position of the spine is usually considered correct for spinal anesthesia because the midline landmarking is very easy. However, it can be difficult for patients with pre-existing conditions to maintain a sitting position for premedicated patients. The medical sympathectomy is performed following spinal anaesthesia to relieve pressure on the peripheral blood vessels and induced peripheral blood pooling. It can also lead to significant hypotension in the sitting position [5].

A study conducted by international researchers revealed that patients with spinal anaesthesia who were treated with bupivacaine had a lower incidence of hypotension than those who were placed in a sitting position. The incidence of hypotension was 34% lower in the lateral position than in the 56% sitting position. The study also showed no significant differences in blood pressure and hemodynamic measures [6,7].

There is not enough local literature and differences in different studies. Therefore, this study was performed to use bupivacaine during the spinal anesthesia to see the hemodynamic effects of positions of cesarean section. The superior of the two techniques was used to reduce the morbidity.

2. MATERIALS AND METHODS

This study was conducted in Department of Anesthesiology, Surgical Intensive Care and Pain Management Clinic, Dr. Ruth Pfau hospital Karachi, Pakistan. All patients age between 18-45 years, parity ≤3 with singleton pregnancy on ultrasound, ASA I and II undergoing elective caesarian section were included in this study. Refusal from patient, emergency caesarian section, women with weight >85kg, Height more than 175cm or less than 150cm and contraindication to anaesthetic drugs were excluded.

Eligible women undergoing elective caesarian section within the next 24 hours meeting the inclusion criteria willing to participate post explanation of the purpose and procedure of the study were enrolled in the study.

One hundred twenty six patients undergoing elective caesarean section according to American Society of Anesthesiologists physical status I and II were randomized to receive spinal anaesthesia in the lateral position (Group L) or the sitting position (Group S) through lottery methods. Using the L3-4 interspace, patients received intrathecal plain bupivacaine, 10mg or 12 mg according to their height, after which they were placed immediately in the supine position with left uterine displacement.

Maternal blood pressure was measured with the help of Non-invasive BP apparatus. BP was recorded at baseline then every 5 min till 30 minutes by anesthetist who was unaware of parturient group. Any single or more reading of SBP of <90 mmHg was considered as Hypotension.

3. RESULTS

Mean age of the patients was 31.65 ±10.77 years. Mean age of the patients in lateral group was 31.49 ±10.87 years and mean age of the patients in sitting group was 31.80 ±10.77 years (p-value 0.869). Majority of the patients 34 (50.70%) with ≤30 years were presented in lateral position while 30 (50.80%) patients with >30 years were presented in sitting position. Mean weight of the patients was 59.72 ±4.95 Kg. Mean weight of the patients in lateral group was 59.84 ±5.05 Kg and mean weight of the patients in sitting group was 59.60 ±4.89 Kg (p-value 0.789). Majority of the patients 5 (62.50%) with ≤55 Kg weight were presented in lateral position while 60 (50.80%) patients with >55 Kg weight were presented in sitting position. Mean height of the patients was 1.53 ±0.06m. Mean height of

the patients in lateral group was 1.53 ±0.06 m and mean height of the patients in sitting group was 1.54 ±0.05 m (p-value 0.696). Majority of the patients 46 (51.10%) with ≤1.5 m height were presented in sitting position while 19 (52.80%) patients with >1.5 m height were presented in lateral position. Mean BMI of the patients was 27.81 ±5.01 Kg/m². Mean BMI of the patients in lateral group was 27.71 ±5.07 kg/m² and mean BMI of the patients in sitting group was 27.92 ±4.96 kg/m² (p-value 0.814) (Table 1).

Majority of the patients 32 (51.60%) with ≤30Kg/m² BMI were presented in lateral position while 33 (51.60%) patients with >30 Kg/m² were presented in sitting position. Majority of the patients 47 (52.80%) with primipara were presented in lateral position while 21 (56.80%) were patients with multipara were presented in sitting position (Table 1)

Majority of the patients 35 (62.5%) with hypotension were presented with sitting position. Statistically significant difference was observed in both groups as p-value founds to be less than level of significance (p-value 0.012) (Fig. 1).

Table 1. Demographic variable N=126

Variable	Group	N	Mean ± Sd	P-value	95% CI
Age	Lateral	63	31.49 ±10.87	0.869	-4.13 to 3.49
	Sitting	63	31.80 ±10.77		
Weight	Lateral	63	59.84 ±5.05	0.789	-1.51 to 1.99
	Sitting	63	59.60 ±4.89		
Height	Lateral	63	1.53 ±0.06	0.696	-0.01 to 0.02
	Sitting	63	1.54 ±0.05		
BMI	Lateral	63	27.71 ±5.07	0.814	-1.98 to 1.55
	Sitting	63	27.92 ±4.96		

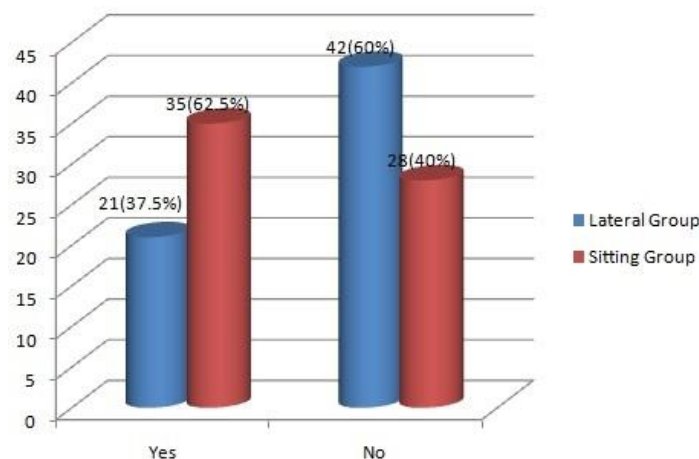


Fig. 1. Hypotension with respect to group (P value 0.012) n=126

Table 2. Different variable and hypotension with respect to groups N=126

Variable	Group	Hypotension		Total (%)	P-Value
		Yes (%)	No (%)		
AGE ≤30 years n=67	Lateral	12 (40)	22 (59.5)	34 (50.7)	0.113
	Sitting	18 (60)	15 (40.5)	33 (49.3)	
AGE >30 years n=59	Lateral	9 (34.6)	20 (60.6)	29 (49.2)	0.047
	Sitting	17 (65.4)	13 (39.4)	30 (50.8)	
WEIGHT ≤55 Kg n=8	Lateral	3 (60)	2 (66.7)	5 (62.5)	0.850
	Sitting	2 (40)	1 (33.3)	3 (37.5)	
WEIGHT>55 Kg n=118	Lateral	18 (35.3)	40 (59.7)	58 (49.2)	0.009
	Sitting	33 (64.7)	27 (40.3)	60 (50.8)	
HEIGHT≤1.5 m n=90	Lateral	11 (29.7)	33 (62.3)	44 (48.9)	0.002
	Sitting	26 (70.3)	20 (37.3)	46 (51.1)	
HEIGHT>1.5 m n=36	Lateral	10 (52.6)	9 (52.9)	19 (52.8)	0.985
	Sitting	9 (47.4)	8 (47.1)	17 (47.2)	
BMI ≤30 kg/m ² n=62	Lateral	14 (46.7)	18 (56.3)	32 (51.6)	0.450
	Sitting	16 (53.3)	14 (43.8)	30 (48.4)	
BMI >30 kg/m ² n=64	Lateral	7 (26.9)	24 (63.2)	31 (48.4)	0.004
	Sitting	19 (73.1)	14 (36.8)	33 (51.6)	
PRIMIPARA n=89	Lateral	14 (34.1)	33 (68.8)	47 (52.8)	0.001
	Sitting	27 (65.9)	15 (31.3)	42 (47.2)	
MULTIPARA n=37	Lateral	7 (46.7)	9 (40.9)	16 (43.2)	0.729
	Sitting	8 (53.3)	13 (59.1)	21 (56.8)	

4. DISCUSSION

The seating position seems to be the best place to place spinal anesthesia because the markings, especially the midline, are easy to identify. However, patients who are already taking medications usually have difficulty maintaining a seated position. On the other hand, older patients are usually considered more likely to remain in the lateral position. However, physical markers are difficult to identify [8]. The medical sympathectomy after spinal anesthesia increases gravity-induced peripheral blood pooling, which usually leads to significant hypotension. The lateral recumbent position causes less hypotension compared to the sitting position [9].

An international study conducted by Obasuyi BI, found the incidence of hypotension was lower in patients treated with 10-12 mg of conventional bupivacaine in 34% left lateral recumbent lumbar anesthesia than in the 56% sitting position [6]. In a local study, heart rate, systolic and diastolic blood pressures were not significantly different from hemodynamic variables. In the sitting group, anesthesia was initiated rapidly (4.5 min vs. 5.4 min) [10].

In particular, these studies have shown that high doses of vasopressors cause vasoconstriction in the uteroplacental circulation, which can lead to fetal hypoxia. This has led to an emphasis on

non-pharmacological approaches to the management of hypotension and the introduction of ephedrine as a selective vasopressant for obstetric patients. However, recent medical findings have questioned conventional education and have had a profound impact on how we respond to hypotension under spinal anesthesia during labor [11].

The use of left uterine displacement to prevent aortocaval compression is common in obstetric anesthesia. In 1950, Holmes suggested that gravid uterus compressed the inferior cava and spinal anaesthesia during Caesarean section further reduced vasomotor tone that led collapsed circulatory system [12,13]. Following Holmes' advice, Crawford emphasized the importance of lateral tilt in a series of 150 anesthesia cesarean cases, scoring better when he noted that Apgar blood gas and Apgar occurred when left tilt was used [14]. Placing the patient in a fully left lateral position after spinal injection has been shown to reduce hypotension or better CO compared with the tilted supine position [15]. An international study third trimester women were studied in seven positions, including full lateral, supine, and varying degrees of left and right table tilt. They found no benefit between the supine position and the different tilt positions of 2.5 to 12.5 degrees, except for a significant increase in cardiac output in patients in the full left lateral position [15]. Similarly, Study

of Kinsella SM reported that women who underwent severe cesarean delivery, 30 of whom received spinal anesthesia, there was no benefit to a 20-degree tilt of the operating table compared to the supine position [16].

It would be useful to be able to identify patients likely to suffer from aortocaval compression. Hypotension was reported to be more likely if the mother was tachycardic in the supine position and in a flexed knee position to improve venous return prior to lumbar anesthesia. However, the high rate of false negatives with such nonspecific symptoms makes their prognostic value too low to be medically useful [17].

5. CONCLUSION

We concluded that less frequency of hypotension was observed when spinal anaesthesia for caesarean section using plain bupivacaine in the lateral position.

CONSENT AND ETHICAL APPROVAL

After obtaining approval from College of Physicians and Surgeons Pakistan and ethical review committee of Dow University of Health Sciences & Verbal informed consent was taken from patients.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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