



A Comparison of The Hemodynamic Effects of Lateral And Sitting Positions During Induction of Spinal Anaesthesia For Cesarean Section

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ABSTRACT

Objective: To compare the hemodynamic effects in patients who are given spinal anaesthesia in lateral and sitting positions during cesarean section

Methods: 100 ASA II pregnant patients posted for elective Lower Segment Cesarean Section were randomly assigned to receive spinal anesthesia in either lateral position (Group 1) or sitting position (Group 2). All patients received intrathecal 0.5% Hyperbaric Bupivacaine 10 mg in L3-L4 interspace, after which they were placed immediately in the supine position with left uterine displacement. Vital parameters were measured preoperatively, immediately after administration of spinal anaesthesia, and thereafter, every minute for 10 min, every three min for 20 min, and every 5 minutes thereafter.

Results: The incidence of hypotension was higher in the Sitting Group compared to the Lateral Group, though not statistically significant. Onset of hypotension was similar between the two groups. The lowest recorded systolic blood pressure was lower in the sitting group compared to lateral group. Fall of diastolic blood pressure from baseline was more in the sitting group. Ephedrine usage was higher in the sitting group, though not statistically significant.

Conclusion: There is no statistical difference in incidence of hypotension between sitting and lateral groups.

KEYWORDS : Spinal Anesthesia, Cesarean Section, Sitting position, Lateral position

Introduction:

Hypotension occurs commonly during spinal anaesthesia in parturients. Maternal position during induction of spinal anaesthesia may have an effect on the level of blockade and hemodynamic effects by influencing the spread of the local anaesthetic(1).

The present work is designed to compare the hemodynamic effects in patients who are given spinal anaesthesia in lateral and sitting positions during cesarean section

Methodology:

About the study: This is a prospective, randomized, analytical comparative study, conducted at the Department of Anaesthesiology, Kanyakumari Government Medical College, Nagercoil, Tamilnadu.

Ethical committee approval & written informed patient consent were obtained.

The study population of 100 (n=100) patients was randomly assigned to receive spinal anesthesia in either lateral position (Group 1) or sitting position (Group 2)

Inclusion Criteria

- ASA II
- Posted for Elective Cesarean Section
- Written informed consent

Exclusion Criteria

- ASA III & IV
- Hypertension / PIH
- BMI > 35
- Abruptio placenta / Placenta praevia
- Coagulation abnormality / Thrombocytopenia
- Cord Prolapse
- Twin Gestation
- Less than 28 weeks gestation
- Active Labour
- Fetal distress

In The Theatre Two wide bore IV lines were secured. Routine monitors were connected – ECG, NIBP, and SpO2. Patients were given spinal anaesthesia in either Right Lateral or Sitting position, accord-

ing to the study group assigned. Patients received intrathecal 0.5% Hyperbaric Bupivacaine 10 mg in L3-L4 interspace, after which they were placed immediately in the supine position with left uterine displacement.

Parameters monitored: Vital parameters were measured preoperatively, immediately after administration of spinal anaesthesia, and thereafter, every minute for 10 min, every three min for 20 min, and every 5 minutes thereafter. Pulse Rate, Blood Pressure (Systolic, Diastolic and Mean Arterial Blood Pressures), SPO2, and level of sensory blockade

Hypotension was defined as a fall in systolic blood pressure >20%. Hypotension was treated with incremental doses of Inj Ephedrine. Bradycardia was to be treated with Inj Atropine

RESULTS:

Statistical tools: Data analysis was done with the help of computer using **SPSS statistical package- Version 17**. Range, frequencies, percentages, means, standard deviations, chi square, 't' value and 'p' values were calculated. 't' test was used to test the significance of difference between quantitative variables. Yate's and Fisher's chi square tests for qualitative variables. A 'p' value less than 0.05 is taken to denote significant relationship.

PROFILE OF CASES STUDIED:

Table 1

Variable	Value for		'p'
	Lateral position group	Sitting position group	
Total cases studied	50	50	
Age (years)	25.7 ± 3.4	25.2 ± 5.3	0.7238 (Not significant)
Height (cms)	152.2 ± 4.5	152.1 ± 3.5	0.938 (Not significant)
Weight (kgs)	71.0 ± 6.1	68.9 ± 5.2	0.2476 (Not significant)
BMI	27.9 ± 1.5	27.2 ± 1.6	0.1248 (Not significant)

Fig 1

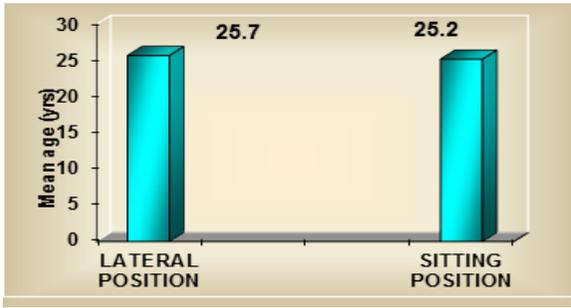
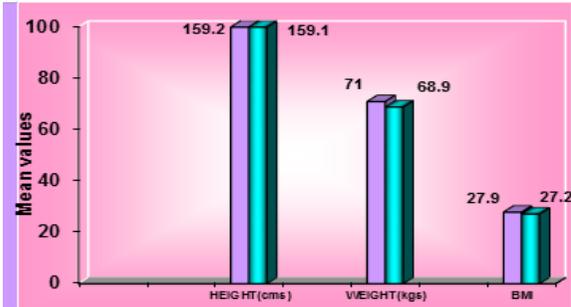


Fig 2



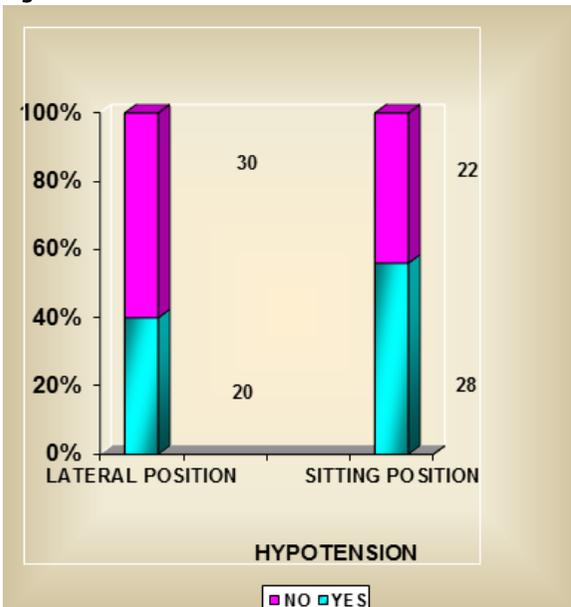
HEMODYNAMIC COMPARISON OF TWO GROUPS:

Table 2:

Variable	Value for		'p'
	Lateral position group	Sitting position group	
Incidence of Hypotension			0.5266 (Not significant)
Yes	20 (40%)	28 (55%)	
No	30 (60%)	22 (45%)	
Onset of Hypotension	1.83 ± 1.19 min	1.6 ± 1.72 min	0.7004 (Not significant)

INCIDENCE OF HYPOTENSION:

Fig 3



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p value: 0.5266 (Not significant)

ONSET OF HYPOTENSION

Fig 4



p value: 0.7004 (Not significant)

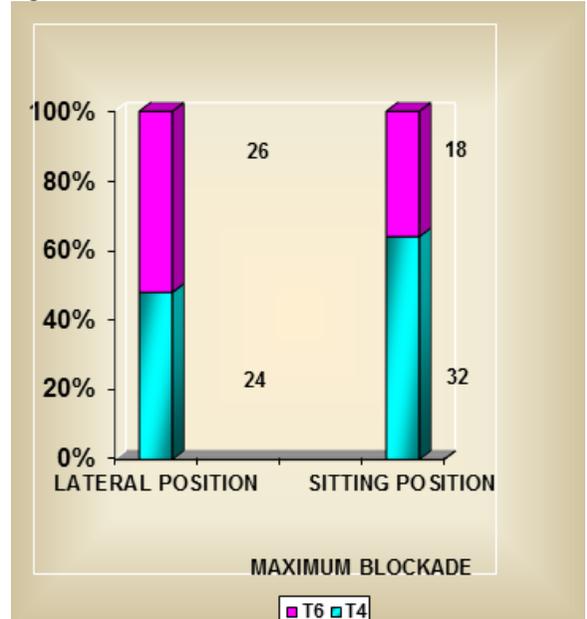
SENSORY BLOCKADE AND DOSE OF EPHEDRINE

Table 3:

Variable	Value for		'p'
	Lateral position group	Sitting position group	
Maximum blockade reached			0.6301 (Not significant)
T4	26 (52%)	32 (64%)	
T6	24 (48%)	18 (36%)	
Dose of Ephedrine required(mgs)	4.5 ± 5.46	8.1 ± 5.93	0.053 (Not significant)

MAXIMUM BLOCKADE REACHED

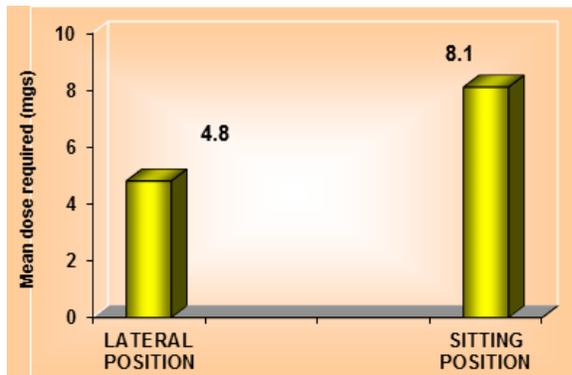
Fig 5



p value: 0.7301 (Not significant)

EPHEDRINE REQUIRED

Fig 6



p value: 0.053 (Not significant)

VARIATION (FALL) FROM BASELINE

Table 4

Variable	Value for		'p'
	Lateral position group	Sitting position group	
Sys. BP	22.7 ± 7.3	25.2 ± 8.8	0.3331 (Not significant)
Dias BP	15.4 ± 3.4	18.5 ± 6.1	0.0497 (Significant)
Pulse Rate	2.8 ± 8.6	6.3 ± 12.5	0.3087 (Not significant)
MAP	17.3 ± 4.2	19.5 ± 6.6	0.2258 (Not significant)

FALL FROM BASELINE

Fig 7



p value: 0.3331 (Not Significant)

p value: 0.0497 (Significant)

p value: 0.3087 (Not significant)

p value: 0.2258 (Not significant)

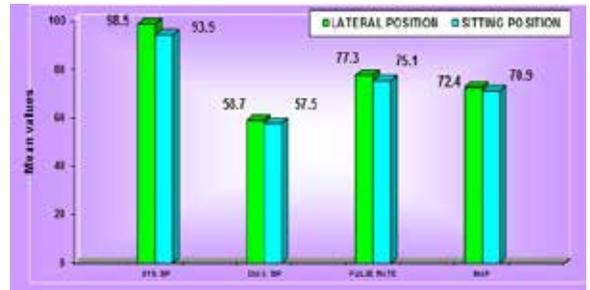
LOWEST VALUES OF VITAL PARAMETERS

Table 5:

Variable	Value for		'p'
	Lateral position group	Sitting position group	
Sys. BP	98.5 ± 7.2	93.9 ± 5.9	0.0347 (Significant)
Dias BP	58.7 ± 3.1	57.5 ± 3.8	0.3012 (Not significant)
Pulse Rate	77.3 ± 9.7	75.1 ± 11.3	0.5136 (Not significant)
MAP	72.4 ± 4.1	70.9 ± 4.2	0.259 (Not significant)

LOWEST VALUES REACHED

Fig 8



p value: 0.0347 (Significant)

p value: 0.3012 (Not significant)

p value: 0.5136 (Not significant)

p value: 0.259 (Not significant)

SUMMARY

The incidence of hypotension was higher in the Sitting Group compared to the Lateral Group, though not statistically significant. Onset of hypotension was similar between the two groups. The lowest recorded systolic blood pressure was lower in the sitting group compared to lateral group. Fall of diastolic blood pressure from baseline was more in the sitting group. Ephedrine usage was higher in the sitting group, though not statistically significant

DISCUSSION

Hypotension, a common complication of spinal anaesthesia may be due to the cephalad spread of the local anaesthetic in the subarachnoid space and also aortocaval compression by the gravid uterus. Both these factors are influenced by the parturient posture during and immediately after the subarachnoid injection. By influencing the spread of the local anaesthetic, maternal posture may affect the spread of onset of the sensory blockade (2)

Regional anaesthesia may be conducted with the parturient in the sitting position or lateral position (3). Parturients who were favorable for the lateral recumbent position tended to be leaner than those who preferred the sitting position for the procedure (4). The sitting position facilitates identification of the midline structures and allows better spinal flexion, thus making it preferable for obese patients or when technical difficulty in performing the block is anticipated (5).

Causes for hypotension during cesarean section (6,7)

Aortocaval compression - Supine Hypotensive Syndrome of Pregnancy (SHSP) causing marked bradycardia with a reduction in cardiac output and severe hypotension

Loss of sympathetic tone due to spinal anaesthesia

Impact of posture change after spinal anaesthesia, on cephalad spread of local anaesthetic (8,9)

Postural change to supine position immediately after injection of intrathecal drug from either lateral or sitting positions have shown to enhance the cephalad spread of local anaesthetic, and thus the hemodynamic effects

Why Sitting Position for spinal anaesthesia?(10,11,12,13)

ADVANTAGES

- Comfort of the patient
- Preferred in obese patients
- Avoids concealed aortocaval compression as occurs in lateral position due to maximal lumbar flexion causing reduction in maternal cardiac output

DISADVANTAGES

- Increased orthostatic hypotension

In this study, the incidence of hypotension was similar between the two groups. The onset of hypotension was also similar between the two groups. Maximum blockade reached was slightly higher in the

sitting group, but not significant statistically. Total dose of Ephedrine required to correct hypotension was higher in the sitting group, but not statistically significant. The fall from baseline of diastolic blood pressure was significantly greater in the sitting group. Lowest value of systolic blood pressure recorded was lower in the sitting group, and it is significant statistically.

Related Studies:

Coppejans HC et al ----- Severity of hypotension → lateral > sitting

Yun et al (CSE) ----- Incidence of hypotension → sitting > lateral

Obasuyi et al ----- Incidence of hypotension → sitting > lateral

H Y Kim et al (non-obstetric patients) ----- Incidence of hypotension → lateral > sitting

CONCLUSION

There is no statistical difference in incidence of hypotension between sitting and lateral groups.

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