Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies

Journal home page: WWW.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-95

(p) ISSN Print: 2348-6805

Original Research

Incidence of Supine Hypotension Syndrome in Patients Undergoing Lower Segment Caesarean Section under Spinal Anaesthesia

Dr. Lokesh SB¹, Dr. M. Nandhini², Dr. Geetha M³

¹Senior Resident, Department of Anesthesia, ESIC Medical college & PGIMSR and Model Hospital, Bangalore; ²Registrar, MGM Hospitals, Chennai;

³Post Graduate, Department of Anesthesia, ESIC Medical college & PGIMSR and Model Hospital, Bangalore

ABSTRACT:

The ratio of the dosage required for irreversible cardiovascular collapse (CC) and the dosage that will produce CNS toxicity (convulsions), is lower for Bupivacaine than lignocaine. Ventricular arrhythmias and fatal ventricular fibrillation may occur after rapid intravenous administration of a large dose of Bupivacaine but not lignocaine. Detailed pre-anesthetic evaluation was done. Patient fulfilling the essential criteria are selected and are allocated to each of the 2 groups, Group S- supine position and Group L- Lateral table tilt, by computer generated random numbers. All patients are preloaded with Ringer's lactate solution (10 ml kg⁻¹) along with premedication of Metoclopramide (10 mg) i.v., Ranitidine (50) mg i.v., 15 minutes prior to surgery. When the series is studied as a whole, there is no statistically significant difference in baseline values of systolic and diastolic blood pressure between the two groups in both sitting and supine posture. This is shown in the table above. However, in 7 patients each of both group L and S, there was more than 20% fall in blood pressure, on change of posture from sitting to supine.

Keywords: Supine Hypotension Syndrome, Caesarean Section, Spinal Anaesthesia

Received: 4 March, 2021

Accepted: 10 April, 2021

Corresponding author: Dr.M. Nandhini, Registrar, MGM Hospitals, Chennai

This article may be cited as: SB Lokesh, Nandhini M, M Geetha. Incidence of Supine Hypotension Syndrome in Patients Undergoing Lower Segment Caesarean Section under Spinal Anaesthesia. J Adv Med Dent Scie Res 2021;9(5):119-123.

INTRODUCTION

For most obstetric patients, a single-shot spinal is the preferred technique. The primary equipment choice for spinal anesthesia concerns the type and size of the spinal needle. Cutting-bevel needles like Quincke are rarely used in contemporary obstetric anesthesia practice because of the high incidence of post-dural puncture headache associated with their use.¹ Instead, non-cutting needles like e.g., Whitacre, Sprotte, Gertie Marx are used almost exclusively. It is now believed that the non-cutting needles cause more trauma to the dura, which then results in a more intense inflammatory response than occurs with cutting-bevel needles. Presumably, the inflammation results in more rapid closure of the dural defect. The needle is inserted and after aspirating to ensure the free flow of CSF, the anesthesia provider injects the local anesthetic at a rate of approximately 0.2 mL per second.²

The ratio of the dosage required for irreversible cardiovascular collapse (CC) and the dosage that will

produce CNS toxicity (convulsions), is lower for Bupivacaine than lignocaine. Ventricular arrhythmias and fatal ventricular fibrillation may occur after rapid intravenous administration of a large dose of Bupivacaine but not lignocaine. Cardiac resuscitation is more difficult after Bupivacaine -induced cardiovascular collapse. Acidosis and hypoxia markedly potentiate the Cardiotoxicity of Bupivacaine. Acidosis or hypoxia results in increased PaCO2 levels which facilitates the conversion of the base form to the cationic form and results in increased local anaesthetic uptake by the brain and enhances the toxicity. CC/CNS ratio for Bupivacaine is 3.7+ 0.5 and for lignocaine is $7.1 + 1.1.^3$

The left lateral table tilt of 15 degrees is required to produce uterine displacement. The pelvic angle achieved with lateral tilt of the operating table differs from the degree of table tilt and is usually greater than the table angle. The explanation is that when the operating table is tilted laterally in a term pregnant woman, the weight of the uterus produces further axial rotation of the abdomen and bony pelvis.⁴

METHODOLOGY

Detailed pre-anesthetic evaluation was done. Patient fulfilling the essential criteria are selected and are allocated to each of the 2 groups, Group S- supine position and Group L- Lateral table tilt, by computer generated random numbers. All patients are preloaded with Ringer's lactate solution (10 ml kg⁻¹) along with premedication of Metoclopramide (10 mg) i.v., Ranitidine (50) mg i.v., 15 minutes prior to surgery. Baseline blood pressure (BP) was measured in sitting position in right arm and then she is allowed to lie supine for 10 minutes and blood pressure was measured again in right arm. Any postural change in blood pressure is noted.

Subsequently, spinal anesthesia was given in sitting position at L3-L4 interspace with 26G Quinke's spinal needle with 2ml inj. Bupivacaine heavy (0. 5%).Then according to allocated numbers, further study was conducted with standard ASA monitors with group S in supine position and group L in lateral table tilt of 15 degrees.

Sensory block was assessed at two minutes' interval by using loss of sensation to touch using tooth pick. Time of onset of sensory blockade at T10 and maximum height of dermatomal block at 15 min was noted. Motor block was assessed by modified Bromate scale. APGAR score of newborn at one and five minutes after extraction was recorded.

BP and heart rate (HR) was recorded once in 3 minutes for first 20 minutes and there after every 5 minutes. Surgery was permitted to commence after establishment of adequate sensory and motor block.

Parturients whose blood pressure falls by >20% on changing from sitting to supine posture is considered to have supine hypotension syndrome. Hypotension was defined as >20% fall from baseline blood pressure and Bradycardia was defined as >20% fall from baseline value. Hypotension was treated with crystalloids, inj. Ephedrine 6mg iv. Bradycardia was treated with inj. Atropine 0.02mg/kg (not more than 2 mg) and if not responding, inj. Adrenaline 100 microgram iv.

Number of episodes of hypotension and bradycardia are recorded. In any patient, if the hypotension and bradycardia are encountered despite treating with fluids and vasopressors, other measures are taken like lateral table tilt, wedge under right hip or manual displacement of uterus.

Informed consent was obtained from patients selected for the study. Patients are assured that, if hypotension is severe enough to jeopardize the well-being of mother /fetus, they will be promptly treated with suitable drugs and posture.



FIGURE 1: Mean age

Mean Age (in years) of subjects in group-L and group-S was 26.39 ± 4.01 and 26.46 ± 3.6 respectively. There was no statistically significant difference between the groups with a p value of 0.912 with 95% confidence interval of -1.346 to 1.203.

	PREOPERATIVE MEAN BASELINE VALUES OF BLOOD PRESSURE						
	$SITTING(MEAN \pm SD)$			$SUPINE(MEAN \pm SD)$			
	Group-L	Group-S	P value	Group-L	Group-S	P value	
	126.30	128.04		123.43	125.04		
SBP(in	±	±	0.334	±	±	0.406	
mmhg)	10w.12	11.45		11.43	11.45		
DBP(in	76.36	81.81		77.27	79.73		
mmhg)	±	±	0.168	±	±	0.120	
_	0.77	11.15		8.7	9.76		

TABLE 1: Baseline mean values of systolic and diastolic blood pressure

When the series is studied as a whole, there is no statistically significant difference in baseline values of systolic and diastolic blood pressure between the two groups in both sitting and supine posture. This is shown in the table above.

However, in 7 patients each of both group L and S, there was more than 20% fall in blood pressure, on change of posture from sitting to supine. These 14 parturients qualify by definition as, supine hypotension syndrome, giving an incidence of 14 in 140(10%). In these patients the average fall of blood pressure, on changing from sitting to supine posture is 26.78%.

TABLE 2: Incidence of supine hypotension syndrome

SHS	GROUP -L	GROUP-S	TOTAL	PERCENT
PRESENT	7	7	14	10%
ABSENT	63	63	126	90%
TTOTAL	70	70	140	



FIGURE 2: Incidence of supine hypotension syndrome

The incidence of supine hypotension syndrome in the study group is 10%.

DISCUSSION

The demographic profile with respect to age, weight, baseline blood pressure and heart rate in both the groups were similar.

In our series of 140 parturients posted for LSCS,14 parturients showed features of SHS (defined as >20%

fall in blood pressure from baseline) during their preanesthetic evaluation, giving an incidence of the incidence of 10%. All were asymptomatic. In 1953, Howard et al⁵ observed an incidence of 18 in 160 (11.2%) parturients. They made them to lie supine for several minutes and described SHS in those who had

drop in SBP by more than 30 mm Hg or who developed an SBP of <80 mm Hg. The first large study on SHS was done by Holmes et al⁶, on a group of 500 women whom they evaluated during their antenatal visits in the last month of pregnancy. They described that 8.2% of women experienced more than 30% decrease in SBP when placed supine and 3.6% experienced more than 40% decrease in SBP.

Following spinal anaesthesia with 10mg of 0.5%Bupivacaine(H) at L3 –L4 interspace, we assessed the hemodynamic changes in supine(S) and tilted (L) posture (70 each). The hypotensive episodes after SAB if any, were studied in relation to time of extraction of the baby (before / after extraction)

In our study, the total number of hypotensive episodes in Group-L is 26(37.14%) and Group-S is 22(31.42%). 24 (34.3%) parturients in Group-L and 18(25.7%) parturients in Group-S had 1 episode of hypotension, who required 6mg of ephedrine. And 1 (1.4%) parturient in Group-L and 2 (2.9%) in Group-S had 2 episodes of hypotension and they required 12mg of ephedrine). There was no statistical significant difference between the groups with a p value of >0.05.

10 (38.46%) parturients in Group-L and 8(36.36%) parturients in Group-S had hypotensive episodes before extraction of the baby. 16 (61.53%) parturients in Group-L and 14(63.63%) parturients in Group-S had hypotensive episodes after extraction of the baby. This implies that lateral tilt has no benefit and assigns a major role for sympathetic blockade rather than aortocaval compression before extraction; On the other hand, the combined effect of sympathetic blockade and blood loss could be contributing to hypotensive episodes after extraction.

After an extensive search in existing literature, we found that no studies have mentioned about hypotensive episodes intraoperatively and whether they happened before or after extraction of baby.

In our study Mean maximum fall in systolic and diastolic blood pressure before extraction of baby was 18.21±12.69(SBP), 14.49±11.94(DBP) in group-L and 20.61±12.53(SBP), 15.90±13.36 (DBP) in group-S respectively (p > 0.05). The Mean maximum fall in systolic and diastolic blood pressure after extraction of baby was 19.84±13.01(SBP), 14.49±11.94 (DBP) group-L in and 23.60±12.94(SBP), 15.54 ± 14.07 (DBP) in group-S respectively (p >0.05). There was no statistically significant difference between the groups. This implies that providing a left lateral tilt does not offer any advantage over supine posture, in reducing the magnitude of fall in blood pressure both before and after extraction of baby.

Rees et al⁷ conducted a randomized controlled trial on 60 women undergoing elective Caesarean section under spinal anesthesia with 2.5ml 0.5% Bupivacaine and 0.3mg diamorphine(0.3ml). All 60 women were given a mandatory ephedrine dose of 6mg after spinal anesthesia. They were randomly allocated to either a measured 15° left table tilt position (n = 31) or full

left lateral position (n = 29) for a 15-minute period after spinal blockade and their hemodynamic changes were studied during that 15-minute period. They found that the 17(57%) subjects in table tilt group and 19(68%) subjects in full left lateral group had hypotensive episodes (p value - 0.37). The number of subjects who required ephedrine apart from mandatory ephedrine dose was 22(73%) in supine with 15° table tilt group and 22(79%) in full left lateral group. The mean ephedrine requirement was 15.3 ± 8.6 in supine with 15° table tilt group and 14.9±8.7 in full left lateral group. There was no statistically significant difference between the groups with a p value of 0.86. They assessed aortic compression using blood pressure measurement in the leg and found that leg systolic arterial pressure over time was significantly lower in the tilt group (p -0.001). But Arm systolic arterial pressure over time was similar in both groups. They concluded that following spinal anesthesia, even a true 15⁰ left table tilt position is associated with aortic compression. In our study we have recorded blood pressure only in the arm and also we have used a lesser dose of Bupivacaine(10mg) without adjuvant.⁸

CONCLUSION

There was no difference in the rate of occurrence of hypotensive episodes or vasopressor requirements between tilted posture and supine posture in healthy uncomplicated parturients undergoing LSCS under spinal anesthesia.

REFERENCES

- 1. Kundra P, Arunsekar G, Vasudevan A, Vinayagam S, Habeebullah S, Ramesh A. Effect of postural changes on inferior vena cava dimensions and its influence on haemodynamics during caesarean section under spinal anaesthesia. J Obstet Gynaecol. 2015;35:667-71.
- Higuchi H, Takagi S, Zhang K, Furui I, Ozaki M. Effect of lateral tilt angle on the volume of the abdominal aorta and inferior vena cava in pregnant and nonpregnant women determined by magnetic resonance imaging. Anesthesiology. 2015;122:286– 293.
- Nelson DB, Stewart RD, Matulevicius SA, et al. The effects of maternal position and habitus on maternal cardiovascular parameters as measured by cardiac magnetic resonance. Am J Perinatol. 2015;32:1318– 1323.
- 4. Lee A, Landau R, Mattingly J, Meenan M, Corradini B, Wang S et al. Left Lateral Table Tilt for Elective Cesarean Delivery under Spinal Anesthesia Has No Effect on Neonatal Acid–Base Status. Anesthesiology. 2017; 127:241-9.
- 5. Howard BK, Goodson JH, Mengert WF. Supine hypotensive syndrome in late pregnancy. Obstet Gynecol. 1953;1:371–377.
- Holmes F. Incidence of the supine hypotensive syndrome in late pregnancy. A clinical study in 500 subjects. J Obstet Gynaecol Br Emp. 1960;67:254–258.
- Rees SG, Thurlow JA, Gardner IC, Scrutton MJ, Kinsella SM. Maternal cardiovascular consequences of positioning after spinal anaesthesia for Caesarean

section: left 15 degree table tilt vs. left lateral. Anaesthesia. 2002;57:15-20.

8. Mendonca C, Griffiths J, Ateleanu B, Collis R. Hypotension following combined spinal-epidural anaesthesia for Caesarean section. Left lateral position vs. tilted supine position. Anaesthesia. 2003;58(5):428-431.