

Left Lateral Tilt in Women Undergoing a Cesarean Section is Not Necessary with Preload Administration and a Vasopressor

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ABSTRACT

Women who undergo cesarean deliveries are often put at a left lateral tilt of 15 degrees so as to prevent impendance of the inferior vena cava which leads to hypotension (Bamber, J. H., & Dresner, M., 2003). This is because, as part of an effect of anesthesia, her body is unable to adequately compensate for the decreased blood pressure, making the supine position not recommended. As a result of the tilt, she is less likely to undergo cardiac compromise, hypotension and therefore baby endangerment.

The traditional lateral tilt technique is challenged by researchers, hypothesizing that the use of IV fluids in conjunction with a vasopressor (such as phenylephrine) immediately after induction of spinal anesthesia, would result in healthy infant blood pH and gas levels, which is a sign of adequate maternal blood flow. With these vasopressors the need for the lateral tilt will diminish under normal circumstances.

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INTRODUCTION

One of the common complications women in childbirth can experience is hypotension. To avoid this, medical professionals have been placing women in a left lateral tilt of 15 degrees as a common practice since the 1970's during cesarean sections (Lee et al., 2017). This has been successful due to the prevention of the inferior vena cava compression which leads to hypotension (Bamber, J. H., & Dresner, M., 2003). As part of an effect of regional anesthesia, her body is unable to adequately compensate for the drop in blood pressure, making the supine position initially not recommended and the lateral tilt more necessary.

However, the left lateral tilt in pregnant women about to undergo a cesarean section is a compromise between easy surgical access and the prevention of hypotension (Rees et al., 2002). For this reason, the traditional lateral tilt technique is challenged by researchers, hypothesizing that the use of IV fluids, specifically colloids, in conjunction with a vasopressor (such as phenylephrine) immediately after induction of spinal anesthesia, would result in healthy levels of the infant's blood pH and base excess. With these in place the need for the lateral tilt will diminish and the surgeon can more easily perform the cesarean section with improved outcomes (Rees et al., 2002).

METHODS AND MATERIALS

One hundred parturients volunteered for this first study discussed. Fifty were randomly put in the 15-degree left lateral position, and the other 50 were supine. Parturients in the supine position were administered phenylephrine with flexible titration depending on the severity of the hypotension. An initial infusion of 50 µg/min of phenylephrine was administered once the blood pressure decreased by 10% from baseline. For a decrease of more than 10% there was a gradual increase of infusion until the desired effects are seen, to reach a maximum of 200 µg/min. (Lee et al., 2017)

In the second study, preloads of Hartmann's Solution 1.5 L, and Hydroxyl Ethyl Starch 0.5 L and 1.0 L were compared. Sixty volunteers were randomly put into one of these three groups. Baseline HR, CO, SBP and SPO2 were recorded during a left lateral tilt of 15 degrees before the preload was given. After preload delivery, vitals were checked every 5 minutes and the spinal was placed after 30 minutes. After the spinal, patients were assessed every 5 minutes for 20 minutes. (FRCA P.T., et al)

RESULTS

The results are determined by comparing the health of the mother and the health of the newborn in patients in the different groups. The infant's Apgar score and base excess were included in the determining factors for evaluation. Patients assigned to the supine position with the vasopressors had similar results as the patients in the lateral tilt, but with the advantage of improved surgeon accessibility. CO and SBP were also improved the most with HES 1 L before the spinal, although after the spinal these decreased along with the other groups. However, there was a less dramatic decrease with HES 1 L.

	Supine Group	Tilt Group	P Value
UA blood gases	(n = 50)	(n = 47)	
pH	7.28 ± 0.05	7.28 ± 0.04	0.39
Pco ₂ (mmHg)	55 ± 7	55 ± 11	0.69
Po ₂ (mmHg)*	19 ± 3	19 ± 5	0.57
HCO ₃ (mmol/l)	25 ± 1	25 ± 1	0.88
Base excess (mmol/l)	-0.5 ± 1.6	-0.6 ± 1.5	0.64
UV blood gases	(n = 49)	(n = 47)	
pH	7.33 ± 0.05	7.33 ± 0.04	0.49
Pco ₂ (mmHg)	46 ± 6	46 ± 5	0.68
Po ₂ (mmHg)	26 ± 5	26 ± 5	0.95
HCO ₃ (mmol/l)	23 ± 1	24 ± 1	0.54
Base excess (mmol/l)	-1.7 ± 1.3	-1.6 ± 1.5	0.91

The values are means ± SD.

*Po₂ values less than 17 mmHg are reported by the laboratory as "less than 17 mmHg" and were treated as 17 mmHg for this analysis.

UA = umbilical artery; UV = umbilical vein.

Table 1. Neonatal Acid-Base Status According to Maternal Position (Lee et al., 2017)

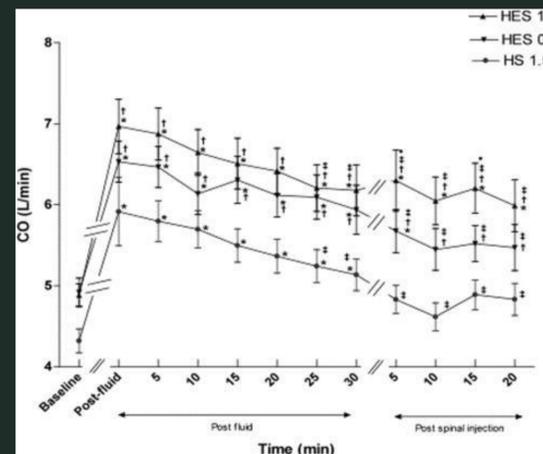


Table 3. Serial Measures of Cardiac Output (FRCA P.T., et al)

TABLE 17.5 Normal umbilical arterial and venous blood gas values		
	Umbilical artery	Umbilical vein
pH	7.26 ± 0.07 ^a	7.34 ± 0.06
Pco ₂ (mm Hg)	53 ± 10	41 ± 7
Po ₂ (mm Hg)	17 ± 6	29 ± 7
Base excess (mEq/L)	-4 ± 3	-3 ± 3

^aAll values are ± 1 standard deviation.
Adapted from Helwig JT, Parer JT, Kilpatrick SJ, et al. Umbilical cord blood acid-base state: what is normal? *Am J Obstet Gynecol.* 1996;174:1807-1812.

Table 2. Normal Umbilical Base Excess Values

Table 3. Hypotension Incidence/Treatment and Umbilical Cord Gases

	HS (n = 20)	HES 0.5 (n = 20)	HES 1.0 (n = 20)
Hypotension incidence, n (%)	14 (70)	7 (35)	13 (65)
Ephedrine dose (mg)	12 (0-18)	0 (0-10)	6 (0-17)
Time to first ephedrine dose (min)	7 (0-11)	0 (0-9)	8 (0-12)
Nausea, n (%)	6 (30)	4 (20)	5 (25)
Uterine incision time to delivery (s)	84 ± 9	109 ± 12	108 ± 13
Umbilical venous pH	7.35 ± 0.05	7.34 ± 0.04	7.36 ± 0.02
Umbilical venous base excess (mEq/L)	-2.5 ± 1.2	-2.7 ± 1.5	-2.5 ± 1.4
Umbilical arterial pH	7.28 ± 0.04	7.27 ± 0.05	7.28 ± 0.04
Umbilical arterial base excess (mEq/L)	-2.4 ± 1.7	-2.3 ± 2.1	-2.50 ± 2.0

Values are mean ± SD, n (%), or median (IQR). There were no significant differences among groups.
HS = Hartmann's solution; HES = hydroxyethyl starch solution; IQR = interquartile range.

Table 4. Hypotension Incidence/Treatment and Umbilical Cord Gases (FRCA P.T., et al)

DISCUSSION & CONCLUSION

Patient health is critical, and certain surgeries work best in certain patient and surgeon positions. If it's possible to optimize conditions for the surgeon without compromising the health of the patient, this would generally increase the success rate and simultaneously decrease the possibility of complications. Therefore, since no significant differences are found between the positional groups, the supine position with the administration of phenylephrine infusion is preferred, along with a colloid preload of HES 1 L.

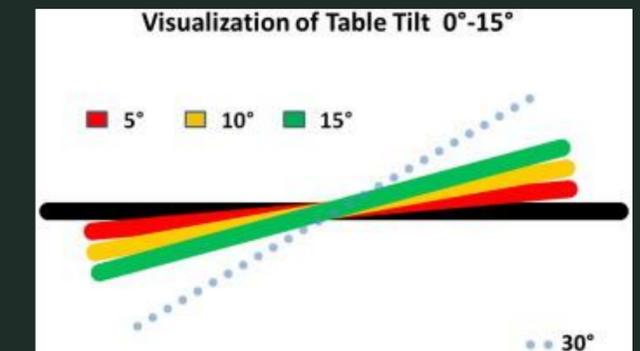


Table 5. Visualization of table tilt.

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