Hemodynamic optimization with non-invasive continuous monitoring system in non-emergent caesarean delivery undergoing subarachnoid anesthesia.

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BACKGROUND

- During pregnancy, physiologically, there is a progressive adaptation of the maternal cardiovascular system for proper fetal development. Hemodynamic changes occur related to cardiac output and systemic vascular resistance.
- In the caesarean delivery undergoing subarachnoid anesthesia, these changes are accentuated due to the sympathetic blockade established, which may lead to hyper or hypodynamic states.
- The ClearSight® is a continuous non-invasive monitoring system that allows to know the baseline hemodynamic status of the patient and optimize the use of fluids and vasopressors, which was performed empirically until now. In this way we can prevent the signs and symptoms of hypotension that can appear because of the sympathetic blockade of the subarachnoid anesthesia, to the blood loss after delivery or to the administration of uterotonics.
- The goal of this preliminary study is to describe the hemodynamic changes produced in pregnant women undergoing non-emergent caesarean delivery with subarachnoid anesthesia.

MATERIAL AND METHODS

- ✓ Observational prospective study of 20 patients.
- ✓ Non-emergent caesarean delivery with subarachnoid anaesthesia.
- ✓ Patients were monitored by ClearSight® during the intervention.

Until today, the vasopressor of choice has been phenylephrine, since ephedrine can produce fetal acidosis.

Nevertheless ephedrine was used in patients with low cardiac index, since it is known that phenylephrine decreases cardiac output.

RESULTS

Using phenylephrine in these patients could agravate the hemodynamic status in case of hypodinamia and it could affect the uteroplacental perfusion and fetal well-being.

	N = 20		N = 20
Colloid (ml)	435 (SD +/- 137,7)	Baseline CI	5,01 (SD +/- 0,7)
Cristalloid (ml)	560 (SD +/- 174,4)	Baseline SV	93,65 (SD +/- 16,9)
Total fluids (ml)	995 (SD +/- 218)	Baseline MAP	95,25 (SD +/- 9,0)
Ephedrine (mg)	2,25 (SD +/- 5,4)	Baseline SVRI	1428,50 (SD +/- 218,7)
Phenylephrine (mg)	1020 (SD +/- 726,6)	Post-anaesthesia CI	4,57 (SD +/- 0,8)
Local anesthetic (mg)	10,40 (SD +/- 0,5)	Post-anaesthesia SV	79,85 (SD +/- 17,2)
T4-T6 blockade level	6 (30%)	Post-anaesthesia MAP	83,70 (SD +/- 15,4)
T7-T10 blockade level	14 (70%)	Post-anaesthesia SVRI	1300,05 (SD +/- 267,9)
Apgar scoring (7-10) 1 st min	20 (100%)	Post- fetal extraction CI	4,69 (SD +/- 1,1)
Apgar scoring (7-10) 5 th min	20 (100%)	Post- fetal extraction SV	93,60 (SD +/- 28,2)
Apgar scoring (7-10) 10 th min	20 (100%)	Post- fetal extraction MAP	90,25 (SD +/- 18,1)
Fetal pH 7,20- 7,24	4 (20%)	Post- fetal extraction SVRI	1457,75 (SD +/- 295,2)
Fetal pH >7,25	16 (80%)	Post- uterotonic CI	5,34 (SD +/- 1,1)
Fetal peripheral O ₂ saturation	93,6 (SD +/- 1,4)	Post- uterotonic SV	100,45 (SD +/- 20,3)
Low cardiac output symptoms	0,85 (SD +/- 1,1)	Post- uterotonic MAP	86, 45 (SD +/- 12,4)
Intraoperative urine output (ml)	134 (SD +/- 67,9)	Post- uterotonic SVRI	1188 (SD +/- 278,5)

CONCLUSIONS

- Thanks to this non-invasive continuous monitoring system we can optimize the CI, as we can observ in the table.
- Furthermore we can detect those patients with low baseline CI allowing us to use the best vasopressor.
- More randomized prospective studies with adequate n are needed to confirm these first results.

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