475574 - HYPOTENSION DURING CESAREAN DELIVERY: ROLE OF IMPEDANCE CARDIOGRAPHY

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Introduction: Maintaining normal blood pressure (BP) in pregnant patients is important for normal placental blood flow and to avoid undesirable symptoms. Despite our practice to maintain normal baseline BP, hypotension remains the most common complication during Cesarean delivery under spinal anesthesia. We hypothesize that continuous monitoring of several cardiovascular hemodynamics may provide insights into the mechanism(s) of hypotension during a Cesarean delivery under spinal anesthesia.

Methods: After ethics committee approval, noninvasive thoracic impedance cardiography (PhysioFlow Impedance device, VasoCom Inc, Philadelphia) was performed to measure continuously (every minute) the cardiac index (CI), systemic vascular resistance index (SVRI), stroke volume (SV), systolic blood pressure (SBP) and heart rate (HR) in pregnant patients (n = 10) undergoing elective Cesarean delivery under spinal anesthesia. Prior to performing a lumbar spinal anesthesia, baseline hemodynamics were measured and patients were preloaded with 1000 ml of Lactated Ringers' solution. Spinal anesthesia was then performed with 12.5 mg of 0.75% hyperbaric bupivacaine, 10 mcg fentanyl and 100 mcg morphine via a 27G Whittacre needle. Phenylephrine at doses of 100-200 mcg bolus was used to treat hypotension with the aim to preserve SBP at 100% of baseline. Repeated measures analysis of variance (ANOVA) was used to compare any significant ($p < 0.5$) differences from baseline controls.

Results: We were successful in measuring continuously the cardiovascular hemodynamics in all (n=10) patients during the Cesarean delivery. We observed the greatest change of the cardiovascular hemodynamics before and after delivery. Table 1 showed that the SBP before (98.3 ± 7.0) and after (98.3 ± 5.7) were significantly decreased by 25% when compared to baseline control (133 ± 5.6). In addition, all measured cardiovascular hemodynamics were also significantly decreased before and after delivery (Table 1).

Discussion: Despite a preventive approach using phenylephrine to maintain baseline BP significant hypotension still occurs during Cesarean delivery under spinal anesthesia. Our results suggest that significant decrease in several cardiovascular functions may be responsible for the occurrence of hypotension. Moreover, the PhysioFlow Impedance device provides a reliable noninvasive monitoring of the cardiovascular hemodynamics. Thus, continuous monitoring of cardiovascular functions with noninvasive bioimpedance may provide insights into the mechanisms of hypotension. This may leading to preemptive treatments before significant hypotension occurs and to avoid undesirable symptoms. A larger study is further required to confirm these preliminary findings.

References: BJOG 2007;114:576

Table 1. Hemodynamics Before And After Delivery@

Hemodynamics Parameters#	Baseline Control	Before Delivery*	After Delivery*
SBP	133 ± 5.6	98.3 ± 7.04	98.3 ± 5.7
CI	4.6 ± 0.32	2.9 ± 0.16	3.5 ± 0.31
HR	93.3 ± 3.0	63.1 ± 1.6	72.4 ± 3.6
SV	94.3 ± 5.48	79.7 ± 4.5	83.4 ± 5.7
SVRI	1823.2 ± 206.7	1336.5 ± 165.5	1224.2 ± 171.5

@All data are presented as mean ± SE of n = 10.

#SBP(mmHg), CI(l/min/m²), HR(bpm), SV(ml/beat), SVRI (dyne/sec/cm⁵/m²)

*All results before and after delivery were significant p < 0.05, when compared to baseline control.