

## **Pulse Oximetry Plethysmographic Waveform Changes during Cesarean Section under Spinal Anesthesia.**

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### **Background**

In daily clinical obstetric anesthesia practice, it is still a challenge to optimize cardiac preload and avoid fluid overload or hypovolemia. Pleth variability index (PVI) allows continuous monitoring of respiratory variations in the pulse oximetry plethysmographic waveform amplitude and is sensitive to changes in ventricular preload in ventilated patient.<sup>1</sup> In spontaneous breathing patients, DeltaPP is also able to predict fluid responsiveness secondary to passive leg raising<sup>2</sup>. We therefore investigated the possibility that PVI can assess fluid responsiveness and vasopressor needs in pregnant women during cesarean section under spinal anesthesia.

### **Methods**

After IRB approval and informed/written consents obtained, we conducted a prospective observational study. Twenty spontaneously breathing pregnant women with singleton term pregnancies undergoing elective cesarean delivery were enrolled. Heart rate, PVI<sub>1</sub> and noninvasive arterial pressure (systolic blood pressure:SPB) were recorded at baseline after 5 minutes of rest. A second set of measurements (PVI<sub>2</sub>) was obtained after 500 ml Ringer's lactate solution were given over 10 min before spinal anesthesia. All patients received a spinal anesthesia with a intrathecal dose of hyperbaric bupivacaine (8-10 mg), plus fentanyl 5 microg and morphine 100 microg. SBP cycling was set to every minute. At intrathecal injection, we started a 1 mg phenylephrine and 30 mg ephedrine infusion combination diluted to 20 ml in saline (syringe pump connected to an IV cannula). The rate of the infusion was started at 20 mL/h and then was adjusted in steps of 10 mL/h to maintain SBP values near 80-100% baseline until uterine delivery. The total volume of vasopressors required before delivery was recorded (Vaso1) and vasopressors needs by min (Vaso2) was calculated (time: spinal injection- fetal delivery). Wilcoxon test and Spearman test were used for statistical analysis.

### **Results**

PVI<sub>1</sub> and PVI<sub>2</sub> were  $17.4 \pm 4.7$  and  $16.9 \pm 4.0$ , respectively (n.s). Baseline SBP was  $118 \pm 10$  mm Hg. Vaso1 was  $8.5 \pm 3.8$  mL (min:3.2 mL - max:16.1 mL)). No relationship was found between PVI<sub>1</sub>/Vaso2 or PVI<sub>2</sub> /Vaso2 ( $r < 0.10$ )).

### **Conclusions**

This study showed that a fluid challenge in pregnant women at term has no effect on PVI and that baseline PVI does not predict vasopressor needs following spinal anesthesia.

1) Delorme S, et al.. Am J Emerg Med. 2007;25:637-642.; 2) Cannesson M. et al. Anesthesiology. 2007;106:1105-1111.

Figure 1

