

Changes in pleth variability index and detection of hypotension during spinal anaesthesia for caesarean section

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Background: Hypotension occurs commonly during caesarean section under spinal anaesthesia. As the onset may be rapid, it may fail to be detected by non-invasive blood pressure (BP) measurement in a timely fashion. Pulse oximeters can continuously and non-invasively measure tissue perfusion (perfusion index (PI)) and its variation with the respiratory cycle (pleth variability index (PVI)). As with stroke volume variation, PVI predicts fluid responsiveness in mechanically ventilated patients with a high degree of sensitivity and specificity. Whilst there have been very few studies in spontaneously breathing patients, a volunteer study revealed that PVI decreased with straight leg raising. As stroke volume variation is known to increase during spinal anaesthesia, we hypothesized that this would also be the case for PVI and that this rise could be used to identify the onset of hypotension.

Methods: Routine monitoring consisted of electrocardiography, pulse oximetry (left thumb) and non-invasive BP. The Radical Seven_® pulse oximeter probe (Masimo Corporation, Irvine, CA, USA) was placed on the index finger of the left hand with the finometer cuff applied to the adjacent middle finger. The patient and anaesthetist were blinded to the output from both the pulse oximeter and the finometer. Perioperative data were recorded by a member of the research team who had no clinical role.

Results: Our results indicate that estimation of PVI may not be useful for detecting the onset of hypotension during caesarean section under spinal anaesthesia. The observation that intraoperative PVI declined was unexpected as we anticipated that it would increase during the relative hypovolaemia induced by spinal anaesthesia.

Conclusion: In conclusion, we found no evidence that intraoperative estimation of PVI could inform the perioperative management of BP during caesarean section under spinal anaesthesia.