

Clinical utility of ultrasonography, pulse oximetry and arterial line derived hemodynamic parameters for predicting post-induction hypotension in patients undergoing elective craniotomy for excision of brain tumors - A prospective observational study

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Background: Hypotension, which is a common adverse effect of induction of anesthesia, may be especially detrimental in neurosurgical patients. Hence, it is important to investigate hemodynamic parameters which may be useful in identifying patients at risk of hypotension, following induction. Our study was designed to assess the utility of parameters derived from ultrasonography, pulse oximeter and arterial line for predicting post-induction hypotension.

Methods: The study was designed as a prospective, observational trial. Written informed consent was obtained from 100 American Society of Anesthesiologists (ASA) 1 and 2 patients, between 18-60 years of age, scheduled for elective craniotomy for brain tumors. Arterial cannula was inserted before induction of anesthesia and connected to Vigileo cardiac output monitor. Baseline stroke volume variation (SVV), stroke volume (SV), cardiac index (Ci), cardiac output (CO) and pulse pressure variation (PPV) were recorded. Plethysmography variability index (PVI) and perfusion index (PI) were obtained from the Masimo rainbow SET® Radical-7® pulse oximeter. Ultrasonographic assessment of the inferior vena cava (IVC) was performed before induction of anesthesia and again within 15 min after induction. Maximum and minimum IVC diameters (dIVCmax and dIVCmin) and collapsibility index (CI) were measured. All the other aforementioned parameters were recorded every minute starting at induction, until the 15th minute following induction.

Results: PI, CI and dIVCmax were found to have the largest AUCROC for the prediction of post-induction hypotension (AUCROC 0.852, 0.823 and 0.781 respectively). Multiple logistic regression analysis revealed CI to be the most significant independent factor for the prediction of post-induction hypotension.

Conclusion: Non-invasively derived hemodynamic parameters like dIVCmax, CI and PI were more accurate for the prediction of post-induction hypotension, compared to invasively derived parameters.