

Pleth Variability Index Predicts Hypotension During Anesthesia Induction.

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Background

The pleth variability index (PVI) is a new algorithm used for automatic estimation of respiratory variations in pulse oximeter waveform amplitude, which might predict fluid responsiveness. Because anesthesia-induced hypotension may be partly related to patient volume status, we speculated that pre-anesthesia PVI would be able to identify high-risk patients for significant blood pressure decrease during anesthesia induction.

Methods

We measured the PVI, heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), and mean arterial pressure (MAP) in 76 adult healthy patients under light sedation with fentanyl to obtain pre-anesthesia control values. Anesthesia was induced with bolus administrations of 1.8 mg/kg propofol and 0.6 mg/kg rocuronium. During the 3-min period from the start of propofol administration, HR, SBP, DBP, and MAP were measured at 30-s intervals.

Results

Heart rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure were significantly decreased after propofol administration by 8.5%, 33%, 23%, and 26%, respectively, as compared with the pre-anesthesia control values. Linear regression analysis that compared pre-anesthesia PVI with the decrease in mean arterial pressure yielded an r value of -0.73. Decreases in systolic blood pressure and diastolic blood pressure were moderately correlated with pre-anesthesia PVI, while heart rate was not. By classifying PVI >15 as positive, a mean arterial pressure decrease >25 mmHg could be predicted, with sensitivity, specificity, positive predictive, and negative predictive values of 0.79, 0.71, 0.73, and 0.77, respectively.

Ability of PVI to predict changes in MAP in 76 patients undergoing anesthesia.

Observation	Specificity	Sensitivity	Positive predictive value	Negative predictive value
PVI \geq15	0.79	0.71	0.73	0.77
95% confidence interval	0.68–0.87	0.60–0.79	0.63–0.81	0.66–0.86

Patients with pre-anesthesia PVI \geq 15 were classified as the positive high-risk group, while a decrease in MAP \geq 25mmHg during anesthesia induction was considered to be a significant decrease that could be predicted. PVI, pleth variability index; MAP, mean arterial pressure

Conclusion

Pre-anesthesia PVI can predict a decrease in mean arterial pressure during anesthesia induction with propofol. Its measurement may be useful to identify high-risk patients for developing severe hypotension during anesthesia induction.