

Impact of Skin Incision on the Pleth Variability Index.

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Objective

The pleth variability index (PVI), which is calculated from respiratory variations in the perfusion index (PI), reportedly predicts fluid responsiveness. However, vasomotor tone fluctuations induced by nociceptive stimuli change the PI and may reduce the accuracy of PVI. The aim of this study was to confirm the effects of surgical stimuli on PVI.

Methods

Twenty-four patients were examined after the induction of general anesthesia. Heart rate (HR), mean arterial blood pressure (MBP), PI, PVI, stroke volume variation (SVV), and cardiac index (CI) were recorded before and after the skin incision. PI and PVI were calculated using a Radical 7 pulse oximeter, and SVV and CI were calculated using the FloTrac/ Vigileo system.

Results

After the skin incision, the PI decreased significantly from 5.3 (4.0–6.2%) to 3.6% (1.8–4.7%), whereas the PVI increased significantly from 9.5 (7.0–12.0%) to 13.5% (9.0–16.0%). A significant negative correlation was observed between the changes in PI and PVI before and after the skin incision. The skin incision did not affect the HR, CI, or SVV but increased the MBP.

Conclusion

This study showed a significant increase in the PVI and a negative correlation between the changes in PVI and PI before and after the skin incision. The PVI can be calculated from the variations in the PI caused not by mechanical ventilation, but rather by fluctuations in vasomotor tone. When using the PVI as an indicator for fluid responsiveness, it is crucial to pay attention to fluctuations in vasomotor tone induced by nociceptive stimuli.