

The Perfusion Index as Measured by a Pulse Oximeter Indicates Pain Stimuli in Anesthetized Volunteers

Hager H, Church S, Mandadi G, Pully D, Kurz A. *Anesthesiology*. 2004;101:A514.

Introduction

The perfusion index (PI) in the Masimo SET pulse oximetry system reflects the strength of a patient's perfusion at the monitored site by calculating the relation between pulsatile and constant absorbed light. Perfusion at the extremities is known to be affected by vasoconstriction and vasodilation as stimulated by temperature, volume, and anesthetics. The researchers examined whether perfusion was also affected by pain stimuli and, if so, whether the PI could serve as a reliable indicator of pain.

Methods

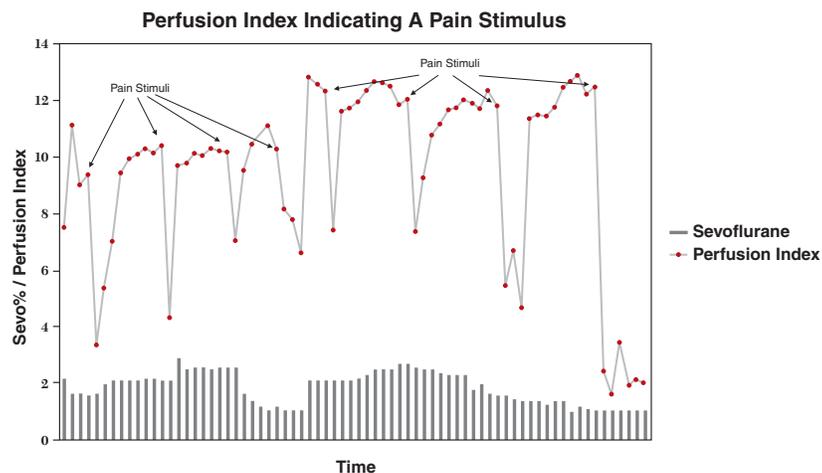
Having obtained informed consent, volunteers were given Propofol (2mg/kg), maintained with Sevoflurane (1.0%, 1.5%, 2.0%, and 2.5% - given in random order), and monitored with ECG, NIBP, and the Masimo SET Radical pulse oximeter. In each condition, standardized painful stimuli were provided by two 25-g electric needles inserted into the lower portion of each subject's anterior thigh. A bilateral 65-70 milliamperere, 100 Hz tetanic electrical current was maintained for 10 seconds.

Results

As expected, heart rate and mean arterial blood pressure increased under the influence of painful stimuli, as represented in the table below. The perfusion index followed suit, showing a statistically significant decrease during painful stimuli.

	Heart Rate	Arterial Pressure	Perfusion Index
Pre-Stimulus	62.5 ± 9.5	70.75 ± 9.44	11.07 ± 1.19
During Stimulus	80.38 ± 13.18	92.00 ± 15.11	5.42 ± 2.39
p-value	0.01	0.005	< 0.001

The figure below shows the location of each pain stimulus and the resulting drop in PI.



Authors' Discussion and Conclusions

"The perfusion index is able to independently indicate a pain stimulus in anesthetized volunteers in different concentrations of Sevoflurane. Thus, it may be of clinical value to assess pain."