

Impact of Lower Extremity Nerve Blockade on Oximeter Perfusion Index & Pleth Variability Index.

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Introduction

Regional nerve blockade and subsequent sympathectomy are associated with increased blood flow to the blocked extremity. Upper limb sympathectomy has been shown to increase pulse oximetry-derived perfusion index (PI). However, reports of the impact of lower extremity regional nerve blockade are lacking. Furthermore, there is no report about the impact on Pleth Variability Index (PVI). PVI is an algorithm that continuously and automatically quantifies the respiratory variation in pulse oximeter plethysmography waveform amplitudes. Changes in PVI correlate well with local blood volume changes. The aim of this pilot study was to determine if PI and PVI correlated with successful regional nerve blockade of the lower extremity.

Methods

After obtaining institutional review board approval and informed consent, 6 adult patients receiving regional anesthesia for surgery of the lower extremities were studied. A pulse oximeter (Radical-7, Masimo Corp.) was attached to the second toe of the ipsilateral limb. PI, PVI, Oxygen saturation were followed continuously, as well as non-invasive blood pressure and heart rate. Baseline values over the five minutes prior to the block were averaged and then data were recorded every minute thereafter for ten minutes. All regional blocks successfully achieved surgical anesthesia. Student's t tests were used to analyze data. A $p < 0.05$ was considered significant.

Results

PI and PVI values changed significantly following nerve blockade. PI increased immediately, with statistically significant change occurring at four minutes. At ten minutes, PI had increased from a baseline mean of 1.4 to 6.6 ($p=0.002$). PVI decreased significantly from a mean of 18.5 at baseline to 12.3 at ten minutes ($p=0.03$).

Discussion

Increases in perfusion that result from successful regional anesthesia nerve blockade can be quickly detected by changes in PI and PVI. Although not formally recorded in this study, changes in PI and PVI often preceded patient reporting of decreased sensation to pinprick and cold stimulation. In patients undergoing regional anesthesia for surgery, PI and PVI may be additional early indicators of successful blockade, especially in situations where patients are under general anesthesia, deep sedation, or are otherwise unable to provide feedback.

Figure 1

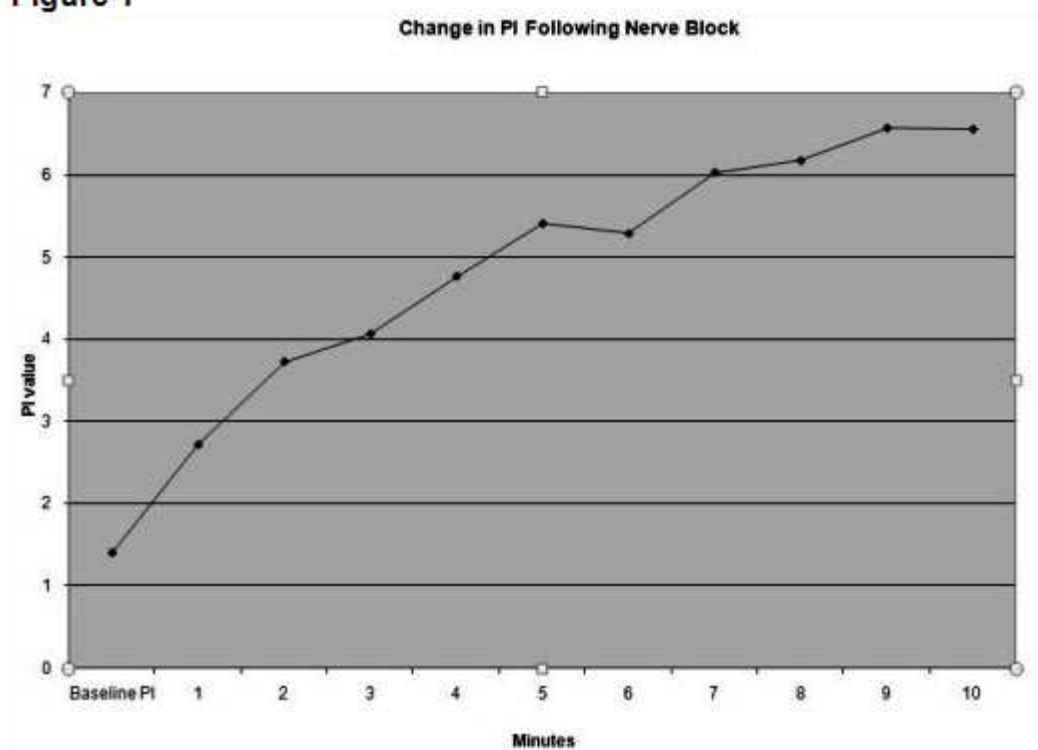


Figure 2

