

Does Perfusion Index Correlate with Pulse Oximeter Heart Rate Variability?

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Rationale

Classically, heart rate variability (HRV) has been used to gauge fetal well-being in utero. From an obstetrical perspective, indicators of short and long term variability have been invaluable as guides to when intervention is needed. In neonatal and pediatric populations, HRV changes have been associated with worsening neonatal sepsis, traumatic brain injury, and depth of anesthesia. The relationship of the pulsatile to the non-pulsatile blood at the site measures corresponds to the perfusion index (PI). Changes in sympathetic tone affect smooth muscle tone at the arterial level altering levels of perfusion. Preliminary data suggest that PI values may correlate with clinical course.

Methods

To study this effect, 28 patients were monitored for 6 hours using the Masimo Radical (V4.1) Pulse Oximeter. PI was measured and averaged over the selected epoch. Heart rate was corroborated with ECG tracing. Variability was calculated by analyzing the average beat to beat deviation from the mean HR. PI calculations were matched for corresponding HR variability. HRV and mean PI were correlated over the course of the analyzed epoch and stratified according to PI.

Results

Patients with low PI had decreased HRV as indicated in the graph ($p=0.02$).

Conclusions

PI may be an important adjunct to the spot assessment of patients at risk for worsening clinical course and its associated change in heart rate variability.