

Decreased Perfusion Index (PI) Predicts Neonatal Therapeutic Intervention Scoring System (NTISS) Identified Sick Neonates And Correlates With Decreases In Heart Rate Variability (HRV).

Goldstein M.R., Pernia M.L., Yang L.L., Lawas-Alejo P., Furman G.I., Ochikubo C.G., Sindel B.D., Martin G.I. *Proceedings of the 2005 Annual Meeting of the Pediatric Academic Societies*: 569.

Background

Classically, HRV has been used to gauge fetal well-being in utero. In neonatal and pediatric populations, HRV changes have been associated with worsening neonatal sepsis, traumatic brain injury, and depth of anesthesia. PI measures the relationship of pulsatile to non-pulsatile blood at the measured site. Changes in sympathetic tone affect smooth muscle tone at the arterial level altering levels of perfusion. PI values may correlate with clinical course. Recent data has suggested that this measurement may be corroborated by SNAP-I scores associated with higher acuity neonatal disease measurements. The NTISS is a therapy driven inventory that is reassessed daily scoring the most intense level of each therapy during a 24 hour period and may be a better indication of the ongoing acuity.

Objective

We asked whether PI or decreased HRV better correlated with NTISS identified sick neonates.

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 this period. HR was corroborated with ECG. HRV was calculated by analyzing the average beat to beat deviation from the mean HR. PI calculations were matched for corresponding HRV. HRV and mean PI were correlated over the course of the analyzed epoch and stratified according to PI. Neonates were stratified by illness severity with the Neonatal Therapeutic Intervention Scoring System (NTISS).

Results

PI was quantified at both NTISS stratifications, NTISS identified sick patients had PI of 1.27 ± 0.43 as compared to PI of 1.93 ± 0.51 of patients identified as well ($p < 0.003$). Patients with PI > 1.7 had HRV 10.25 ± 1.94 versus HRV of 8.45 ± 2.49 for PI < 1.7 (0.02). HRV changes were not statistically significant for NTISS stratifications.

Conclusions

Low PI, decreased HRV, and increased NTISS have been associated with worsening clinical course. Although decreased HRV is identifiable at low PI, HRV does not necessarily predict NTISS. PI was corroborated by low NTISS and was able to independently predict decreased HRV.