

## Cerebral oxygenation in preterm infants born at high-altitude in the first 96hrs of life

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**Background:** Cerebral oxygenation as measured by near-infrared spectroscopy (NIRS) may be a better predictor for risk of brain hypoperfusion than standard hemodynamic monitoring parameters. Regional cerebral oxygen saturation (rcSO<sub>2</sub>) and cerebral fractional tissue oxygen extraction (cFTOE) in term neonates have been found to be lower in those born at high-altitude compared to those born at low-altitude. Reference ranges for cerebral oxygenation in preterm infants born at high-altitude remain to be described.

**Objective:** Obtain normative data for rcSO<sub>2</sub> and cFTOE in preterm infants at a high-altitude location (5,312ft/1619m) and evaluate for correlations with fraction of inspired oxygen (FiO<sub>2</sub>) required, hemodynamic parameters, mortality, and common morbidities of prematurity.

**Design/ Methods:** Prospective observational study of infants born at <32 weeks' gestation without placental abruption or anomalies that may impair perfusion. 20 participants underwent cerebral NIRS monitoring starting within 24hrs of birth until 96hrs of age. Heart rate, mean arterial blood pressure, and FiO<sub>2</sub> obtained throughout the NIRS monitoring period were recorded.

**Results:** Median rcSO<sub>2</sub> was 73% on day of birth, increased to 75% at 24-48hrs of age, and decreased to 73% at 72-96hrs of age. Median cFTOE followed a similar, but inverse, parabolic pattern. These patterns are similar to those previously reported in preterm infants to date, when data obtained using adult sensors were extrapolated for use of neonatal sensors. There is limited comparison data for cFTOE in preterm infants in the first several days of life using neonatal sensors.

**Conclusions:** Cerebral oxygen saturation at high-altitude appears to be similar to low-altitude values in preterm infants. The use of supplemental oxygen to maintain standard levels of peripheral oxygen saturation may contribute to this finding, counteracting the effect of altitude. However, in our study population, association between SpO<sub>2</sub> and rcSO<sub>2</sub> approached, but did not reach significance (p=0.07).