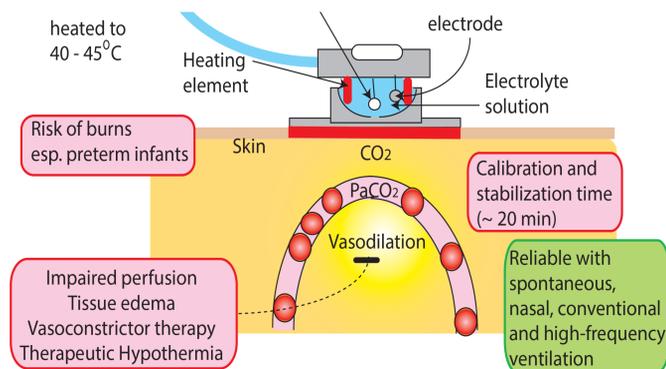


Introduction

- Therapeutic hypothermia (TH) is standard of care in the management of hypoxic-ischemic encephalopathy (HIE).
- Fluctuations in partial pressure of arterial carbon dioxide (PaCO₂) during TH is associated with poor neurodevelopmental outcomes.
- Frequent arterial blood gas monitoring may not be practical.

Objective

- Study the accuracy of transcutaneous CO₂ (TCO₂) in newborns undergoing TH



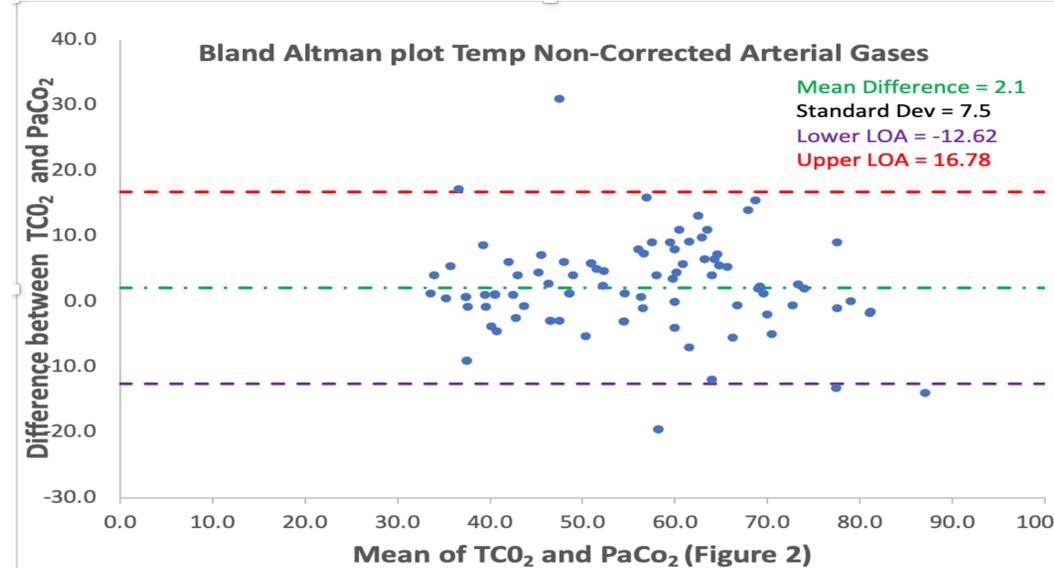
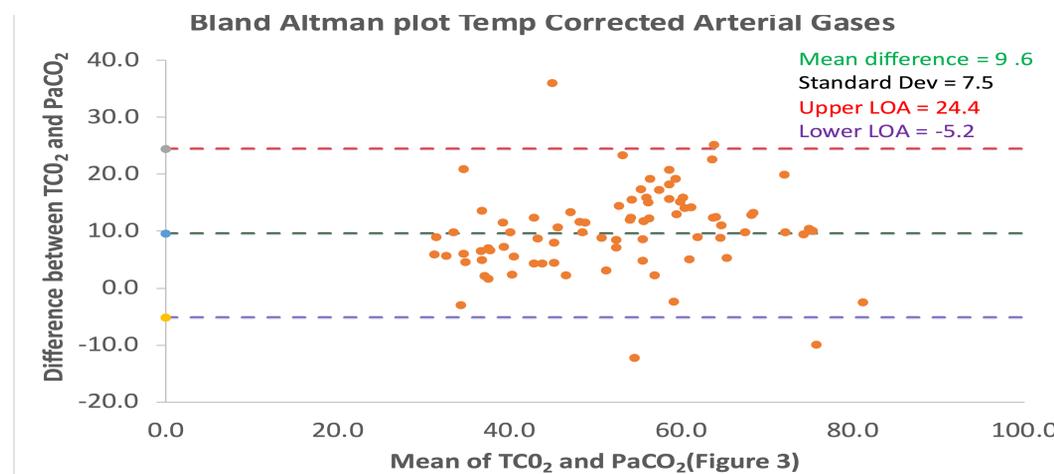
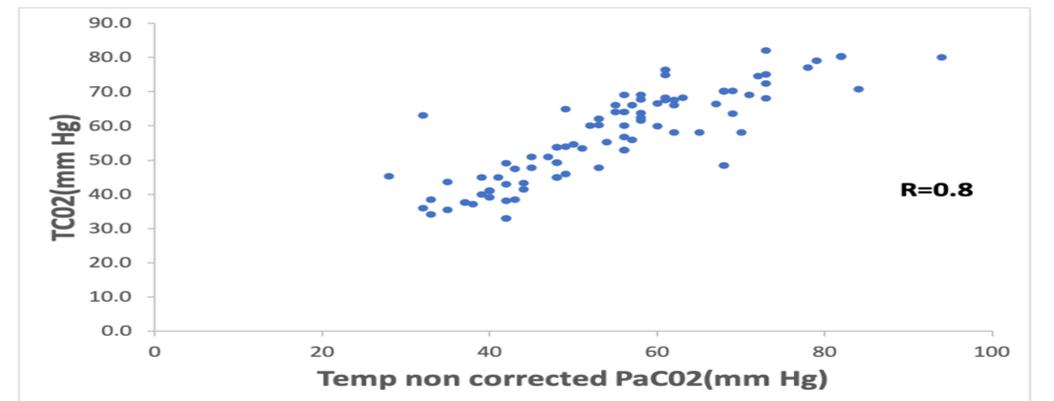
Design/Sample

- Retrospective review of data
- Inclusion Criteria: neonates on respiratory support undergoing TH for HIE
- Ninety-one PaCO₂ and TCO₂ pairs from 10 patients available for analysis

Analysis

Data was analyzed for correlation using Pearson Correlation. The Bland-Altman plots were used to assess bias and repeatability.

Results



Summary

- Temp corrected PaCO₂ had a strong positive correlation with TCO₂ (r= 0.8, p<0.05), but with a poor mean difference of 9.6 mm Hg
- Temp noncorrected PaCO₂ compared to TCO₂ showed a better mean difference of 2.1 mm Hg with a similar r of 0.8, p<0.05
- Applying the equation $pCO_2(T) = pCO_2(37^\circ C) \times 10^{(0.019 \times [T-37])}$ to the TCO₂ values, showed a low mean difference of 1.5 and a good level of agreement of ± 14 mm Hg

Conclusions

- Targeting corrected PaCO₂ during TH results in cerebral hyperemia and homogenous brain cooling
- TCO₂ monitoring correlates better with uncorrected PaCO₂ possibly due to sensor skin warming and the algorithm used by the TCOM, which corrects PCO₂ measured at the sensor temperature to 37°C
- Incorporating a mathematical correction model to adjust TCO₂ to corrected PaCO₂ will increase cerebral blood flow and potentially improve outcomes

References

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Lingappan K, et al. Pediatr Res. 2016
Eberhard P. et al. Anesth Analg. 2007



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