Poor performance of end-tidal CO₂ monitoring in neonatal anesthesia
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Background
Carbon dioxide is a potent vasoactive substance and there is a strong relation between pCO₂ and cerebral perfusion. During general anesthesia pCO₂ is routinely monitored by use of continuous end-tidal monitoring. The method is well established for use in adults and older children but the knowledge is limited regarding its accuracy in pCO₂ monitoring during anesthesia and surgery in newborn infants.

Objective
To evaluate current methods used for ETpCO₂ monitoring during general anesthesia in neonates.

Conclusion
Our data demonstrate that the methods used for end-tidal monitoring of pCO₂ during neonatal anesthesia correlates poorly to blood gas. Settings of mechanical ventilation during general anesthesia should not rely solely on end-tidal measurements of pCO₂.

Results
The ET pCO₂ data were compared with a total of 58 corresponding blood samples analyzed for pCO₂. The mean difference between BG and ET pCO₂ was 1.8±1.4 in ETₘₐᵢ𝐧 and 2.5±1.5 (SD) kPa in ETₜₛᵢ𝐝. Regression analysis revealed an r-value of 0.48 in ETₘᵢₙ and r = 0.29 in ETₜₛᵢᵈ.

Methods
Neonates (< 44 w post-conceptual age) admitted to the NICU and scheduled for surgery were prospectively enrolled. Two variants of ETpCO₂ measurement were evaluated: Side stream sampling and by a main stream sensor. Values were recorded and compared with blood gas (BG) analyses from capillary blood samples.