had significantly higher ET-1 levels than controls (1.88 and 3.82 pg/mL, respectively, $P = 0.001$)

Conclusion: Our newborn infants with and without **congenital pneumonia** had similar plasma ET-1 levels, whereas ET-1 levels were higher in **congenital pneumonia** than in control newborns 18 to 40 h after birth. The increased vascular resistance in **congenital pneumonia** may be related to high ET-1 levels.

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EFFECTS OF REDUCED ELECTRODE TEMPERATURE ON THE ACCURACY AND PRECISION OF TRANSCUTANEOUS CARBON DIOXIDE MEASUREMENTS

L.C. Sorensen¹, L. Brage¹, G. Greisen^{1,2}

¹Departm. of Neonatology, National University Hospital; Rigshospitalet, ²Faculty of Health Sciences, University of Copenhagen, Copenhagen, Denmark

Background and aims: The harmful effect of hypocapnia on the neonatal brain emphasizes the importance of monitoring arterial carbon dioxide tension (PaCO₂). Transcutaneous monitoring of carbon dioxide (tcPCO₂) reduces need of arterial blood sampling. Drawbacks are high electrode temperature causing short application time and risks of skin burning. The aim of this study was to determine the accuracy and precision of tcPCO₂ at reduced electrode temperature.

Methods: Forty newborns (GA 24.9- 41.7) were included. Two tc-monitors were applied (TCM4, Radiometer, Copenhagen). The metabolic constant was 0.53 kPa. Arterial blood gas sampling and recording of the tcPCO₂-level at different electrode temperatures was done simultaneously (39°C, 40°C, 41°C, 42°C, 44°C). The Bland and Altman method was used for analysis. PaCO₂-tcPCO₂ difference was expressed in fraction of the mean.

Results: Mean PaCO₂ was 5.8 kPa [3.2; 7.9]. The mean PaCO₂ - tcPCO₂ difference (bias) increased from 5% at 44°C to 17% at 39°C, but did not differ significantly between 41°C and 40°C (14.8% vs. 11.8%). The precision of the tcPCO₂ at each temperature ranged from +7% to +10%. After correction for the temperature-dependent overreading, the Bland-Altman plot showed increasing PaCO₂ - tcPCO₂ difference with increasing PaCO₂, approx. 2% pr. kPa increase of CO₂. Sequence of electrode temperatures

did not matter. Only mild transient erythema was observed.

Conclusions: A lower electrode temperature in tcPCO₂-monitoring increases systematic overreading of the tc-electrode. However, in very preterm babies, monitoring at 40°C or 41°C is possible provided bias correction of 12-15%.

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ELECTRICAL IMPEDANCE TOMOGRAPHY (EIT) CAN RAPIDLY DETECT SMALL PNEUMOTHORACES

R. Bhatia^{1,2}, G. Schmolzer^{1,2}, P.G. Davis^{1,2,3}, D.G. Tingay^{1,2,3,4}

¹Newborn Research, The Royal Women's Hospital, ²Murdoch Childrens Research Institute, ³Dept of Obstetrics and Gynaecology, University of Melbourne, Melbourne, ⁴Dept of Neonatology, The Royal Children's Hospital, Melbourne, VIC, Australia

Background: Diagnosis of pneumothorax currently relies on clinical suspicion and chest radiography and is often delayed.

Aims: To determine whether EIT can accurately identify the location of surgically created pneumothoraces of varying sizes.

Methods: Six anaesthetised and muscle-relaxed piglets with saline lavaged surfactant-deficient lungs (AaDO₂ >350mmHg in F_{IO2} 1.0) were studied. A chest drain was inserted into the right ventral chest and increasing amounts of air (10 to 200 mL in 10-20mL aliquots) were instilled into the pleural space. At the end of these instillations, a Heimlich valve was attached to the chest drain. At each instillation, regional end-expiratory volumes (EELV) were measured using EIT concurrently with SpO₂, heart rate and arterial blood pressure (BP).

Results: At all volume instillations, mean impedance within the right ventral (RV) quadrant was significantly higher than all other quadrants ($p < 0.0001$ ANOVA). A significantly greater EIT time-course signal was identified in the RV quadrant after as little as a 10 mL instillation ($p < 0.0001$; ANOVA). Impedance in the RV quadrant fell from mean (SD) 46 (39.5) c.u. to 18.3 (20.5) suggesting a 60.3% resolution of the pneumothorax within 60-secs following attachment of the Heimlich valve ($p < 0.001$; ANOVA). A deterioration in SpO₂ to 89 (6)% did not occur until 100 mL instillation ($p < 0.001$;