END-TIDAL CARBON MONOXIDE (ETCO_c) AT DAY ONE PREDICTS UNMYELINATED WHITE MATTER (UNMWM) VOLUME AT TERM EQUIVALENT AGE OF VERY PRETERM NEONATES

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Background: Increased levels of ETCOc in preterm infants during the 1st day of life are associated with inflammatory processes, oxidative stress and adverse neurodevelopmental outcome at 2 years of life (Krediet et al, Acta Paediatr 2006)

Objective: To investigate the relation between early ETCOc levels and unmyelinated white matter volume.

Design/methods: From a cohort of 156 extremely and very preterm infants in which ETCOc was determined within 24 h after birth, 30 infants had volumetric MR imaging at term equivalent age for determination of different cerebral tissue classes.

Results: Median [range] of GA, BW and ETCOc, were 26.4 [25.0-29.9] wk, 972 [680-1700] g and 2.2 [0.7-5.5] ppm. Ventricular volume (VV) ranged from 3.0-to-28.9 ml and UnmWM/Total brain volume (TBV) ratio from 0.32-to-0.53. Linear Regression-analysis between VV and ETCOc and between UnmWM/TBV ratio and ETCOc showed a positive and negative correlation respectively ($r=0.56$, $p<0.02$ and $r=-0.73$, $p<0.0001$). Multiple LR analysis (dependent Variable: UnmWM/TBV ratio; independent variables: ETCOc; GA; amnionitis; smoking; PIVH; and PDA) showed that only ETCOc was (inversely) related to the UnmWM/TBV ratio (Part F-test: 11.3), suggesting a relation between the height of ETCOc and loss of unmyelinated WM.

Suggestion: ETCOc levels shortly after birth, may express oxidative stress and inflammation in the perinatal period, were related with damage of the vulnerable unmyelinated white matter in the preterm infant.