PaCO2 and neurodevelopment in extremely low birth weight infants.

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**Abstract**

**OBJECTIVE:** To determine the relationship between PaCO2 in the first 4 days of life and neurodevelopment at 18 to 22 months.

**STUDY DESIGN:** Stepwise regression and exhaustive CHAID (Chi-squared Automatic Interaction Detector) analyses were done for neurodevelopmental impairment (NDI), mental developmental index (MDI), and psychomotor developmental index (PDI) using clinical variables in combination with the maximum (max), time-weighted average (avg), and max-minimum (max-min) PaCO2 in 400 infants of 401 to 1000 g birth weight (BW).

**RESULTS:** By regression, NDI predictors were male sex, non-Caucasian race, premature prolonged rupture of membranes (PPROM), lower BW, IVH 3 to 4, and lower 1-minute Apgar score. For lower MDI, predictors were male sex, non-Caucasian race, PPROM, IVH 3 to 4, sepsis, and higher max-min PaCO2. For lower PDI, predictors were male sex, PPROM, lower BW, IVH 3 to 4, sepsis, and higher avg PaCO2. By CHAID, the most important predictor of NDI was sex. For MDI, sex was most important followed by max-min PaCO2 >42 mm Hg in boys. For PDI, IVH was most important, followed by max-min PaCO2 >42 mm Hg for grade < or = 2 IVH.

**CONCLUSIONS:** Extreme fluctuations in PaCO2 and higher max PaCO2 are associated with worse neurodevelopmental outcomes and may indicate
either a greater severity of illness or contribution of PaCO2 to pathophysiology of adverse neurodevelopment.

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