

## Capnography in Pediatric Critical Care Unit and Correlation of End-Tidal and Arterial Carbon Dioxide in Ventilated Children

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Recording of end-tidal carbon dioxide (EtCO<sub>2</sub>) noninvasively reflects a real-time estimation of arterial carbon dioxide (PaCO<sub>2</sub> [partial pressure of CO<sub>2</sub>]). However, as the EtCO<sub>2</sub> is dependent on metabolism, perfusion, and ventilation, predicting PaCO<sub>2</sub> from EtCO<sub>2</sub> is not linear. The objective of the study was to find out the predictability of PaCO<sub>2</sub> from EtCO<sub>2</sub> in PICU and to evaluate the factors affecting the correlation of EtCO<sub>2</sub> and PaCO<sub>2</sub> in critically ill ventilated children. The design involved was prospective observational study. The setting discussed over here is that of pediatric intensive care unit (PICU) of tertiary care hospital. A total of 160 children between 1 month and 14 years received mechanical ventilation. EtCO<sub>2</sub>, PaCO<sub>2</sub>, PaO<sub>2</sub>/FiO<sub>2</sub> (PF) ratio, oxygenation index (OI), and ventilation index (VI) are the factors involved in main outcome measures. A total of 535 pairs of EtCO<sub>2</sub> and PaCO<sub>2</sub> were recorded in 160 ventilated children during the stable hemodynamic state. Mean age and weight (Z-score) of patients were  $31.15 \pm 40.46$  months and  $-2.10 \pm 1.58$ , respectively. EtCO<sub>2</sub> and PaCO<sub>2</sub> differences were normal (2–5 mm of Hg) in 393 (73.5%) pairs. High gradient (>5 mm of Hg) was mostly found with children with pneumonia, prolonged ventilation, and pressure mode of ventilation ( $p < 0.05$ ). EtCO<sub>2</sub> had a strong positive correlation with PaCO<sub>2</sub> ( $r = 0.723$ , 95% confidence interval [CI] = 0.68 and 0.76) and not significantly affected by PF ratio or OI. However, presence of pneumonia and high ventilation index (VI > 20) adversely affected the relationship with poor correlation coefficient ( $r = 0.449$ , 95% CI = 0.30, 0.58 and  $r = 0.227$ , 95% CI = 0.03, 0.41, respectively). EtCO<sub>2</sub> reading showed good validity to predict PaCO<sub>2</sub> and not affected by oxygenation parameters. The correlation was affected by the presence of pneumonia and high ventilation index; hence it is recommended to monitor PaCO<sub>2</sub> invasively in these patients till a good correlation is established.