

Accuracy of End-Tidal CO₂ Capnometers in Post-Cardiac Surgery Patients During Controlled Mechanical Ventilation.

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Background

The determination of end-tidal carbon dioxide (etCO₂) is very helpful in cardiac resuscitation for confirmation and monitoring of endotracheal tube placement and as an indicator of return of circulation and effectiveness of chest compressions. There is now also widespread use of capnometry on-site at emergency and trauma fields. *Objective:* We studied the accuracy and correlation of three capnometers (EMMA, Medtronic, and Evita) with partial pressure of arterial CO₂ (PaCO₂) measurements.

Methods

The three capnometers were placed in-line in the ventilator tubing of the patient. Forty sedated and mechanically ventilated post-cardiac surgery patients were studied. Twenty consecutive etCO₂ values were collected simultaneously from all three monitors while drawing an arterial blood sample. Paired sample t-test and Pearson correlation were used to compare the capnometers and their correlation with PaCO₂.

Results

The correlation of etCO₂ measurements between all three capnometers was good (Emma vs. Evita: 0.874, Emma vs. Medtronic: 0.949, Evita vs. Medtronic: 0.878). The correlation of PaCO₂ with the Evita is the lowest (0.671) as compared to the EMMA (0.693) and the Medtronic (0.727). The lowest dispersion of the difference between etCO₂ and PaCO₂ was seen in EMMA (3.30), the highest in Evita (3.98).

Conclusions

A good correlation between etCO₂ and PaCO₂ was shown with the three capnometers in the present study. However, etCO₂ measurements were not valid to estimate PaCO₂ in these patients. Therefore, capnometry cannot be used to replace serial blood gas analyses completely, but may be a good cardiopulmonary trend monitor and alerting system in catastrophic events.