



CLINICAL PRACTICE GUIDELINE

Guideline coverage includes NICU KEMH, NICU PMH and NETS WA

End Tidal CO₂ Monitoring

This document should be read in conjunction with the [Disclaimer](#)

End tidal CO₂ (ETCO₂) provides a constant surveillance of expired CO₂ in ventilated infants. Most neonatal studies have shown a good correlation between ETCO₂ and PaCO₂ ($r=0.8$), even in preterm infants. This correlation falls with significant respiratory failure. ETCO₂ can be used to detect trends in PaCO₂ and ETCO₂ alarm limits can be usefully used to maintain PaCO₂ within an acceptable range. However, the most important use of ETCO₂ monitoring is for the immediate detection of extubation.

Please note a 'good ETCO₂ reading' does not give good information about the exact position of the endotracheal tube in the airway, i.e. an ETT could be too high or low (main stem bronchus) with an acceptable ETCO₂. Most studies show that transcutaneous CO₂ (TCCO₂) monitoring is a more precise method of monitoring PaCO₂ than ETCO₂. With both ETCO₂ and TCCO₂ monitoring, regular correlation with PaCO₂ is important.

Inclusion Criteria

This currently varies between KEMH and PMH. The PMH NICU is moving to use ETCO₂ monitoring on all babies on conventional ventilation when monitors are available or unless ordered otherwise by a consultant. This will include all ventilated infants being transferred between departments, e.g. theatre and radiology, when appropriate monitors become available. NETS WA is also moving to the routine use of ETCO₂ monitoring.

ETCO₂ monitoring at KEMH is being reconsidered.

Key Points

- The basic types of ETCO₂ monitors: Side stream; and in line monitors.
- Side stream (Phillips Microstream) is the preferred system in PMH NICU.
- The end tidal device has a dead space of 0.5 mL.
- End tidal CO₂ units are single use and last for 72 hours. This time will be reduced with increased ETT secretions and humidity. To reduce rainout getting into the device, keep the sample line facing up as much as possible. It is advisable to remove the humidification from the End Tidal device, approximately every 4 hours. Remove the device from the ETT (reconnect ventilator to the patient), air dry the unit and reinsert. This can aid in improving the accuracy of readings.
- TCMs should be remembraned prior to use with each new patient and run in conjunction with End Tidal CO₂.

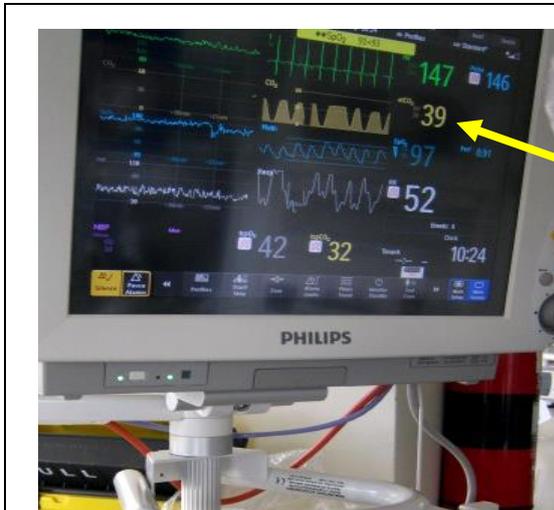
- The device should not be used for 4 hours post surfactant delivery.
- End tidal CO₂ is not accurate with oscillation ventilation or if moderate to large leak around ETT.

Application

The end tidal device is positioned between the patients ETT and the ventilator flow sensor.

The device is then connected to the X2 on the monitor. Reading starts immediately, no calibration is required. A wave form is displayed on the monitor with an end tidal CO₂ value.

If monitoring is required for patient transfer the X2 unit and Microstream extension is removed with from the Monitor and placed in a MP50. This allows reading of > 3 wave forms and provides a power source to run the Microstream extension unit.



End tidal CO₂ Microstream in X2 monitor, yellow CO₂ wave form and value displayed on monitor screen.



End tidal CO₂ Microstream inserted between ETT and ventilator flow sensor.

References

1. Bhat, Y, Abhishek, N. Mainstream end-tidal carbon dioxide monitoring in ventilated neonates. Singapore Medical Journal 2008; 49(3) 199-203.
2. Trevisanuto, D. et al End tidal Carbon Dioxide Monitoring in very low birth weight infants: correlation and agreement with arterial carbon dioxide. Pediatric Pulmonology. 2012 Vol 47, 4, 367-372.
3. E J Molloy, K Deakins. Are carbon dioxide detectors useful in neonates? Arch Dis Child Fetal Neonatal Ed 2006;91:F295–F298.

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