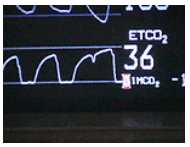
ED Capnometry

Emergency Department Indications

1. Confirmation of Endotracheal Intubation (ETT)
2. Continued Monitoring of Endotracheal Tube Placement (ETT)
3. Cardiopulmonary Resuscitation (CPR)
4. Procedural Sedation and Analgesia (PSA)
5. Oxygen Therapy in COPD/CO2 Retainers (COPD)

Interpretation of Capnograph

1. **ETT**: EtCO2 waveform on continuous capnography or color change on colorimetric capnometer confirms Endotracheal intubation. Colorimetric capnometry is less accurate at detecting esophageal intubation.
2. **CPR:** EtCO2 provides information on adequacy of CPR and prognosis:
   - Waveform increases in amplitude after onset of effective CPR.
   - Late values (20 minutes from onset of ACLS) of <10mmHg = no survival
3. **PSA/COPD:** Predicts otherwise undetected:
   - Apnea (**loss of waveform or EtCO2 <30 mmHg**)
   - Hypoventilation (**EtCO2 >50mmHg or increase >10 mmHg**)



Waveform

EtCO2 Monitoring Equipment

The Mount Sinai ED resuscitation monitors are equipped with Microstream Capnography modules. Both nasal cannula and ETT EtCO2 tubing are in the third drawer of the resuscitation room airway cart. Although capnography is preferable, we still have colorimetric EtCO2 detectors in the cart.


Nasal Cannula Capnoline


ETT Capnoline


Colorimetric Capnometer

Use of Philips EtCO2 Monitoring System

1. Slide the Microstream module cover in the direction of the arrow ←
2. Screw the butterfly handled end of the Capnoline into the uncovered port
3. The EtCO2 tracing will appear automatically

Advanced Interpretation/Troubleshooting

If cardiac output is normal, EtCO2 changes will reflect changes in ventilation and will approximate PaCO2.

- **When high**, ETCO2 can always be trusted to coincide with elevated PaCO2. Increased EtCO2 is found in hypoventilation, respiratory depression, and hyperthermia.
- **When low or normal**, ETCO2 can't really be trusted to indicate a low or normal PaCO2. Decreased EtCO2 may be recorded in states of decreased cardiac output such as shock, cardiac arrest, pulmonary embolism, and severe bronchospasm.

Selected References

1. American College of Emergency Physicians Clinical Policies Subcommittee on Procedural Sedation and Analgesia. Procedural sedation and analgesia in the Emergency Department. Ann Emerg Med. 2005; 45:177–96.
2. Does End-tidal Carbon Dioxide Monitoring Detect Respiratory Events Prior to Current Sedation Monitoring Practices? Burton JH et al., Academic Emergency Medicine May 2006, Vol. 13, No. 5
3. End-tidal carbon dioxide and outcome of out-of-hospital cardiac arrest. Levine RL, Wayne MA, Miller CC. N Engl J Med. 1997 Jul 31;337(5):301-6.
4. More at http://www.critical-care.info and http://www.capnography.com.