Treatment Protocols / Special Project Waivers

Advanced Airway Monitoring for ALS Patient

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PURPOSE

1. To introduce guidelines to standardize continuous capnometry /capnography and oxygen saturation measurement in addition to vital sign monitoring.
2. Provide initial and ongoing confirmation of proper endotracheal tube placement in the intubated patient, and continuous assessment of oxygenation and ventilatory support in the perfusing patient throughout the course of treatment and transport to the receiving hospital.
3. To further assess the continuous ventilatory support provided to patients receiving MAI, CPAP or bag valve mask ventilation.
4. Assess effectiveness of resuscitation efforts in cardiac arrest patients. Studies have shown that that a PCO2 value < 10 at 20 min into the resuscitation indicate non-viability. Additionally, a sudden rise in PCO2 can indicate a return of spontaneous circulation (ROSC), often before a pulse or blood pressure can be obtained.
5. Assess the ventilatory status of the patient with bronchospasic disease (asthma, COPD), where ETCO2 waveform may be helpful in determining therapy plans.

HISTORY
Endotracheal intubation (ETI), though an indispensable skill in the hands of a well trained ALS clinician, requires constant monitoring to insure proper tube position and ventilatory technique. Once ETI is established, constant SPO2/ ETCO2monitoring is now obtainable through the use of the Physio-Control LP-15 whenever these monitoring devices are applied to the perfusing patient. SPO2 / ETCO2 monitoring provides a quantitative measurement of the event and is recorded along with heart and respiratory rate by the code summary / trending analysis feature of the LP-15 monitor.

RATIONALE
Boston EMS paramedics have received extensive training in advanced airway techniques, and in a large urban EMS system like Boston, are provided with opportunities to maintain these skills on a regular basis. BEMS paramedics have an extremely high ETI success rate in the adult and pediatric patient. However, many EMS systems need to improve their quality assurance efforts to address critical training and performance issues related to endotracheal intubation. Oxygen desaturation during attempts to intubate as well as over-aggressive manual ventilation inducing hypocapnea (contributing to cerebral hypo perfusion in patients with head injuries), can contribute to poor patient outcome.

Proper endotracheal tube placement is only one aspect of the procedure that needs confirmation, equally important is ensuring the tube is not displaced and monitoring the quality of ventilatory support given following the procedure. In order to provide continuous

measurement of SPO2 and ETCO2 values in perfusing patients intubated by Boston EMS paramedics, Microstream® ETCO2 monitoring provided by the Physio-Control LP-15 will replace the Easy-Cap® capnometry device in all but those clinically or logistically justified cases. The Microstream® ETC02 device fits the BVM mask as well as the endotracheal tube and should provide the clinician with a good assessment of a patient's spontaneous respiratory or assisted ventilatory status.

PROCEDURE

1. In addition to clinical assessment, vital sign monitoring, and confirmation of proper tube placement, ALS personnel caring for an intubated patient with a perfusing rhythm shall carefully monitor the effectiveness of ventilations by continuously monitoring the presence of an ETC02 value, and maintaining an SPO2 value. Unless justifiable, clinical judgment or logistics dictate otherwise, all patients with a perfusing rhythm requiring endotrachael intubation shall have their ETCO2 / SPO2 measurements continuously monitored immediately prior and during any endotracheal intubation attempt, and continuously monitored after successful intubation until patient care is transferred to another provider.

2. Documentation of Medication Assisted Intubations (MAI) must include all dosing and Controlled Medication information (CSR# , wasted amount). Similar to EKG data, the Safety Pad data cable will interface with the LP-15 and will merge transmit all event trending data (ETC02, SP02, HR, and RR) with the PCR prior to transmission to the Safety Pad server.

CLINICAL BENCHMARKS FOR ETI ASSESSMENT

- ETCO2 value > 8mmhg required to capture respiratory rate trending.
- Guidelines suggest maintaining SpO2 levels > 95% in pre-oxygenated patients. ETCO2 levels desired CO2 in head trauma: 35-40mmhg; for head trauma with signs of herniation desired levels are 25-30mmhg.
- AHA guidelines suggest ventilation of the apneic patient at 10-12 per minute in adult, 12-20 in pediatric cases