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	Title: Waveform Capnography Trauma-Shared	Effective Date: 05/13/2021

PURPOSE:

This policy will provide guidelines for monitoring continuous waveform capnography (ETCO₂ monitoring) on trauma patients. ETCO₂ values have been well established in supporting literature as a strong inverse correlate to serum lactate levels, and it can be a useful adjunct in the assessment and resuscitation of trauma patients.

POLICY STATEMENT:

Continuous waveform capnography will be monitored on all trauma patients within the following guidelines.

ENTITIES AFFECTED BY THIS POLICY (SCOPE):

This policy applies to Raleigh Emergency Services, Cary Emergency Services, WPP Surgery, Raleigh Respiratory Therapy, and Cary Respiratory Therapy

PROCEDURES:

- I. All adult Trauma Alerts and Trauma Bravos will have continuous waveform capnography via nasal cannula implemented upon arrival to the trauma bay per physician order. After trending more than one ETCO₂ value with appropriate waveforms the monitoring may be deferred by a Trauma Services provider, or in the absence of a Trauma Services provider the Emergency Department Attending.
 - . As continuous waveform capnography is an added means by which medical and nursing staff can monitor trauma patients for early signs of decompensation (and can be more sensitive than pulse ox and BP in indicating patient status) providers should consider continuous monitoring as an added patient safety measure.
- II. It is not recommended that ETCO₂ be deferred on patients exhibiting any of the following in either the pre-hospital or ED setting: ventilatory dysfunction, metabolic derangement, abnormal low or high ETCO₂ values, abnormal capnography waveforms, any abnormal vital signs, on intubated patients, patients with confusion, anxiety, GCS<15, or on patients that have required volume resuscitation.
- III. A nonrebreather mask will be initially implemented on all Trauma Ones and Trauma Alphas per physician order. The placement of a nasal cannula under a nonrebreather mask for the purpose of monitoring ETCO₂ may supply inaccurate values and should not be implemented. If the Trauma Attending deems the patient is appropriate to be weaned to a nasal cannula continuous waveform capnography will then be implemented (See below algorithms).
- IV. All intubated trauma patients will have continuous waveform capnography in place while in the Emergency Department. Implementation while in the ICU is per admitting team discretion.

Origination date: *Not Set*


Prepared by: *MGR, TRAUMA PROGRAM*

Approved by: *MEDICAL DIR TRAUMA - RALEIGH, PHYSICIAN, SURGEON*

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- V. The placement of trauma patients on continuous waveform capnography and monitoring is a joint responsibility of nursing and respiratory therapy.

Pediatric Trauma Patients:

- VI. In non-intubated pediatric trauma patient's waveform capnography will need to be implemented on a case-by-case basis based on need, appropriateness, and patient compliance with nasal cannula placement.
- VII. All intubated pediatric trauma patients will have continuous waveform capnography in place while in the Emergency Department. Implementation while in the ICU is per admitting team discretion.

I. ADDITIONAL RESOURCES

- a. Caputo, N., Fraser, R., Paliga, A., Matarlo, J., Kanter, M., Hosford, K., Madlinger, R. (2012). Nasal cannula end-tidal CO₂ correlates with serum lactate levels and odds of operative intervention in penetrating trauma patients: A prospective cohort study. *Journal of Trauma and Acute Care Surgery*, 73(5), 1202-1207.
- b. Stone, M.E., Kalata, S., Liveris, A., Adorno, Z., Yellin, S., Chao., ... Teperman, S. (2017). End-tidal CO₂ on admission in associated with hemorrhagic shock and predicts the need for massive transfusion as defined by the critical administration threshold: A pilot study. *Injury*, 48(1), 51-57.

Origination date: *Not Set*


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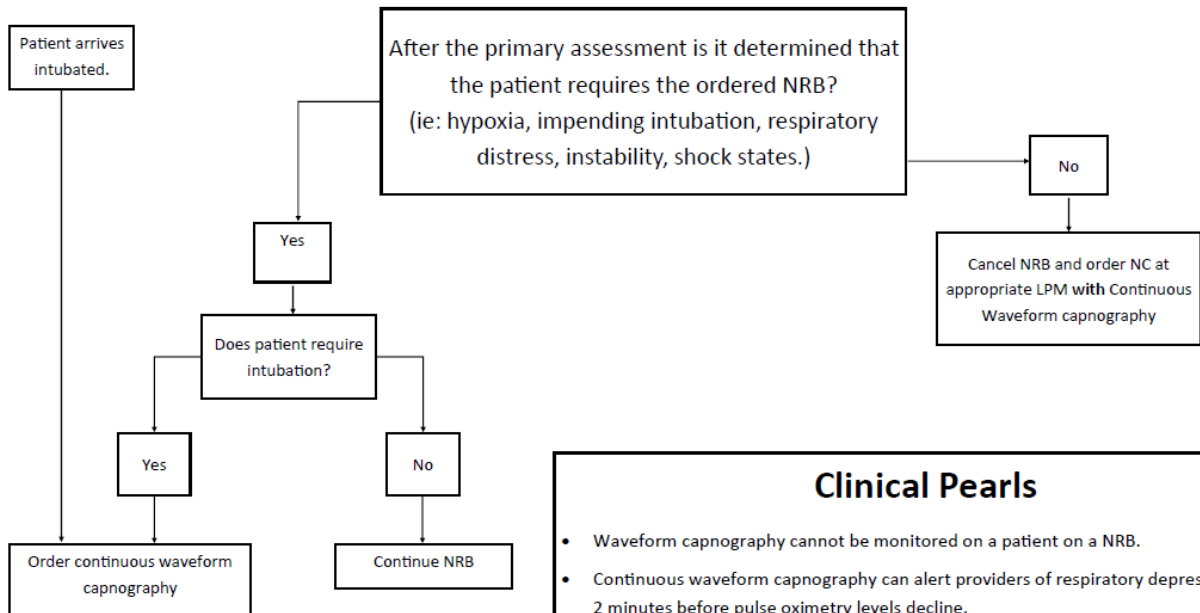
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Trauma One/Trauma Alpha Waveform Capnography Algorithm

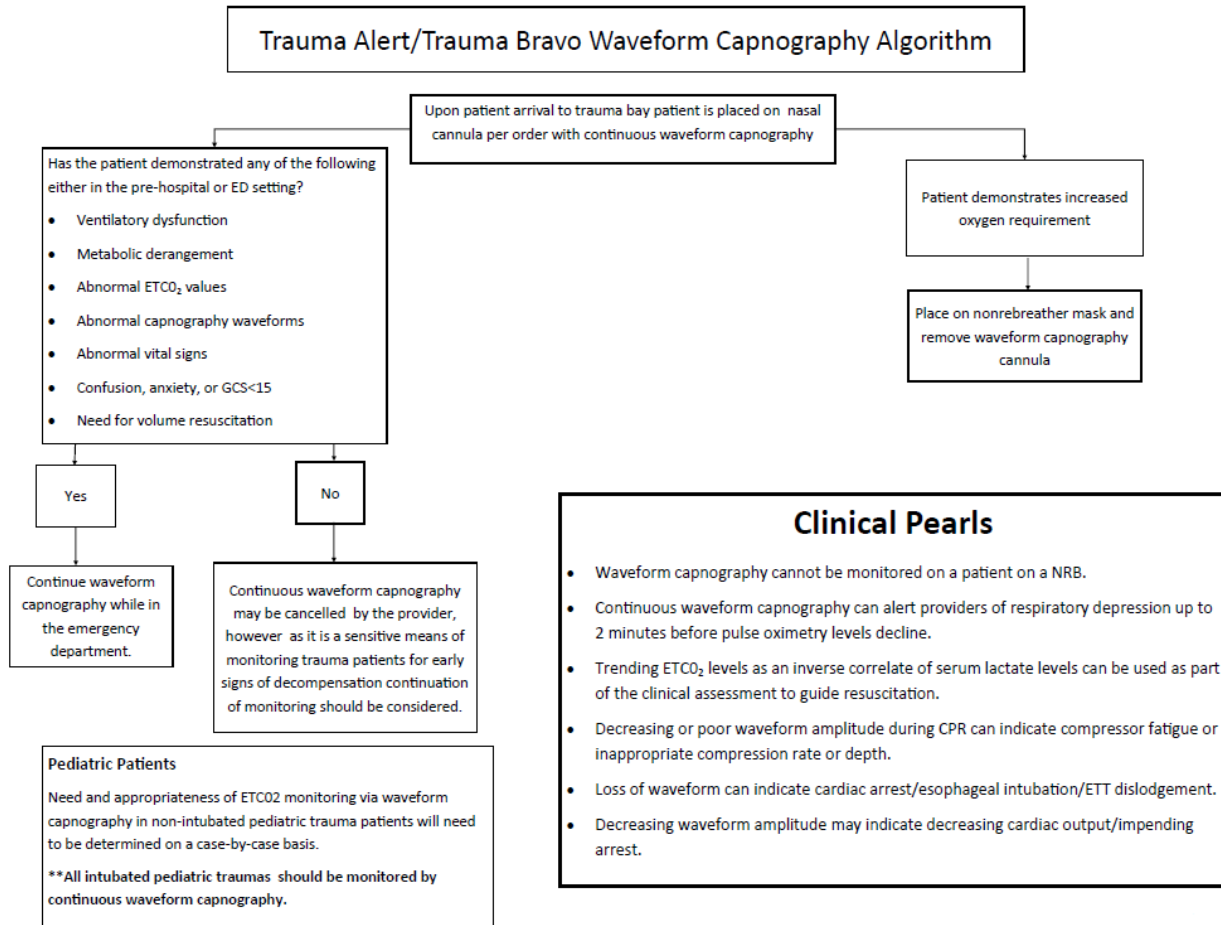


Pediatric Patients
 Need and appropriateness of ETCO₂ monitoring via waveform capnography in non-intubated pediatric trauma patients will need to be determined on a case-by-case basis.
****All intubated pediatric traumas should be monitored by continuous waveform capnography.**

- Clinical Pearls**
- Waveform capnography cannot be monitored on a patient on a NRB.
 - Continuous waveform capnography can alert providers of respiratory depression up to 2 minutes before pulse oximetry levels decline.
 - Trending ETCO₂ levels as an inverse correlate of serum lactate levels can be used as part of the clinical assessment to guide resuscitation.
 - Decreasing or poor waveform amplitude during CPR can indicate compressor fatigue or inappropriate compression rate or depth.
 - Loss of waveform can indicate cardiac arrest/esophageal intubation/ETT dislodgement.
 - Decreasing waveform amplitude may indicate decreasing cardiac output/impending arrest.

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