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
Reviewed: 05/13/2021
Revised: 05/13/2021

Printed copies are for reference only. Please refer to the electronic copy for the latest version.
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


Trauma One/Trauma Alpha Waveform Capnography Algorithm

After the primary assessment is it determined that the patient requires the ordered NRB?
(ie: hypoxia, impending intubation, respiratory distress, instability, shock states.)

Yes

Does patient require intubation?

Yes

Order continuous waveform capnography

No

Continue NRB

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.
Trauma Alert/Trauma Bravo Waveform Capnography Algorithm

Upon patient arrival to trauma bay patient is placed on nasal cannula per order with continuous waveform capnography

Has the patient demonstrated any of the following either in the pre-hospital or ED setting?
- Ventilatory dysfunction
- Metabolic derangement
- Abnormal ETCO2 values
- Abnormal capnography waveforms
- Abnormal vital signs
- Confusion, anxiety, or GCS <15
- Need for volume resuscitation

Yes
- Continue waveform capnography while in the emergency department.

No
- Continuous waveform capnography may be cancelled by the provider, however, as it is a sensitive means of monitoring trauma patients for early signs of decompensation continuation of monitoring should be considered.

Patient demonstrates increased oxygen requirement
- Place on non-rebreather mask and remove waveform capnography cannula

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.

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 trauma patients should be monitored by continuous waveform capnography.**