ALS PROCEDURES

Oral Endotracheal Intubation

» Indications

- Patient with decreased sensorium (GCS less than or equal to 8) and apneic (adults)
- Patient with decreased sensorium (GCS less than or equal to 8), ventilation unable to be maintained with BLS airway

» Contraindications

- Pediatric patients under 40 kg
- Suspected hypoglycemia or narcotic overdose
- Maxillo-facial trauma with unrecognizable facial landmarks
- Patients experiencing seizures
- Patients with an active gag reflex

Ventilation should be interrupted for no more than two periods of up to 30 seconds during laryngoscopy or intubation attempts and patients should be ventilated with 100% oxygen for 1 minute via bag-valve mask between attempts. No more than two attempts at endotracheal intubation should be done (an intubation attempt is defined as the laryngoscopy and passing of an ET tube beyond the teeth with the intent of placing the endotracheal tube). Use of rescue airway or return to BLS maneuvers may occur at any time (neither require repeated advanced airway attempts before use).

Base hospital physician consultation is recommended if there is any question concerning the need to intubate a patient. The base hospital physician may also approve extubation of a patient in the field. Nasotracheal intubation is not an approved skill in Contra Costa County.

» Procedure

1) Assure an adequate BLS airway.
2) Oxygenate with 100% oxygen using a bag-valve-mask.
3) Select appropriate ET tube. If appropriate tube has a cuff, check cuff to ensure that it does not leak; note the amount of air needed to inflate. Deflate tube cuff. Leave syringe attached.
   a. Insert appropriate stylet, making sure that it is recessed at least one cm. from the distal opening of the ET tube. Lubricate the tip of the tube.
   b. Prepare endotracheal tube introducer (bougie) and rescue airway for possible use.
4) Assure c-spine immobilization with suspected trauma.
5) Insert laryngoscope and visualize the vocal cords. If unable to identify cords, resume BLS airway management and utilize endotracheal tube introducer in next attempt.
6) Suction if necessary and remove any loose or obstructing foreign bodies.
7) CAREFULLY pass the endotracheal tube tip past the vocal cords; remove the stylet; advance the ET tube until the cuff is just beyond the vocal cords
8) Inflate the cuff with 5-7ml of air. For uncuffed pediatric tubes, advance tube no more than 2.5 cm beyond vocal cords (use vocal cord marker line if present on tube).
9) Immediately assess tube placement with capnography or colorimetric end-tidal CO2 indicator and/or esophageal detector bulb (see tube confirmation procedure):
10) Following successful confirmation of intubation, auscultation of lungs, epigastrium, and observation of chest rise should be done. If chest does not rise, extubate and reintubate. Endotracheal tube introducer (bougie) should be considered for second attempt.
11) Secure the tube with tape or ET holder and ventilate. Mark the TUBE at the level of the lips.
Confirmation of Tube Placement / Post-Intubation Monitoring

- Every patient intubated with an endotracheal tube or esophageal airway requires initial evaluation of tube placement and ongoing tube monitoring until patient turnover or until resuscitative efforts cease.
- Physical findings (chest rise, lung and abdominal sounds, and vital signs, if present) must be assessed and documented in all intubated patients.
- End-tidal carbon dioxide (ETCO₂) measurement must be utilized in all intubated patients. Electronic waveform capnography (with numerical ETCO₂ readout) should be utilized from the earliest moment possible after every tube placement to continuously verify placement as well as to guide ventilation rates. Colorimetric ETCO₂ indicators may be useful if electronic monitoring is not immediately available, but should be replaced with waveform monitoring as soon as possible.
- Documentation of ETCO₂ measurement in the patient care record is required in all intubations. Electronic data upload or attachment of a code summary from the monitor-defibrillator to the record should be done in all cases.
- The esophageal detector bulb is useful only in cardiac arrest situations in which no ETCO₂ is detected, and should only be used with endotracheal tubes (not with King Airway).
- When ETCO₂ is not detected in the setting of King Airway use, physical exam remains as the key method to assess functionality of the airway.

Procedure

1) Following tube placement and cuff inflation, attach waveform capnography unit (or colorimetric ETCO₂ indicator if waveform not immediately available).
   a. If exhaled ETCO₂ is detected, the tube should be secured. Waveform capnography should be used continuously until patient turnover or cessation of resuscitative efforts. Physical exam reassessment should also be utilized after any patient movement.
   b. If exhaled ETCO₂ is not detected:
      1. In a patient with pulses, the tube should be removed and reintubation attempted.
      2. In a patient without pulses:
         b. King Airway: use physical examination findings (chest rise, lung sounds present, abdominal sounds absent) should be used to verify placement.
   c. Reassessment should occur after any patient movement, and in pulseless patients may include re-use of the esophageal detector bulb.
   d. In all patients, ETCO₂ monitoring should be continued as it may be the initial indicator when there is return of spontaneous circulation.
### SIGNIFICANCE OF END-TIDAL CO₂ WAVEFORM / CHANGES AFTER INTUBATION

| Loss of previous waveform with ETCO₂ near zero | - Endotracheal tube disconnected, dislodged, kinked or obstructed  
| - Loss of circulatory function |
| Decreasing ETCO₂ with loss of plateau | - Endotracheal tube cuff leak or deflation  
| - Endotracheal tube located in hypopharynx  
| - Partial obstruction |
| Sudden increase in ETCO₂ | - Return of spontaneous circulation |
| Gradual increase in ETCO₂ | - If elevated above normal levels, need for increased ventilation  
| - From low levels, improvement in perfusion |
| Gradual decrease in ETCO₂ | - Effects of hyperventilation  
| - Worsening of perfusion |
| “Sharkfin” waveform | - Asthma or COPD |

#### Normal capnography:

![Normal capnography graph]

#### ET Tube disconnected, displaced, or patient develops cardiac arrest:

![ET Tube disconnected, displaced, or patient develops cardiac arrest graph]

#### ET Tube in hypopharynx (above cords), partly obstructed, or cuff leak:

![ET Tube in hypopharynx (above cords), partly obstructed, or cuff leak graph]

#### Sudden Increase in ETCO₂ (return of spontaneous circulation):

![Sudden Increase in ETCO₂ (return of spontaneous circulation) graph]

#### “Shark-Fin” waveform (asthma or COPD):

![“Shark-Fin” waveform (asthma or COPD) graph]

(Source: Medtronic Physio-Control Capnography Educational Series 2002)

### ESOPHAGEAL DETECTOR BULB FINDINGS AND ACTIONS

<table>
<thead>
<tr>
<th>Finding</th>
<th>Action</th>
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<td>Rapid inflation of bulb</td>
<td>- Tracheal placement – Secure tube</td>
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| Slow inflation or no inflation | - Likely esophageal placement – remove tube and re-attempt intubation.  
| - If second attempt, remove tube and use King Airway or BLS airway management |
| If paramedic confident of tube placement (false findings more common with excessive secretions, CHF, or obesity) | - Visualize airway directly via laryngoscopy  
| - Alternative – rotate tube 90 degrees, suction, and recheck with bulb  
| - Remove tube if any question |