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TO:       All Seattle Fire Department Firefighter Paramedics

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RE:       Guidelines for use in the verification of ETT placement:
           • ESOPHAGEAL INTUBATION DETECTOR (EID)
           • END-TIDAL CO2 DETECTOR

Indications for use:

1. The ESOPHAGEAL INTUBATION DETECTOR (EID) will be used to verify correct placement of endotracheal tube following tracheal intubation.

2. The FEF END-TIDAL CO2 DETECTOR will be used to verify correct placement of endotracheal tube following tracheal intubation and for continuous monitoring of endotracheal tube position during transport of the patient to the hospital.

NOTE: The EID and END-TIDAL CO2 DETECTOR are to be used as adjuncts to assess tracheal intubation. They do not eliminate clinical judgment. Continue to verify endotracheal tube placement in the standard manner with direct laryngoscopic visualization and auscultation of both lung fields and the epigastrium.

DISCUSSION: ESOPHAGEAL INTUBATION DETECTOR
Esophageal intubation detectors are to be used to distinguish an esophageal intubation from a tracheal intubation. Endotracheal tube obstruction, morbid obesity, pulmonary edema, mainstem bronchus intubation, severe bronchospastic or obstructive lung disease may lead to equivocal results due to decreased air available for aspiration. Use care if storage temperature is near freezing. The bulb will not function properly if it is frozen, due to loss of self-inflating properties. Do not use on children less than five years of age or less than 15kg. The EID does not replace the need to auscultate both lung fields and the epigastrium.

Directions for use: EID

1. Perform leak test: Compress bulb, apply gloved thumb over adapter and release.

2. Insert ETT. DONOT INFLAT THE CUFF.

3. Compress the bulb and attach it to the endotracheal tube.

4. Release the bulb and allow it to self-inflate.

   • If air returns and fills the bulb rapidly (less than 5 seconds) the tube is likely in the trachea. Inflate the cuff, listen for breath sounds, attach the CO2 DETECTOR and verify with color change.
   • If air slowly fills the bulb, carefully reassess ETT location, attach the CO2 DETECTOR and verify with color change. If a question still exists, reintubate.
   • If air does not fill the bulb or vomit returns, the tube is likely in the esophagus. Reintubate the patient.
DISCUSSION END-TIDAL CO2 DETECTOR:

The CO2 detector is a disposable plastic device designed to fit between an endotracheal tube and the bag valve mask. The device has a non-toxic chemically treated indicator strip that reflects CO2 levels in the respiratory cycle by changing color. The color change of the indicator strip is quick enough to reflect differences between inspiration and expiration within the single breath. A color chart present on the device is arranged for side-by-side comparison with the indicator strip. If the endotracheal tube is properly placed, the CO2 detector should change from the color purple to the color yellow.

- “A” range are purple hues – low concentrations of CO2 (0.03% to 0.3%)
- “B” range are brown hues – marginally low concentrations of CO2 (.5% to 1%)
- “C” range are yellow hues – normal to near normal concentrations of CO2 (2.0% to 5.0%)

The use of the device is restricted to a single patient and is indicated for all patients. Pediatric devices are available for body weight less than 15 kg. END-TIDAL CO2 DETECTORS are considered almost 100% reliable in non-cardiac arrest patients. The slow rate of exchange of CO2 makes them less reliable in cardiac arrest patients. The device loses reliability after two hours.

Directions for use: CO2 DETECTOR

1. Immediately following endotracheal intubation, inflate the cuff if equipped, and attach a new end-tidal CO2 detector to the endotracheal tube. Attach the bag valve mask to the CO2 detector.

2. Verify endotracheal tube placement by direct laryngoscopic visualization, observing mist in the tube, and auscultation of both lung fields and the epigastrium.

3. Ventilate the patient with six breaths of moderate tidal volume. If the endotracheal tube is properly placed the CO2 detector should change from the color purple to yellow. (An esophageal intubation may be read as a false positive due to gastric distention if read before six breaths)

4. If after six breaths of moderate tidal volume no color change is noted, recheck placement by direct laryngoscopic visualization and auscultating both lung fields and the epigastrium. If in your opinion, the endotracheal tube is properly placed do not extubate the patient. Confirm and note the lack of color change. If there is doubt extubate the patient and reintubate. Reassess placement using the steps described.

5. Document color change on the form 20B for both intubation and transport.

Note: Do not extubate the patient in cardiac arrest unless you are unsure of the intubation for reasons other than the CO2 detector. Remember, the color indicator may not be able to reflect the adequacy of CO2 exchange in cardiac arrest.