

APPENDIX: B

TITLE: INTUBATION PROCEDURES

REVISED: April 29, 2011

I. BACKGROUND

Advanced Airway Procedures and competency are the cornerstones of Paramedicine. True competency involves knowing not only how to control the airway, but when to control the airway, and selecting the best method to do so. While oral-tracheal intubation is the gold standard of securing the airway, it is not the only means available to ACEMSS paramedics. The window of opportunity in controlling the airway is often brief indeed. Good clinical judgment is paramount, coupled with critical decisiveness, and is essential to obtain the best outcomes possible for the patient.

II. INDICATIONS AND CONTRAINDICATIONS**ABSOLUTE INDICATIONS:**

- Cardiopulmonary arrest
- Respiratory arrest
- Comatose with non-maintainable airway
- Pronounced hypoxia
- Inadequate ventilation by BVM or other airway device.

STRONGLY CONSIDER WITH:

- Any patient with a decreased level of consciousness with compromised ability to manage their airway
- Airway burns or edema
- CHF with diminished respiratory drive
- Acute asthma / COPD with diminished respiratory drive
- Other Respiratory failure/distress with diminished respiratory drive
- Suspected intracranial bleed/closed head injury
- Those patients who fail to respond to positive pressure ventilation
- GCS <8 without reversible causes

CONTRAINDICATIONS:

None

III. PROCEDURE

ORAL INTUBATION: Listed below is a general guide to the procedure. It may be modified as needed due to patient's position, anatomical features, or other conditions as needed. Prepare all equipment while hyperventilating the patient with 100% oxygen.

- Position the patient's head in the "sniffing position" (unless C-Spine Injury is suspected)
- Insert the laryngoscope blade of choice into the pharynx and visualize the glottic opening and the epiglottis by placing the blade either in the vallecula or under the epiglottis. Exert traction upward on the handle of the laryngoscope. This **must not** be done in a prying motion nor should the teeth be used as a fulcrum

- Insert the proper size tube into the pharynx and pass it between the vocal cords anterior to the arytenoid cartilages, approximately 1 inch in the adult and 5-10 mm. in the child
- The cuff should be inflated with 5-10cc air
- Follow confirmation procedures
- Secure the ET tube. Note the centimeter markings on the tube at the teeth
- Reconfirm placement frequently

NASAL INTUBATION: listed below is a general guide to the procedure. It may be modified as needed due to patient's position, anatomical features, or other conditions as needed

- Hyperventilate with high-flow oxygen for 2-3 minutes with a BVM while preparing the equipment
- Bend the tube to the approximate airway curvature to heighten the degree of success. Use of an "Endotrol" ET tube is at the discretion of the paramedic.
- Lubricate the endotracheal tube with Xylocaine gel. Spray Neosynephrine in the nare to prevent bleeding
- Insert the endotracheal tube into the nostril on a flat plane. Use of the right nostril may be easier
- Turn the tube so as to avoid the nasal turbinates. Use no more than gentle pressure to advance the tube; *NEVER FORCE THE TUBE*
- Continue advancing the tube judging position in the throat by the amount of air you can feel coming out of the tube
- If there is suddenly less air flow than noted previously, the tube is likely past the area of the epiglottis and vocal cords
- Pull back on the tube until a large amount of airflow returns
- If using a standard ET tube, turning the tube to the left and encouraging the patient to cough and then advancing the tube will assist with good placement.
- Using cricoid pressure and the BURP procedure may also facilitate passage through the cords
- When you are certain your tube is in the trachea, inflate the cuff with 5-10cc air.
- Follow confirmation procedures
- Secure the ET tube. Note the centimeter markings on the tube at the nare.
- Reconfirm placement frequently

DIGITAL INTUBATION: listed below is a general guide to the procedure. It may be modified as needed due to patient's position, anatomical features, or other conditions as needed

- Hyperventilate with high-flow oxygen for 2-3 minutes with a BVM and oral/nasal airway in place while you are preparing your equipment
- Insert a stylet into the ET tube and curve it to form a "J"
- Lubricate the tube with Xylocaine gel
- With a GLOVED hand, stand or kneel facing the patient opposite shoulder.
- Place the index and middle fingers into the patient's mouth until you palpate the epiglottis, usually in the midline

- Lift the epiglottis with your middle finger and slide the ET tube along the palmar surface of your index finger, guiding the tube under the epiglottis and between the vocal cords
- Withdraw the stylet and confirm proper ETT placement
- Secure the ET tube. Note the centimeter markings on the tube.
- Reconfirm placement frequently

Use of the endotracheal tube introducer (AKA the “Bougie”, Flexiguide): The tracheal tube introducer is used to facilitate difficult intubation. It should not be confused with the more rigid stylet, which is inserted into the ET tube and used to alter its shape prior to intubation. Unlike the stylet a bougie is inserted independently of the ET tube and is used as a guide. Since the bougie is considerably softer, more malleable, and blunter than a stylet this technique is considered to be a relatively atraumatic procedure. It is used where a difficult intubation is anticipated, or a poor view of the glottic opening has been confirmed on laryngoscopy. Listed below is a general guide to the procedure. It may be modified as needed due to patient’s position, anatomical features, or other conditions as needed

- Prepare the endotracheal tube introducer for use: Curve the bougie and ensure the distal tip is formed into a J (coudé) shape
- Perform a laryngoscopy, obtaining the best possible view of the glottic opening. You should always be able to view the tip of the epiglottis and, ideally, the arytenoid cartilages
- Advance the bougie, continually observing its distal tip, with the concavity facing anteriorly
- Visualize the tip of the bougie passing posteriorly to the epiglottis and (where possible) anterior to the arytenoid cartilages
- Once the tip of the bougie has passed the epiglottis, continue to advance it in the mid-line so that it passes behind the epiglottis but in an anterior direction
- As the tip of the bougie enters the glottic opening you may feel ‘clicks’ as it passes over the tracheal rings or the tip may stop against the wall of the airways. This suggests correct insertion, although cannot be relied upon to indicate correct positioning with 100% accuracy. If hold-up is felt, the bougie may then be withdrawn up to 5cm to avoid the ET tube impacting against the carina
- Hold the bougie firmly in place and pass the endotracheal tube over the proximal end of the bougie
- As the proximal tip of the bougie is re-exposed, carefully grasp it, assuming control of the bougie
- The ET tube should then be carefully advanced along the bougie and hence through the glottic opening, taking care to avoid movement of the bougie
- **SUCCESSFUL INTUBATION MAY BE CONSIDERABLY ENHANCED BY ROTATING THE ET TUBE 90° COUNTER CLOCKWISE, SO THAT THE BEVEL FACES POSTERIORLY.** In so doing the bougie may also rotate along the same plane but should not be allowed to move up or down the trachea.
- Once the ET tube is fully in place hold it securely as you slowly withdraw the bougie
- Inflate the cuff
- Follow normal confirmation procedures
- Secure the tube

IV. CONFIRMATION AND DOCUMENTATION

Endotracheal tube placement shall be confirmed (and documented) by **at least 3 methods**, including:

- **(MANDATORY)** Use of STAT-CAP or EASY-CAP or other expired end tidal CO₂ monitor devices on all ET tubes. Titrate ventilations to an ETCO₂ of 30-40 torr.
- Direct visualization of tube passing through the vocal chords
- Auscultation for equal breath sounds **and** the absence of epigastric sounds (counts as one method)
- Observing for fogging/misting of tube
- Use of an endotracheal esophageal detector
- Improvement in patient's clinical status

Patient's head should be immobilized with a collar after intubation to prevent ET tube displacement secondary to flexion or extension of neck. Advanced airways should be reassessed for placement frequently and after any major decrease in patient's status.

Documentation shall include:

- Provider
- Number of attempts and time of successful intubation. An intubation attempt is defined as anytime:
 - The Laryngoscope blade passes the teeth w/ the providers **intent** to intubate the patient
 - The tube passes into nasopharynx or the oropharynx or
 - The digits of the hand (or any other device) are passed into the hypopharynx in an effort to pass an ETT tube
- Depth of ET tube at the lips or nares.
- Complications encountered, reasons for unsuccessful attempt if known.
- Methods of confirmation.
- Tube position just prior to turning over care to ER or D/C efforts in the field.

V. SPECIAL SITUATIONS:

Suspected C-Spine Injury:

Nasal or digital intubation should be considered when possible. Also consider the endotracheal tube introducer (AKA the "Bougie", Flexiguide). If unable to place endotracheal tube, consider use of an alternate airway.

Suspected Hypoglycemia:

Check blood glucose and give *D50 IV* (See Hypoglycemia protocol) prior to intubation if indicated.

Suspected Narcotic Overdose:

Consider *Naloxone* (see suspected narcotic overdose protocol) prior to attempting intubation.

Suspected Head Trauma/Increased ICP:

Lidocaine 1 mg/kg IV for intracranial pressure control in head injured patients, patients with CNS injury (hypertensive crisis, bleed)

Laryngeal edema

Rarely, laryngeal edema due to burns or anaphylaxis will be severe as to result in swelling which obliterates the glottic opening. When nothing but inflamed swollen tissue is visible on laryngoscopy, instruct an assistant to push down slowly on the chest **AND MAINTAIN THE COMPRESSION**. This may result in a bubble of air becoming visible over the (hidden) glottis. Pass a bougie through the bubble and it should enter the larynx. Passage of an ET tube over the bougie should now be possible. A smaller than normal ETT should be considered due to the swelling.

Initial insertion of a bougie will facilitate trying various sizes of ET tube in the event of difficulty as the bougie can remain in position until success is achieved.

If the use of this procedure is not feasible, or is unsuccessful, consider ventilating with a BVM, use of an alternative airway or use of a surgical or needle airway.

A key to good airway management is moving promptly through unsuccessful ETT attempts to successful airway management. Delays caused by repeated attempts trying to get traditional intubation (oral) may result in hypoxia, and poor patient outcomes. Use good clinical judgment when determining when to continue with a traditional ETT, and when to rapidly proceed to other methods (including surgical cricothyrotomy).

Intubation in children > one month of age

Atropine Sulfate 0.02 mg/kg IV, minimum dose 0.1 mg.

SEDATION OR USE OF PARALYTIC MAY BE REQUIRED TO CONTROL PATIENT FOR INTUBATION (CONSCIOUS PATIENT, TRISMUS, ETC.). SEE APPENDIX B

VI. ENDOTRACHEAL TUBE SIZE AND CHART:

Premature	1 - 2.5 kg	2.5 - 3.0 mm
Neonatal	2.5 - 4.0 kg	3.0 - 3.5 mm
6 months	6 - 9 kg	3.5 - 4.0 mm
1 year	10 - 12 kg	4.0 - 4.5 mm
2-3 years	13 - 15 kg	4.5-5.0 mm
4 - 5 years	16 - 18 kg	5.0 - 5.5 mm
6 - 7 years	19 - 23 kg	5.5 mm
8 - 10 years	24 -30 kg	5.5 - 6.5 mm
11 - 14 years	31- 35 kg	6.5 - 7.0 mm
15 years up		8.0 - 9.0 mm

INTUBATION

Estimating ET Tube Size: ET tube should have a diameter of approximately the size of the patient's little finger or their external nares. Use Broselow Tape for guidance with pediatric ET tube sizes.

VII. References

1. Pitt, K., Woollard, M. *Should paramedics bougie on down? Pre-hospital Immediate Care.* 2000;4:68-70.
2. Nocera, A. *A flexible solution for emergency intubation difficulties. Ann Emerg Med,* 1996;27(5):665-667.
3. Woollard, M., Pitt, K. *Difficult intubation protocol: Use of the endotracheal tube introducer (gum-elastic bougie).* Internal document. Welsh Ambulance Services NHS Trust.