

PARAMEDIC TIP SHEET #8:

Surgical & Needle Cricothyrotomy

Indications for Surgical Cricothyrotomy

The **need for a definitive airway exists** AND the following conditions exist:

- ◆ Unable to perform endotracheal intubation due to structural or anatomic cause, OR
- ◆ Unable to clear an obstruction of the upper airway, AND
- ◆ Multiple attempts at endotracheal intubation have been unsuccessful, AND
- ◆ Other methods of ventilation (e.g. BVM, esophageal device, etc) do not allow for effective ventilation and respiration

Indications for Needle Cricothyrotomy

The **need for a definitive airway exists** AND the following conditions exist:

- ◆ Unable to perform endotracheal intubation due to structural or anatomic cause, OR
- ◆ Unable to clear an obstruction of the upper airway, AND
- ◆ Multiple attempts at endotracheal intubation have been unsuccessful, AND
- ◆ Other methods of ventilation (e.g. BVM, esophageal device, etc) do not allow for effective ventilation and respiration, AND
- ◆ Surgical cricothyrotomy is contraindicated or can not be accomplished.

Contraindications for Surgical Cricothyrotomy

- ◆ Age < 8 years
- ◆ Evidence of fractured larynx or cricoid cartilage
- ◆ Evidence of tracheal transection (inferior end of trachea in mediastinum)

Methods

The following surgical cricothyrotomy method assumes that initial care of the patient has already begun. It is an example of one method use to perform this procedure.

1. Assemble all necessary equipment. This should include a scalpel (#10 or #15), curved hemostat, tracheal hook, retractors (optional), tracheostomy tube or 6.0 ET tube, gauze pads (lots!!!), betadine (optional), circumferential tie or tape to secure tube, suction, BVM with oxygen, and good lighting.
2. Expose the patient's neck and identify the landmarks (Cricoid cartilage, thyroid cartilage, and cricothyroid membrane).
3. Prep skin over the cricothyroid membrane with betadine if time permits.
4. Stabilize the larynx using the thumb and third finger of the non-dominant hand.
5. Make a 1 cm horizontal incision into the skin and then into the cricothyroid membrane. Use the tip of the scalpel to incise. Do not use a sawing motion.
6. Insert the tracheal hook into the incision and into the trachea. Retract anteriorly and caudally. Do not let go of the tracheal hook once it is in place.
7. Insert curved hemostats into cricothyroid membrane and carefully enlarge the opening by spreading the hemostats.

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Surgical & Needle Cricothyrotomy (continued)

8. Insert the Shiley tube or 6.0 ET tube into the trachea, directing caudally. Avoid allowing the tracheal hook from cutting the tube's cuff.
9. Secure the tube using twill tie or tape circumferentially around the neck. Pack with gauze pads if necessary to control bleeding.
10. Begin ventilations as soon as tube is inserted. Assess for chest rise and lung sounds.

The following needle cricothyrotomy method assumes that initial care of the patient has already begun. It is an example of one method use to perform this procedure.

1. Assemble all necessary equipment. This should include a 14 gauge 1 ½ inch over the needle IV catheter, 5 cc syringe with luer fitting, 3.0 endotracheal tube connector (if using BVM), high pressure oxygen source, jet ventilation device (if not using BVM), and BVM with oxygen tubing.
2. Identify the landmarks (cricoid cartilage, thyroid cartilage, and cricothyroid membrane)
3. Prep the skin with betadine (time permitting)
4. Attach the 14-gauge IV catheter to the 5-cc syringe.
5. Stabilize the trachea with the non-dominant hand. Insert the catheter into the membrane at a 45-degree angle towards the feet while aspirating.
6. Aspiration of air with little effort indicates placement into the trachea. Advance the catheter and remove the needle and syringe.
7. Attach the 3.0 ET tube connector and bag valve mask to the catheter. Alternatively, a commercially available jet ventilator may be used.
8. Ventilate at a rate of 1 second of ventilation following by 2 – 3 seconds of expiration time.
9. Secure the catheter in place.

Tips

- ◆ Keep the incision medial. If the incision is too lateral, there is an increased risk of bleeding. (cricothyroid arteries, jugular vein, carotid artery)
- ◆ Do not incise too far inferiorly (too far down the trachea). The highly vascular thyroid gland is located just below the incision point. Laceration of the thyroid will result in significant bleeding that will obscure vision of the landmarks.
- ◆ Do not use excessive downward force as the scalpel may penetrate through the posterior tracheal wall.
- ◆ Ensure the tube is placed within the trachea to avoid subcutaneous air of the mediastinum and completely ineffective ventilations.
- ◆ Work quickly to minimize the time of inadequate or no ventilations.
- ◆ The most common complications are bleeding, inability to correctly identify landmarks, prolonged procedure time, and subglottic stenosis.
- ◆ Needle cricothyrotomy is a temporary measure. It does not provide a definitive airway.
- ◆ Hypercarbia is an expected but significant complication of needle cricothyrotomy.
- ◆ High pressures may be generated resulting in barotrauma. Normal chest rise should not be expected.