

Cricothyrotomy

I. Introduction

A cricothyrotomy is an invasive surgical procedure aimed at obtaining a patent airway in a specific patient population. It should only be performed in the situations outlined below. In these situations, speed is of the essence. However, do not allow the urgency of the situation to take precedence over reasonable judgment or action. The indications and technique must be clearly documented whenever it is utilized.

II. Indications

- A. Acute upper airway obstruction which cannot be relieved by other BLS and ALS maneuvers, including any available supra-glottic advanced airway technique (laryngeal mask airway -- LMA, Combitube, King Airway, etc.)
- B. Patient in respiratory arrest with neck injury or head injury who cannot be ventilated adequately with bag/valve/mask and in whom orotracheal and nasotracheal intubation cannot be accomplished. After intubation attempts have failed, or is clearly not possible, attempt to ventilate the patient with BVM technique. If this also fails to result in adequate ventilation, then proceed with surgical cricothyrotomy.
- C. Patient who is in respiratory arrest with facial injuries which preclude endotracheal and nasotracheal intubation, and who cannot be adequately ventilated with BVM technique.
- D. Patient with neck injury in which tracheal intubation either cannot be accomplished or has failed to ventilate the patient due to damage to the airway, and who cannot be adequately ventilated with BVM technique.
- E. Other patients who are apneic and in whom all other BLS and ALS airway techniques have failed and, the time to the receiving hospital is prolonged.

III. Contraindications

- A. Traumatic obliteration of trachea.
- B. Surgical cricothyrotomy is not recommended for pediatric patients < age 10.

IV. Precautions

- A. If bleeding occurs, use suction and proceed. Insertion and inflation of endotracheal tube through cricothyrotomy will protect patient from the hazard of blood in the airway. Direct pressure can then be used on the area.
- B. Advance an endotracheal tube only 1 to 1.5 inches to avoid a right main stem intubation.

SAEMS PREHOSPITAL PROTOCOLS

V. Suggested Procedure - Surgical Cricothyrotomy

- A. Establish the presence of an indication for a surgical cricothyrotomy to maintain a patent airway. NOTE: Intubation attempts have failed or are impossible and the patient cannot be adequately ventilated with BVM technique.
- B. Assemble necessary equipment:
 - betadine prep swabs
 - scalpel
 - large curved hemostat or extra scalpel handle
 - endotracheal tube or trach tube
 - tape
 - bougie (if available)
 - small set of retractors or other instruments/kits (if available)
- C. Expose the neck
- D. Identify the thyroid cartilage, palpate the prominent cricothyroid notch. The space between the cricoid and thyroid cartilages is the cricothyroid space. This is the location of the cricothyroid membrane. Finding these landmarks properly is a crucial step.
- E. Prep area
- F. Stabilize the trachea by holding the thyroid cartilage between thumb and fingers
- G. Follow one of the two guidelines below:
 1. Make a horizontal incision, through the skin and cricothyroid membrane. Incise as close to the cricoid cartilage as possible, taking care to avoid vessels close to each side of the trachea.
 2. Make a vertical incision, through the skin overlying the cricoid membrane. Identify the membrane and make a horizontal incision from one edge of the cricoid cartilage to the other. Incise as close to the cricoid cartilage as possible, taking care to avoid vessels close to each side of the trachea.
- H. Insert hemostat to dilate incision or use other instrument to grasp tracheal ring until opening sufficient to allow passage of small endotracheal tube (6.0 - 7.0 mm).
- I. Pass endotracheal tube about 1 to 1.5 inches into trachea
- J. Inflate cuff, if cuffed tube, and ventilate patient with high flow O₂
- K. Check for breath sounds bilaterally and secure with tape
- L. Monitor patient condition and reassess frequently
- M. Control bleeding and dress wound
- N. Document the indications and procedure

SAEMS PREHOSPITAL PROTOCOLS

VI. Suggested Procedure - Needle Cricothyrotomy

- A. Establish the presence of an indication for a needle cricothyrotomy to maintain a patent airway.
- B. Assemble necessary equipment:
 - betadine prep swabs
 - angiocath (14 gauge or larger)
 - syringe (5 or 10 cc)
 - 3.0 mm pediatric ETT adapter or modified IV extension set with porthole to allow for transtracheal jet insufflation
- C. Expose the neck
- D. Identify the thyroid cartilage; palpate the prominent cricothyroid notch at the inferior margin of the thyroid cartilage. Palpate the cricoid cartilage. The space between the cricoid and thyroid cartilages is the cricothyroid space. This is the location of the cricothyroid membrane.
- E. Prep area
- F. Stabilize the trachea by holding the thyroid cartilage between thumb and fingers
- G. Attach needle to syringe. Insert through skin and cricothyroid membrane into trachea at a 45 degree angle, caudally (toward the feet) while drawing back on the syringe.
- H. A "pop" can be felt as the needle enters the trachea. Aspirate with syringe. If air is aspirated easily, you are in the trachea. If it is difficult to aspirate, or blood is aspirated, re-evaluate needle placement.
- I. Withdraw needle and advance catheter into position, hub should be resting against the skin. Secure with tape.
- J. Attach ETT adapter and ventilate with BVM or attach modified IV extension tubing and begin jet ventilation using at least 50 psi O₂ supply at a ratio of 1 on, 4 off.
- K. Monitor for complications - may need additional angiocaths to allow for adequate airflow.
- L. Document the indications and procedure

VII. Special Considerations

- A. If available, a bougie may be placed through the incision and utilized as a guide over which the endotracheal tube may be advanced into the trachea