

	<b>COUNTY OF SACRAMENTO</b> EMERGENCY MEDICAL SERVICES AGENCY	Document #	8801.13
	PROGRAM DOCUMENT:  <b>Percutaneous Cricothyrotomy, Needle with Jet Insufflation-Ventilation, or High Flow Intermittent Ventilation</b>	Draft Date:	02/01/93
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 EMS Medical Director

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 EMS Administrator

**Purpose:**

- A. To serve as an advanced life support skill guideline when performing a Cricothyrotomy.

**Authority:**

- A. California Health and Safety Code, Division 2.5
- B. California Code of Regulations, Title 22, Division 9

**Percutaneous Cricothyrotomy Indications:**

- A. Older than three (3) years or greater than fifteen (15) kilograms on whom other airway methods have failed (see airway algorithms in PD #8020),

**OR**

- B. Have orofacial injuries or partial airway obstruction that precludes orotracheal intubation.

**Ventilation Indications:**

- A. Jet Ventilation – For use in any adult with a cricothyrotomy airway in all situations EXCEPT complete airway obstruction.
- B. High Flow Intermittent Ventilation – For use in all pediatric patients, and adults with complete airway obstruction

**Absolute Contraindications:**

- A. DO NOT perform Percutaneous Cricothyrotomy on a conscious patient.
- B. DO NOT perform Percutaneous Cricothyrotomy on patients with an anterior neck hematoma or with massive subcutaneous emphysema.
- C. ~~DO NOT perform on patients with a complete airway obstruction.~~
- D. Jet ventilation CAN NOT be used in patients with complete airway obstruction (instead, use high flow intermittent ventilation).

**Equipment:**

- A. ~~13-14 gauge~~ Over-the-needle kink resistant (reinforced) cricothyrotomy catheter.
  - 1. Adult: 13-14 gauge
  - 2. Pediatric: 15-18 gauge
- B. Jet insufflation device with pressure gauge OR oxygen flow modulator designed for transtracheal ventilation (i.e. Enk Oxygen Flow Modulator)
- C. 120ml syringe.
- D. Antiseptic Solution.
- E. Oxygen source 40-60 psi with flow regulator.

**Procedure:**

PERFORMING THIS TECHNIQUE CORRECTLY REQUIRES KNOWLEDGE OF AIRWAY AND NECK ANATOMY (BOTH STRUCTURES AND VASCLATURE).

**Percutaneous Cricothyrotomy:**

- A. With the patient in supine position, palpate the cricothyroid membrane, anteriorly, between the thyroid cartilage and cricoid cartilage and prepare the area with antiseptic solution.
- B. With the over-the-needle catheter attached to a 12 ml syringe, puncture the skin midline and directly over the cricothyroid membrane and direct the over-the-needle-catheter at a 45-70 degree angle caudally.
- C. Carefully insert the over-the-needle-catheter through the lower half of the cricothyroid membrane, aspirating as the needle is advanced, being careful not to perforate the posterior wall of the trachea. Aspiration of air signifies entry into the tracheal lumen.
- D. Gently advance the catheter downward, using the needle as a guide. Once in position, withdraw the needle.

**Ventilation:**

- A. **Jet ventilation: Set oxygen flow rate to 15 liters/min.** attach the catheter hub to the jet inflation device and ventilate with a 1:5 second ratio of inflation: exhalation by triggering the inflation device (10-12 BPM).

**OR**

- B. **High Flow Intermittent Ventilation: Set oxygen flow rate to 1 liter/Kg/min to max of 15 liters/min. Ventilate with a 1:4-1:5 second ratio of inflation: exhalation by occluding all ports of flow regulator device.**

**AND**

- C. **Low frequency ventilation followed by slow low pressure exhalation is important to limit barotrauma.**
- D. **Optimization of the upper airway (when possible) and close monitoring of lung deflation is essential for safe technique**
- E. If the soft tissues of the neck begin to balloon (subcutaneous emphysema), catheter is superficial to trachea. Remove catheter. If landmarks are present, insert another catheter.
- F. Transport immediately after procedure, continually monitoring patient's respiratory status in route to hospital.
- G. Document indications, procedure, and results.

**Complications:**

- A. Subcutaneous emphysema (readily visible).
- B. Mediastinal emphysema.
- C. Hemorrhage.
- D. Pneumothorax.
- E. Esophageal perforation.
- F. Infection.
- G. Pulmonary barotrauma.
- H. Vocal cord trauma.

**NOTE:**

Cricothyrotomy may be performed using a commercially available **percutaneous** cricothyrotomy kit approved by SCEMSA, when following manufacturer guidelines.