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The occasional poor man's cricothyrotomy

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Needle cricothyrotomy is an alternative airway technique for use when you cannot maintain an open airway by less invasive methods. The basic indication is the "can't intubate, can't ventilate" scenario, where you cannot maintain proper ventilation with a bag-mask and have failed to intubate on 2 or more attempts.1 This is most likely to happen in the trauma victim: a recent study of 610 emergency-room intubations in an urban American hospital found that cricothyrotomy was necessary in 7 patients (1% of total patients), 6 of whom were trauma patients. This represented an overall rate of only 2% of trauma patients who needed airway management.2

Several commercial kits are available for either full cricothyrotomy (they will be described in a future article) or jet-air ventilation. However, a poor man's cricothyrotomy may be done easily with equipment available in any emergency department (Fig. 1).3

Since this is a lifesaving procedure, there are no real contraindications. Complications are listed in Table 1. The method is as follows:

Table 1. Complications

1. Kinking of the catheter
2. Subcutaneous emphysema
3. Hypoventilation and hypercapnea
4. Bleeding into the trachea
5. Pneumomediastinum
6. Esophageal perforation

1. Prepare the equipment you will need: a # 12-14 intravenous needle catheter with a 3-mL plastic syringe attached; the adapter from a # 7.5 endotracheal tube (Fig. 1).
2. Be sure the patient is properly positioned. If cervical spine injury is unlikely, extend the

neck or else put a pillow under the shoulders to help achieve some neck extension (Fig. 2).

3. Locate the cricothyroid ligament, just below the thyroid cartilage. Remember, you are doing a cricothyrotomy, not a tracheotomy! (Fig. 3).
4. If time permits, prepare the skin and inject some topical lidocaine.
5. Stabilize the larynx using the thumb and middle fingers of your nondominant hand (Fig. 4). Your index finger can verify the position of the cricothyroid membrane.
6. Insert the needle through the lower part of the cricothyroid membrane (which is less vascular) at an angle of about 45º and aimed toward the feet (Fig. 5). Apply suction to the plunger to detect a flow of air that will indicate that you are in the trachea. (Some sources recommend adding 1 to 2 mL of water to the syringe and then watching for bubbles [McGill University airway management for the emergency/rural physician Course, December 1998].4,5)
7. Once the trachea has been entered, remove the needle and then reattach the syringe, minus the plunger (Fig. 6).
8. Attach the adapter of the #7.5 endotracheal tube to the open end of the syringe, to which it mates nicely (Fig. 7). An Ambu bag-mask or oxygen line may be attached (Fig. 8).
9. Tape the catheter to the skin if desired.

If you wish, you can give oxygen by replacing the 3-mL syringe with a 10-mL syringe. Remove the plunger. Place a 7.0-mL endotracheal tube into the 10-mL plunger, inflate the cuff and then simply attach your oxygen line to the adapter end of the endotracheal tube.

The principles of doing an emergency cricothyrotomy remain the same in the small child, with a few caveats: everything will be smaller, landmarks will be harder to find and there is a greater chance of injuring an adjacent structure. Use a 14- to 16-gauge catheter needle.

Remember that a needle cricothyrotomy is only a temporary airway until a more stable airway — which may include intubation by a more experienced operator, full surgical cricothyrotomy or regular tracheotomy — may be obtained. Remember that even a small partial airway may be enough to keep your patient alive and avoid hypoxic brain damage until more help can be mobilized.

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