

PR22: Surgical Airways

Applicable To

- ACP and higher

Introduction

A surgical airway is indicated in a patient who cannot be oxygenated or ventilated through other means. Paramedics may also consider preparing for surgical airways based on predicted clinical course, or in cases where endotracheal intubation is required and predicted to be difficult.

In patients over the age of 8, the bougie-assisted cricothyrotomy is the preferred approach. In patients under 8, needle cricothyrotomy can be used.

These procedures can be intimidating. Paramedics should have a thorough understanding of the circumstances under which they may be required, and have a low threshold for their use. They can also be logistically challenging and frequently require more space (and personnel) than anticipated. In most cases, paramedics will want to approach a surgical airway with their non-dominant hand towards the patient's head.

Indications

Inability to ventilate, oxygenate, or intubate a patient.

Contraindications

- **ABSOLUTE: INABILITY TO IDENTIFY LANDMARKS OR AIRWAY STRUCTURES**
- Relative: trauma to the neck.
- Relative: history of perithyroid tumors or radiation to the neck.
- Relative: expanding hematomas or other pathologies distorting structures in the neck.

Procedure

Procedure: Bougie-Assisted Cricothyrotomy

1. Personal protective equipment is required for this procedure. Face shields are critically important: upon puncturing the cricothyroid membrane, a spray of blood is frequently produced.
2. Prehospital bougie-assisted cricothyrotomy and needle cricothyrotomy is considered AGMP. If either of these procedures are needed, crews are directed to proceed with airborne PPE including face-shield, EHFR/N95 mask, gown, and gloves.
3. Assemble required equipment: scalpel blade, bougie, and 6.0 ETT.
4. Identify the landmarks as required.
5. Stabilize the thyroid cartilage with the non-dominant hand. The dominant hand will hold the scalpel and rest on the patient's sternum for stability.
6. Make a 4 cm vertical incision through the skin over the cricothyroid membrane. In cases where the anatomy cannot be palpated or identified prior to making the incision, it may be necessary to extend the incision from the mandible to the sternum.
7. Palpate the cricothyroid membrane and bluntly dissect through the subcutaneous tissue using a finger until the membrane is readily identifiable. Puncture the membrane with the scalpel held horizontally.
8. Remove the scalpel and place a little finger in the incision in the membrane to dilate, and to identify the posterior wall cartilage. Ignore any bleeding at this point.
9. Slide the bougie alongside the little finger into the trachea.
10. Remove the finger and pass the endotracheal tube over the bougie and into the trachea. Only advance the endotracheal tube until the balloon is within the airway and no longer visible. Inflate the balloon.
11. Holding the endotracheal tube firmly, remove the bougie and connect a bag-valve mask. Confirm endotracheal

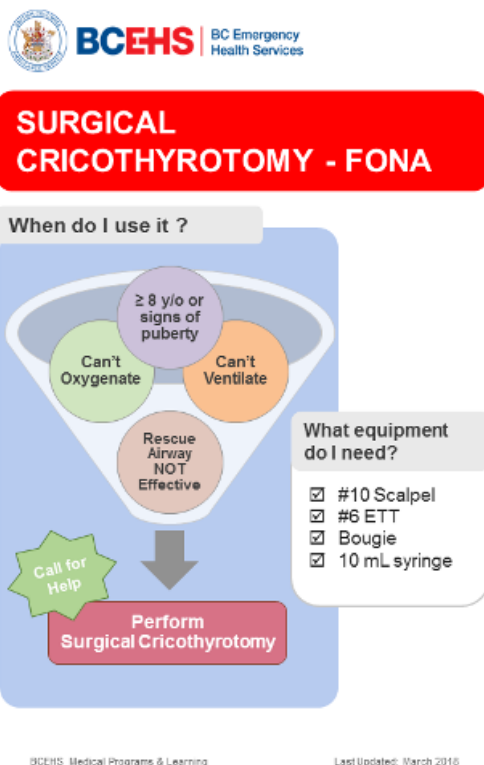
tube placement with end-tidal CO₂ monitoring, auscultation, bilateral chest rise and fall, and misting of the tube.

Procedure: Needle Cricothyrotomy

Children under the age of 8 should not have open cricothyrotomies as there is an unacceptable risk of causing damage to poorly-developed structures in the airway. Needle cricothyrotomy is an option in these cases. Paramedics must remember this procedure is a bridge to definitive airway management: it is possible, using this technique, to oxygenate (but not ventilate) a patient for a brief period of time, typically 15 to 20 minutes.

1. Assembled required equipment:
 1. 14 or 16-gauge catheter over needle. Remove the flash cap from the needle.
 2. 10 mL syringe
 3. 0 endotracheal tube. Remove the universal connector from the endotracheal tube.
2. Identify landmarks: the cricothyroid membrane in children is located in the same position as adults, and should be palpable through the skin below the thyroid cartilage.
3. Mount the needle and catheter on the syringe. Hold the syringe in the dominant hand, which is stabilized on the patient's mandible.
4. Puncture the skin over the cricothyroid membrane. Once through the skin, the needle tip should be directed caudally (i.e., towards the feet). While stabilizing the needle and catheter with the non-dominant hand, draw back on the syringe and maintain negative pressure. Advance slowly towards the trachea.
5. Once the needle enters the trachea, the plunger will release. Advance the needle slightly, then withdraw the needle while threading the catheter into the trachea.
6. Insert the endotracheal tube connector into the hub of the catheter, and connect a bag-valve mask attached to high-flow oxygen. Ventilate, being aware that higher pressures may be required and that chest rise may not be seen. The pressure relief valve may need to be locked down.
7. Secure the catheter with an occlusive dressing (e.g., Tegaderm).

Notes



What are some key landmarks?

Need support?

Please contact
Learning@bcces.ca
 or your **Regional
 Advanced Practice
 Educator**



How do I use it?

1. Landmark
2. Make incision
3. Place finger
4. Place bougie
5. Pass ETT
6. Secure and Confirm

Personal Protection

Adapt PPE based on
 your risk assessment,
 patient's condition e.g.
 infectious diseases.

Best practice: full face
 shield, gloves, N95

What can make it difficult?

Distortion	Trauma, expanding hematoma, infection or other pathology
Access	Obesity, extreme neck flexion (i.e. ankylosing spondylitis)
Radiation	Therapy in area
Tumors	Around cricothyroid membrane

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Resources

