

Major Trauma: Emergency Surgical Airway - Adults

IMPORTANT: The skills required to perform an emergency surgical airway cannot be acquired by reading a guideline. It is a time critical & high risk intervention that should be performed by the most experienced individual available.

PRINCIPLES

1. Plan in advance
2. Ensure all necessary equipment is available in one place and that staff know where to find it in an emergency.
3. Anticipate when an emergency surgical airway may be necessary and ensure your team is briefed and equipment is to hand.
4. Recognise that any attempt at intubation may lead to a 'can't intubate, can't ventilate' scenario requiring surgical intervention.
5. Once the need for a surgical airway is identified act swiftly and do not be distracted by prolonged attempts to intubate.

APPROACH - ADULTS

Two options should be considered. Surgical cricothyroidotomy is preferred as this will allow ventilation. Percutaneous seldinger tracheostomy (as performed **electively** in ICU) is not considered a suitable emergency airway technique.

Needle Cricothyroidotomy

Equipment

1. kink resistant cannula (eg Patil or Ravussin) OR size 12 - 14 iv cannula
2. high pressure ventilation system (eg Manujet) OR prepared oxygen tubing with hole cut towards one end of the tubing
3. A size 11 scalpel may be helpful
4. 5 or 10 ml syringe with saline

Technique

1. Clean the skin with an antiseptic
2. Identify the cricothyroid membrane (see figure 1)
3. Insert the cannula through the cricothyroid membrane at a 45 degree angle caudally. A small cut with the scalpel may make it easier to get the cannula through the skin.
4. Aspirate as you advance - bubbles will indicate placement in the airway.
5. Advance the cannula over the needle taking care not to hit the post tracheal wall.
6. Once needle removed ensure that air can still be freely aspirated.
7. Attach cannula to oxygen tubing or ventilation system.
8. Insufflate by occluding hole in tubing or with jet vent for 1 sec, allow 4 secs for expiration via the upper airway.
9. Ensure plans in place for urgent definitive airway.

CAVEATS:

- If the upper airway is completely occluded then gas cannot escape and significant barotrauma may occur.
- If surgical emphysema occurs abandon and convert to surgical cricothyroidotomy
- Oxygenation can be maintained for 30 to 45 minutes by this technique. Very little ventilation occurs and CO₂ levels will increase rapidly.
- The network supports the use of specific emergency cricothyroidotomy kits such as the Rusch QuickTrach® or Cook Melker® providing that suitable familiarisation and training is provided to relevant clinicians.

Surgical Cricothyroidotomy

Equipment

1. Scalpel
2. Small cuffed endotracheal tube (eg size 6) or tracheostomy tube
3. Tracheal spreader or other device for opening incision.
4. Bougie (if using) 5. Equipment for connecting to tube and ventilating.

Technique

1. Make a transverse incision through the skin and cricothyroid membrane
2. Insert spreader or similar into wound, rotate to 90° and open.
3. Consider inserting a bougie alongside implement used to open the wound to ensure the track is maintained.
4. Insert tube into wound (over bougie, if used) directing caudally.
5. Inflate cuff
6. Ventilate ensuring adequacy by observation, auscultation and exhaled CO₂
7. Ensure plans in place for urgent definitive airway.

Further Reading / Resources

The ATLS™ course provides training and practical skill stations in both needle and surgical cricothyroidotomy.

The Difficult Airway Society has a range of guidelines including 'can't intubate, can't ventilate' (www.das.uk.com)

The EMCrit website has video of a surgical cricothyroidotomy being performed (although with a vertical incision) <http://emcrit.org/wee/real-surgical-airway/> and a number of articles related to emergency surgical airway management.

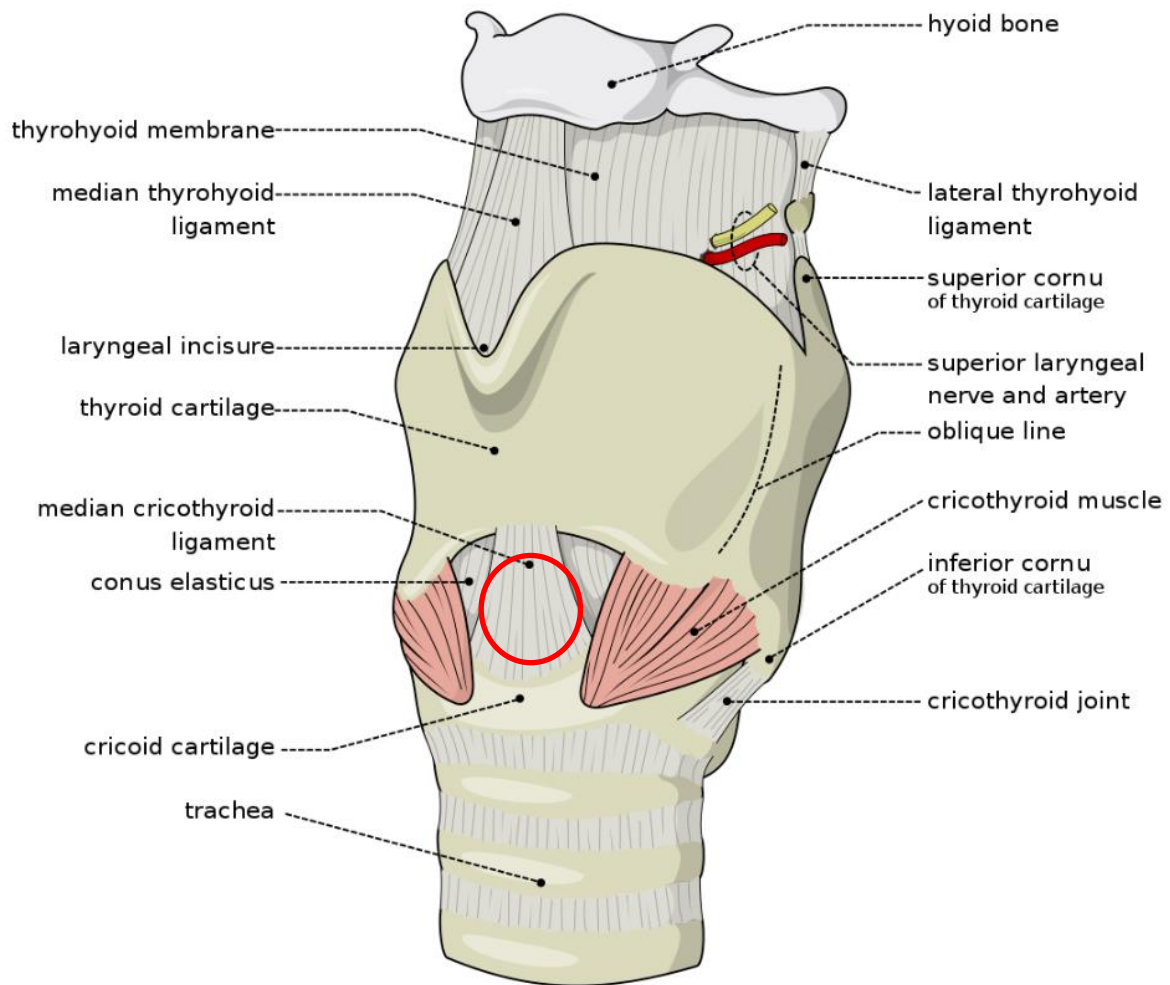


Figure 1: Laryngeal anatomy. The red circle indicates the cricothyroid membrane. Image by Olek Remesz (wiki-pl: Orem, commons: Orem) [CC BY-SA 2.5-2.0-1.0 https://upload.wikimedia.org/wikipedia/commons/8/8a/Larynx_external_en.svg via Wikimedia Commons

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