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Emergency Surgical Airway Guideline

Introduction

Major trauma patients may require an emergency surgical airway as the last step of a 'can't intubate, can't oxygenate' scenario after a Rapid Sequence Induction and a failure of bag-valve-mask or supraglottic device ventilation. In rare circumstances a surgical airway may be required as a primary airway in a patient with severe head and neck trauma or airway burns.

The skills required to perform an emergency surgical cricothyroidotomy cannot be acquired by reading a guideline. This is a time critical & high-risk intervention that should be performed by the most experienced individual available. All network hospitals should ensure that appropriate members of their trauma team are trained in emergency surgical airway.

Needle cricothyroidotomy has a high rate of failure and should not be used for adult patients. Scalpel cricothyroidotomy is the fastest and most reliable method of securing the airway in the emergency setting. A cuffed tube in the trachea protects the airway from aspiration, provides a secure route for exhalation, allows low-pressure ventilation using standard breathing systems, and permits end-tidal CO_2 monitoring.

Equipment required

Members of the trauma team should be able to locate the following equipment in an emergency:

- Scalpel size 10
- Bougie size 15 or 10
- Size 6 cuffed endo-tracheal tube

Emergency Surgical Procedure

A number of surgical techniques have been described, but there is a lack of evidence of the superiority of one method over another. Practitioners should be familiar with one standardised technique that they would use in an emergency.

Techniques include

- scalpel-finger-bougie;
- scalpel-twist 90^0-bougie

Techniques to hold open the crio-thyroid incision

- Bougie
- The use of tracheal dilators
- Artery forceps
- tracheal hooks

Example and technique of surgical airway procedure (using stab-twist –bougie method)

1. Declare to the trauma team that this is an emergency (‘can’t intubate, can’t oxygenate’) and that a surgical airway is required. Call for help.

2. If the Trauma Team Leader is the most experienced person available to perform the procedure they should hand over leadership of the overall resuscitation to another member of staff.

3. Remember that airway is a priority over cervical spine immobilisation - extend the patient’s neck if necessary, maintaining manual inline immobilisation as much as possible given the need for the airway to take priority.

4. Ensure the patient has received neuromuscular blockade.

5. Ensure the patient continues to receive supplemental high-flow oxygen via a tightly fitting facemask or supraglottic airway device.

6. Stabilise the larynx and identify the cricothyroid membrane with an index finger

7a. For those with a palpable cricothyroid membrane make a transverse stab incision through the skin into the cricothyroid membrane. Ensure only the tip of the blade enters the airway to avoid injury to the posterior cricoid cartilage. Rotate the scalpel blade 90° and hold it perpendicular to the skin.

7b. For those with an impalpable cricothyroid membrane (or if the stab-twist-bougie technique has failed) make an initial large (8-10cm) vertical incision from the sternal notch up towards the chin. Pull the soft tissues apart with the fingers to allow the larynx to be identified better. Confirm position of the cricothyroid membrane and make a transverse stab incision through it. Rotate the scalpel blade 90° and hold it perpendicular to the skin.

8. Insert the bougie horizontally into the trachea and advance 10-15cm

9. Railroad a size 6 lubricated cuffed endo-tracheal tube over the bougie continuously rotating the tube as it is advanced. Avoid excessive advancement leading to an endo-bronchial intubation.

10. Remove the bougie and inflate the cuff. Ventilate the patient with 100% oxygen.

11. Confirm position with capnography, visualisation of chest movement, and auscultation.

12. Secure the tube.

13. Reassess the patient.

Potential complications of surgical airway

- Aspiration
- Main-stem bronchial intubation or tube misplacement
- Pulmonary rupture
- Pneumothorax
- Surgical emphysema
- Mediastinal emphysema
- Haemorrhage
- Creation of a false passage through the tissue
- Airway obstruction
- Tracheal injury including perforation, laryngeal injury, vocal cord injury
- Injury to adjacent structures including thyroid and oesophageal perforation
- Late complications include haematoma, persistent stoma, sub-glottic stenosis, tracheomalacia, vocal cord injury, or infection
- Death may occur due to complications

Audit and Governance

All surgical airways should be reviewed locally as part of a governance process by the trauma service.

References

Difficult Airway Society intubation guidelines working group. Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults. British Journal of Anaesthesia 2015;115(6):827–848.

https://das.uk.com/content/fona_training (video resource)

Difficult Airway Society Can't intubate, can't oxygenate action cards (https://drive.google.com/file/d/1BKP6LlAMdu9_X4e9RiAGnw3JHuGJki6v/view)

NICE Guideline NG39. Major trauma: assessment and initial management. February 2016.