

# 30

## Tracheostomy

- ✓ Tracheotomy, the making of an opening into the trachea, is one of the oldest operations in surgery. It can be life-saving. If the operation involves the creation of a stoma - i.e. a connection between the tracheal edges and the skin - this is a tracheostomy.

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### Indications for tracheostomy

- To bypass upper airway obstruction.
- To protect the tracheobronchial tree.
- To facilitate artificial ventilation.

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### Airway obstruction

If a patient has an acutely obstructed airway and you cannot introduce an endotracheal tube, you may be able to bypass a partially obstructed airway using a 'bag and mask' (Fig. 30.1). If the patient is still not getting enough air into the



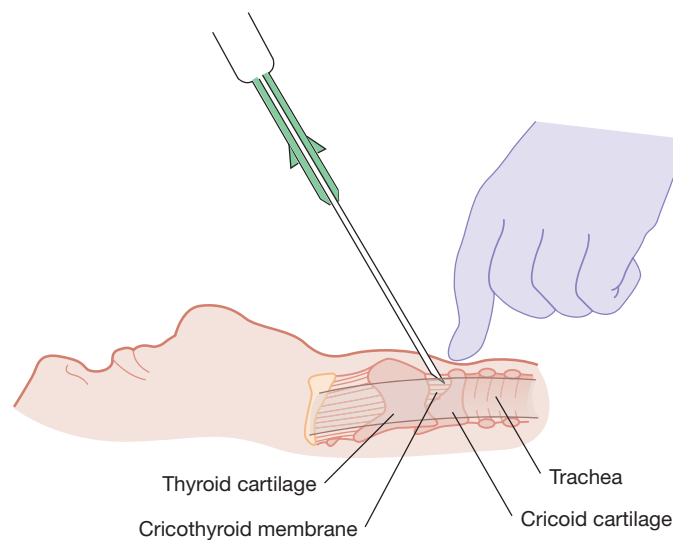
**Figure 30.1** Bag and mask.

*Diseases of the Ear, Nose and Throat Lecture Notes*, Eleventh edition. Ray Clarke. © 2014 John Wiley & Sons Ltd. Published 2014 by John Wiley & Sons, Ltd.

lungs, tracheotomy must be done without delay. You can buy a little time until more experienced help is available by inserting a wide-bore needle into the cricothyroid membrane (Fig. 30.2). Most tracheotomies nowadays are done in more controlled conditions, under general anaesthesia and with an endotracheal tube in place.

### Some causes of upper airway obstruction

- Congenital
  - Subglottic or upper tracheal stenosis.
  - Laryngeal web.
- Trauma
  - Prolonged endotracheal intubation.
  - Neck injuries, gunshot wounds and cut throat, laryngeal fracture.
- Infections
  - Acute epiglottitis (see Chapter 26).
  - Laryngotracheobronchitis.
  - Diphtheria.
  - Ludwig's angina.
- Malignant tumours
- Bilateral vocal cord paralysis



**Figure 30.2** Cricothyroidotomy.

## Protection of the tracheobronchial tube

Any condition causing pharyngeal or laryngeal incompetence may allow aspiration of food, saliva, blood or gastric contents. If the condition is of short duration, e.g. general anaesthesia, endotracheal intubation is best, but for chronic conditions tracheostomy may be needed. This allows easy access to the trachea and bronchi for regular suction and permits the use of a cuffed tube, which further protects against aspiration. Examples of such conditions are:

- Neurological disorders, e.g. polyneuritis (e.g. Guillain-Barré syndrome), brain stem stroke.
- Coma (if it is likely to be prolonged) e.g. due to:
  - Generalized sepsis
  - head injury
  - severe burns
  - poisoning
  - stroke

## To facilitate artificial ventilation

If ventilation is to be for a long period, tracheostomy is better than an endotracheal tube. It is a lot more comfortable for the patient. Other advantages are:

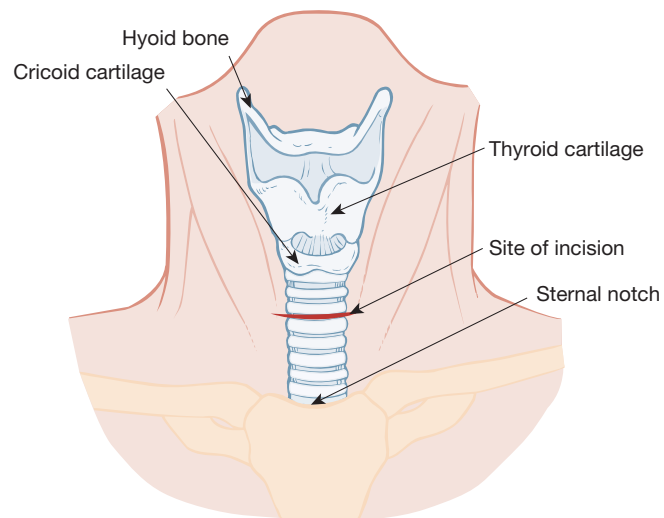
- Bypass of laryngeal resistance – makes ventilation easier with lower pressures.
- Easier access to the trachea for the removal of bronchial secretions (suction).
- Easier administration of humidified oxygen.
- Positive-pressure ventilation is easier.
- 'Dead space' is reduced.

### Elective tracheostomy

#### Surgical

Open surgical tracheostomy is best done under general anaesthesia with endotracheal intubation. Extend the neck and straighten the head. Make a transverse incision midway between the cricoid cartilage and sternal notch (Fig. 30.3). Identify and retract the strap muscles laterally (Fig. 30.4) and divide the thyroid isthmus. Find the cricoid and count the tracheal rings. Make a vertical opening into the trachea, centred on the third and fourth rings (Fig. 30.5). A single slit in the tracheal wall is best, after first inserting stay sutures on either side to allow traction on the opening in order to insert the tube.

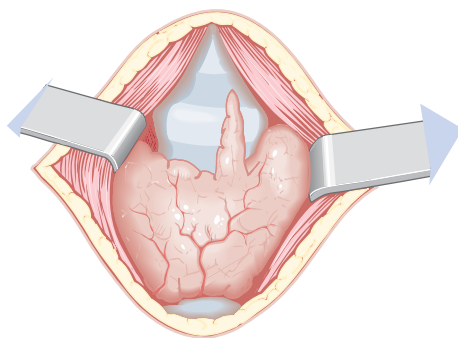
After insertion of the tracheostomy tube, the trachea is aspirated thoroughly.



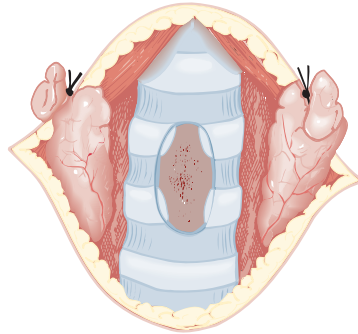
**Figure 30.3** Tracheostomy showing the landmarks of the neck and the incision for operation.

#### Per-cutaneous tracheotomy (PCT)

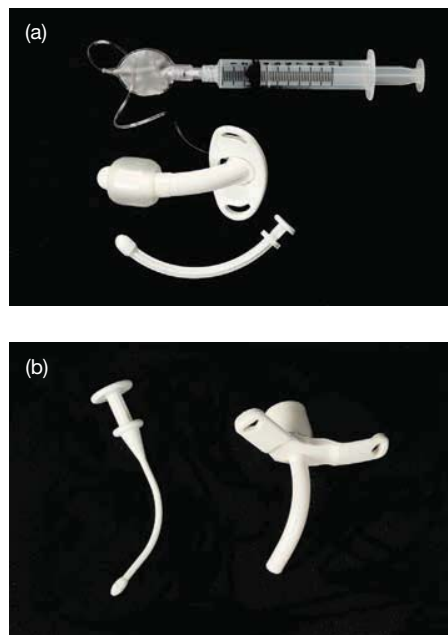
Many intensive care units now recommend a percutaneous technique with a minimal skin incision, introducing a series of cannulas of increasing calibre to dilate the tracheotomy before putting in a tracheotomy tube (Fig. 30.6).



**Figure 30.4** The strap muscles are retracted, exposing the trachea and the thyroid isthmus.



**Figure 30.5** The thyroid isthmus has been divided and an opening made in the anterior tracheal wall.



**Figure 30.6** Tracheostomy tubes. (a) is an adult cuffed tracheostomy tube. The cuff can be inflated to protect the trachea and lungs from secretions and to minimize leakage. (b) is a child's tracheostomy tube with its introducer. In a small child a cuff takes up too much space and is rarely used. There is no inner tube for changing in the event of it getting blocked as the child's airway is too narrow and the inner tube would take up too much space. If the tube blocks, either clean it out immediately with suction or remove it.

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## After-care of the tracheotomy

### Nursing care

Nursing care must be of the highest standard to keep the tube patent and prevent dislodgement.

### Position

Adult patients in the post-operative period should usually be sitting well propped up; take care in infants that the chin does not occlude the tracheotomy; extend the baby's neck slightly over a soft pillow or a rolled-up towel.

### Suction

Apply suction at regular intervals dictated by the amount of secretions. A clean catheter must be gently passed down into the tube in conscious patients. Unconscious or ventilated patients may also need physiotherapy.

### Humidification

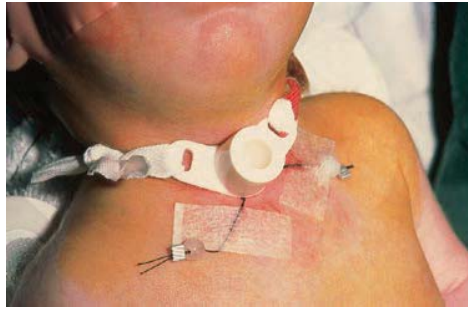
Humidification of the inspired air is essential to prevent drying and the formation of crusts. If necessary, sterile saline (1 mL) can be introduced into the trachea, followed by suction.

### Tube changing

Tube changing should be avoided if possible for 2 or 3 days, after which the track should be well established and the tube can be changed easily. Cuffed tubes need particular attention, with regular deflation of the cuff to prevent pressure necrosis. The amount of air in the cuff should be the minimum required to prevent an air leak.

### Decannulation

Decannulation should only be carried out when it is obvious that the tracheotomy is no longer required. The patient should be able to manage with the tube occluded for at least 24 h before it is removed (Fig. 30.7).



**Figure 30.7** A newly performed tracheostomy in a small child. Note the stay sutures on either side to aid replacement of the tube should it become dislodged.

## Complications

- Bleeding.
- Pneumothorax. Due to perforation of the pleura. This usually heals but may make post-operative care very difficult. Mediastinal emphysema can also occur.
- Obstruction of the tube or trachea by crusts of inspissated secretion may be fatal. Act quickly, remove the whole tube and replace it if blocked. If the tube is patent, explore the trachea with angled forceps to remove the obstruction. An explosive cough may expel the crust and the tube can then be replaced.
- Complete dislodgement of the tube if it is not adequately fixed. Hold the wound edges apart with a tracheal dilator and put in a clean tube. Good light is essential.
- Partial dislodgement of the tube is more difficult to recognize and may be fatal. The tube comes to lie in front of the trachea, the airway will be impaired and, if left, erosion of the innominate artery may result in catastrophic haemorrhage. Make sure that at all times the patient breathes freely through the tube.
- Surgical emphysema may occur if the patient is on positive-pressure ventilation. It is usually self-limiting.
- Perichondritis and subglottic stenosis especially if the cricoid cartilage is injured. Go below the first ring.



### CLINICAL PRACTICE POINTS

- In respiratory obstruction or respiratory failure if there is no steady improvement, support the airway by endotracheal intubation or tracheotomy.
- Learn the technique of emergency tracheotomy/cricothyroidotomy.



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