Page 56 Where anaesthetic skills and drugs are available, endotracheal intubation is the preferred method of securing a definitive airway. This technique comprises:

- rapid sequence induction of anaesthesia ('crash induction')
  - preoxygenation
  - application of cricoid pressure
  - rapid unconsciousness using drugs
  - no 'bagging'
  - rapid placement of endotracheal tube in trachea
  - inflation of cuff before removal of cricoid pressure
- maintenance of cervical spine immobilisation when indicated.

Meticulous care must be taken to keep the cervical spine immobilised if injury to the cervical spine is suspected.

Intermittent oxygenation during difficult intubation

Inability to intubate will not kill. Inability to oxygenate will.

If you can oxygenate by bag and mask, this will keep the patient alive.

Avoid prolonged efforts to intubate without intermittently oxygenating and ventilating. Practise taking a deep breath when starting an attempt at intubation. If you have to take a further breath before successfully intubating the patient, abort the attempt and reoxygenate using the bag and mask technique.

Correct placement of the endotracheal tube

To check correct placement of the endotracheal tube:

- see the endotracheal tube pass between the vocal cords
- listen on both sides in the mid-axillary line for equal breath sounds
- listen over the stomach for gurgling sounds during assisted ventilation for evidence of oesophageal intubation.
- monitor end-tidal carbon dioxide levels. The use of capnography in the emergency intubation is increasingly recommended as a secondary method of confirming correct tube placement. Primary methods such as auscultation are still important, as in the absence of cardiac output there may be little exhaled carbon dioxide to detect. However a capnograph may also help with ensuring continuing correct placement throughout the arrest and transfer, and presence of exhaled carbon dioxide is an indicator of restoration of cardiac output should it occur.
- if in doubt about the position of the endotracheal tube, take it out and oxygenate the patient by another method, bag and mask or surgical airway.

See Figure 7.5.

Other methods for maintaining the airway (not definitive airway as still unprotected):

- Laryngeal mask airway (LMA) (and other supraglottic airway devices) may be used to establish a patent airway and to maintain it thereby allowing adequate ventilation to occur. In the past, laryngeal mask airways have not been used in acute situations, but they are increasingly recommended as an alternative to bag mask ventilation in a cardiac arrest situation. (Reference ILCOR guidelines) They are relatively easy to insert in non-expert hands compared with tracheal intubation, which is important in the light of evidence from studies of intubation involving non-experts resulting in an unacceptably high level of

accidental oesophageal intubation. They may also be inserted with little, if any, interruption to cardiac compressions compared with intubation. Supraglottic airway devices do not protect the airway so there remains the potential risk of aspiration of gastric contents which is a particular concern in pregnant women. . They could be used by non anaesthetists in an emergency where the airway could not be maintained or ventilation reliably achieved by bag mask ventilation in combination with an oropharyngeal (Guedel) airway, and no anaesthetist was available.Any method of manual ventilation whether by bag mask valve or laryngeal mask airway can cause the stomach to become inflated, further predisposing to regurgitation.

Needle cricothyroidotomy can be used to oxygenate in an emergency but it is not a definitive airway. A cannula-over-needle device is inserted through the cricothyroid membrane and attached to a flow of oxygen from an insufflation device or through oxygen tubing connected to wall oxygen at 15 litres/minute with either a Y-connector, three-way tap or side hole in the tubing at the cannula end of the tubing.

Page 58 Surgical airway

A surgical airway should not be undertaken lightly and is used when:

- a hypoxic patient needing a definitive airway for resuscitation is too awake to tolerate endotracheal intubation without the use of anaesthetic drugs and there is no anaesthetist available to intubate in this way in the time span in which the definitive airway is required
- trauma to the face and neck makes endotracheal intubation impossible
- a patient with face and neck burns requires airway protection to pre-empt delayed obstruction but expert anaesthetic help is unavailable to carry out endotracheal intubation
- the anaesthetist cannot intubate or ventilate, e.g. at caesarean section.

Surgical cricothyroidotomy

Surgical cricothyroidotomy places a tube into the trachea via the cricothyroid membrane (see Figure 7.6). A small tracheostomy tube (5–7 mm) is suitable. During the procedure, appropriate cervical spine protection must be maintained when indicated. There are also commercially available surgical cricothyroidotomy sets. A cricothyroidotomy can be replaced by a formal tracheostomy (if needed) at a later time.

Emergency tracheostomy

A formal surgical tracheostomy takes longer and is more difficult than a surgical cricothyroidotomy. Commercial sets are available for rapid percutaneous tracheostomy using a Seldinger (guidewire) technique.

Management of ventilation

Once the airway is patent and maintained there may be a separate requirement to assist breathing (ventilation). Spontaneous ventilation (self-ventilation) means the same as breathing. Assisted (artificial) ventilation means the patient is receiving help with breathing. The aim is to improve gaseous exchange in the lungs and to breathe for the patient if spontaneous ventilation has stopped or is inadequate. The indication for assisted ventilation is when ventilation is inadequate as in:

- chest injury
- respiratory depression due to drugs (such as opiates)
- head injury which might be causing respiratory depression and which requires end tidal carbon dioxide levels to be closely controlled to prevent cerebral vasodilatation and a consequent rise in intracranial pressure. Assisted ventilation can be achieved by the following techniques:

    - mouth-to-mouth (or nose) – unlikely in hospital
    - mouth to pocket-mask
    - self-inflating bag to pocket mask or facemask
    - self-inflating bag to endotracheal tube, laryngeal mask airway or tracheostomy tube
    - automatic ventilation via endotracheal tube or tracheostomy tube.

Page 59 Summary

- Talk, look, listen, feel.
- Primary aim is to provide adequate oxygenation.
- Try simple manoeuvres, i.e. chin lift, jaw thrust, suction.
- Try simple adjuncts, namely the oropharyngeal airway.
- Tracheal intubation, endotracheal or surgical airway are gold standard because theses achieve a patent airway, maintain patency and protect the airway. Laryngeal mask airway may have a role in the absence of skilled help but does not provide a protected airway.
- Beware of cervical spine injury during airway management.

Page 61 Appendix 7·A

Practical procedures

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Advanced Life Support Group.

Oropharyngeal airway

Equipment

- A series of oropharyngeal (Guedel) airways.
- Tongue depressor.

Procedure

The correct size of airway is selected by comparing it with the vertical distance from the angle of the mandible to the centre of the incisors. The airway is inserted in adults and older children as follows:) use a tongue depressor or the tip of a laryngoscope blade to aid insertion of the airway 'the right way up' under direct vision.

- Open the patient's mouth and check for debris. Debris may be inadvertently pushed into the larynx as the airway is inserted.
- Insert the airway into the mouth either:
  (i) 'upside down' (concave uppermost) as far as the junction between. the hard and soft palates and rotate through 180 degrees or
  (ii) use a tongue depressor to aid insertion of the airway 'the right way up' under direct vision
- Insert so that the flange lies in front of the upper and lower incisors or gums in the edentulous patient (Figure 7A.1).
- Check the patency of the airway and ventilation by 'looking, listening, and feeling'

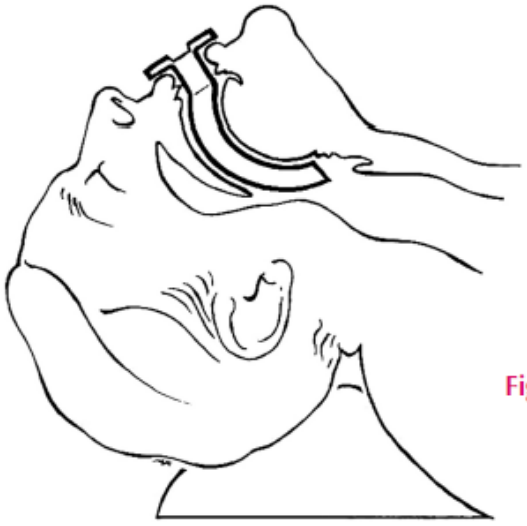

Figure 7A.1 Oropharyngeal Airway in situ