Bare Bones

Anaesthesia

A GUIDE FOR MEDICAL STUDENTS

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N. Marsden and S. Minhas

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Preface

"What should I use to learn this medical specialty… I don't really know what I'm required to learn and to what depth I should learn the content as a medical student?"

The above question is one that as medical students, we have all faced at medical school. The same challenge occurred each year: we had fifteen new and tricky specialties to learn for our examinations, an essay due in a week and we were required to attend placement daily to practise for those dreaded OSCEs. On top of this, we had to maintain some degree of a social life to prevent us from going insane from all this work and stress!

As medical students, we authors decided that this must change. Specifically, we realised that the current resources for medical students to efficiently and effectively learn medical and surgical specialties were not appropriate. This was especially true in the field of anaesthetics. We were tired of wasting our time in the search for appropriate resources to learn the required content. Therefore, we needed a one-stop resource that provided tailored, guideline-specific information to prepare us for our medical school examinations.

By putting our revision notes together, we formed this textbook – *Bare Bones Anaesthesia*. We believe it achieves this goal, in providing knowledge of anaesthetics based on guidelines and evidence, appropriate for the level of a medical student to excel in their medical school examinations. Furthermore, we have incorporated our own experience of tricky MCQ and OSCE scenarios that examiners attempt to catch medical students out on. We have highlighted these specifically throughout the book to emphasise their importance for your learning and to focus your understanding.

We hope that this book stimulates your interest in anaesthetics, such that if you are interested in learning more about the specialty, it has provided you with the basic understanding to carry your learning forward. Alternatively, if you have little interest in the field of anaesthetics, and just want to pass your examinations, this textbook is the perfect aid for you to surpass your medical school requirements and comfortably conduct your career as a foundation doctor. Overall revising does not need to be challenging, especially when you have the right resources by your side.

Adam Arshad
Pooja Devani
Sonika Sethi
Arjuna Thakker

About the authors

Adam Arshad is an ST2 Academic Clinical Fellow in Trauma and Orthopaedics. He has a personal interest in medical education, having completed his PgCert in Medical Education at Newcastle University and published his final coursework on Virtual Reality in Orthopaedics. He is passionate about improving the resources available for medical students to learn specialties, and hopes this book can be a valuable resource for individuals at any stage of their training.

Pooja Devani is a Paediatric Specialist Trainee and Academic Clinical Fellow at the University of Leicester. Pooja has a vast range of teaching experiences from organising local teaching in her hospital, to academic skills courses nationally as part of her company Step2Med. Most popularly, she runs Step2SFP and Step2ACF annually for all applicants to the academic training programmes. She is passionate about improving training for medical students and junior doctors, and piloted the first teaching programme formalised by the University of Leicester in an attempt to equip final year students with clinical insights that may have been missed due to the pandemic. In addition, she is a keen researcher in childhood asthma and is leading several projects looking into uncontrolled asthma and diagnosis of this in childhood.

Nick Marsden is an ST7 in Anaesthetics in the West Midlands Deanery. His interests include paediatric anaesthesia, human factors and ergonomics. He has been involved in medical education for over ten years, during which time he has developed several award-winning simulation courses. He is keen for medical students to have greater exposure and understanding of Anaesthesia before becoming doctors, as it is the best specialty you could ask for, and we want more people to love it too!

Simran Minhas is a Consultant Anaesthetist and Senior Academy Tutor for undergraduate perioperative medicine at the Royal Orthopaedic Hospital in Birmingham. The ROH is a single specialty surgical hospital, which is uniquely placed to provide a vantage point for anaesthesia and perioperative medicine, given the complex operations it provides on all patients without specialty physicians on site.

Simran qualified in London from King's College School of Medicine and has pursued a career in anaesthesia across several regions in the UK and Sydney, Australia. She is passionate about the integrity of clinical leadership and hence

believes that undergraduate students are the key to leading change and innovation.

As a Consultant editor, she is proud of this book as an introduction to Anaesthesia and would like to congratulate her junior colleagues on making sense of a predominantly postgraduate medical specialty.

Sonika Sethi is a medical and gastroenterology registrar in North West Thames, London. She was awarded the prestigious academic clinical fellowship in Gastroenterology with Imperial College. She previously completed her foundation and core medical training in the West Midlands. Sonika has published several papers as a first author as well as completed a number of poster and oral presentations. Sonika is passionate about teaching and being involved in medical education.

Arjuna Thakker is a core surgical trainee currently working in the North East. During his academic foundation programme, Arjuna combined his passion for education and research and completed a postgraduate certificate in medical education from Newcastle University. As part of his dissertation, in conjunction with Leicester Medical School, he explored the benefits of developing virtual near-peer revision sessions for final year medical students whose preparations in transitioning to a junior doctor had been disrupted due to the Covid-19 lockdown period. His dissertation was published in a leading medical education journal.

Alongside Arjuna's clinical duties, he has an active role in a national education company as a senior tutor and leads the company's flagship academic clinical skills course, which has helped dozens of students gain admission into the academic foundation programme.

Abbreviations

ABG	arterial blood gas
AChE	acetylcholinesterase
AKI	acute kidney injury
ASA	American Society of Anesthesiologists
BP	blood pressure
CNS	central nervous system
COPD	chronic obstructive pulmonary disease
CRP	C-reactive protein
CSF	cerebrospinal fluid
CT	computed tomography
DVT	deep vein thrombosis
ECG	electrocardiogram
ERAS	enhanced recovery after surgery
ET	endotracheal
FBC	full blood count
FONA	front of neck access
G&S	group and save
GA	general anaesthesia
GABA	gamma aminobutyric acid
GCS	Glasgow Coma Scale
GI	gastrointestinal
GORD	gastro-oesophageal reflux disease
h	hour
HDU	high dependency unit
HPA	hypothalamic–pituitary–adrenal
ICU	intensive care unit
IM	intramuscular
INR	international normalised ratio
IV	intravenous
LMA	laryngeal mask airway
LMWH	low molecular weight heparin
MAC	minimum alveolar concentration
MP	Mallampati
MRSA	methicillin-resistant *Staphylococcus aureus*
nAChR	nicotinic acetylcholine receptor
NICE	National Institute for Health and Care Excellence
NMBD	neuromuscular blocking drug
NMJ	neuromuscular junction

NPA	nasopharyngeal airway
NSAID	non-steroidal anti-inflammatory drug
OCP	oral contraceptive pill
OPA	oropharyngeal airway
PCA	patient-controlled analgesia
PDPH	post-dural puncture headache
PE	pulmonary embolus
PONV	postoperative nausea and vomiting
POUR	postoperative urinary retention
PPV	positive pressure ventilation
RSI	rapid sequence induction
SC	subcutaneous
SSI	surgical site infection
SVR	systemic vascular resistance
TIVA	total intravenous anaesthesia
U&E	urea and electrolytes
USS	ultrasound scan
VTE	venous thromboembolism
WHO	World Health Organization

CHAPTER 4

Airway management

General anaesthesia reduces the airway tone and so, after induction, we require manoeuvres or devices to keep the upper airway open and allow ventilation to occur. The method of airway control and subsequent ventilation of the patient should be planned during the preoperative assessment.

The devices that we can use are classified anatomically:

- airway adjuncts – oropharyngeal/nasopharyngeal airways
- supraglottic (placed above the vocal cords)
- subglottic (placed below the vocal cords).

EXAM TIP

Learning these types of airways is important for your MCQs and your OSCE examinations. A common OSCE station involves the examiner asking you to talk through and demonstrate the insertion of each of these airway devices. Although you can only practise inserting these airway devices on mannequins and subsequently patients, we can provide you with the theoretical knowledge that underpins their use. Therefore, for each of these devices, learn the following key features:

- the type of airway device
- their method of insertion
- the indications for their insertion
- the common contraindications/complications.

4.1 Airway adjuncts

Airway adjuncts are found in theatre and on resuscitation trolleys. They are devices that can be inserted orally or nasally and are designed to sit within the naso-/oropharynx. They alleviate the obstruction caused by the tongue or soft palate when airway tone is reduced during GA (or if the patient is unconscious, e.g. in a cardiac arrest).

They are called 'adjuncts' because they aid airway patency when other manual airway manoeuvres have been performed, e.g. head tilt–chin lift or jaw thrust.

KEY NOTES

What is a head tilt–chin lift or a jaw thrust manoeuvre?

When a patient is in an unconscious state, there is a risk of their tongue falling backwards and occluding their oropharynx. When this occurs, the patient's airway becomes obstructed, preventing them from breathing adequately. It is heard as the sound of the patient snoring. Without intervention, the patient will have reduced ventilation, resulting in hypoxia and hypercapnia.

To prevent this from occurring, we use head tilt–chin lift and jaw thrust manoeuvres to maintain airway patency.

Head tilt–chin lift

This manoeuvre is conducted by tilting the patient's head backwards by applying pressure to their forehead and lifting the chin. This usually opens the airway (*Figure 4.1*).

The contraindication to this technique is a known/potential cervical spine injury or instability. If there is any C-spine concern, a jaw thrust manoeuvre is more appropriate (with in-line C-spine management).

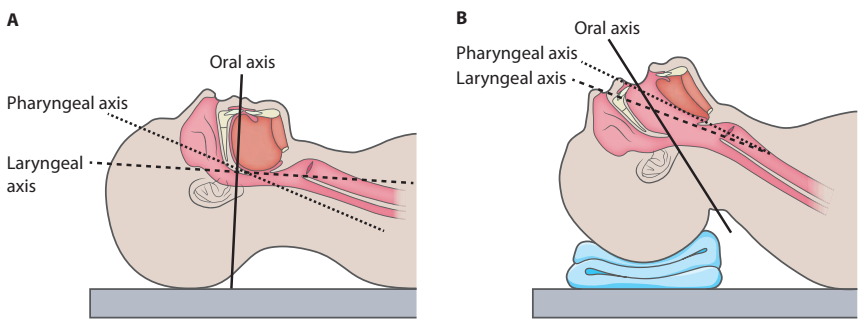


Figure 4.1: The head tilt–chin lift manoeuvre to open the airway. Part A shows head in normal position. In part B, a towel is placed behind the head, with the chin lifted upwards.

Jaw thrust

The clinician's index and middle fingers are placed behind the angle of the mandible and the jaw pushed anteriorly. Moving the mandible forwards lifts the tongue and can prevent it from occluding the airway (*Figure 4.2*).

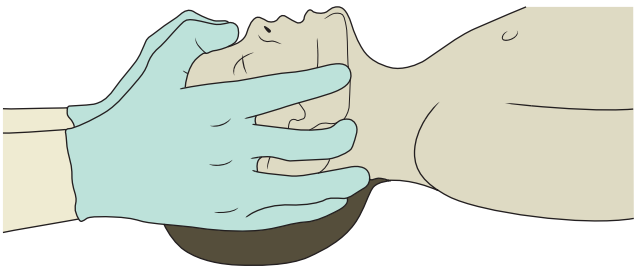


Figure 4.2: Opening the airway using the jaw thrust technique. The clinician's hands are placed behind the patient's mandibular heads, with the mandibular heads pushed upwards[18].

4.1.1 Oropharyngeal airway

Type of airway device

Oropharyngeal airways (OPAs) are also known as 'Guedel airways'. They are designed to maintain a patient's airway by preventing the tongue from falling backwards, causing airway occlusion.

They are curved to fit over the tongue and reach the oropharynx, with a flange that acts as a bite block and prevents the device migrating beyond the patient's teeth (see *Figure 4.3*). They allow ventilation through a hollow aperture in the middle.

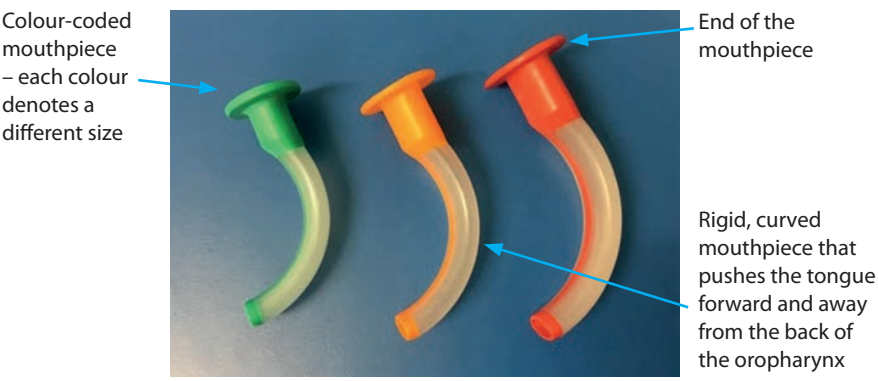


Figure 4.3: Structure of an oropharyngeal airway device. Three different sizes are shown[19]. Green, size 2; orange, size 3; red, size 4.

Oropharyngeal airways are sized (see *Figure 4.4*) by measuring the device against the patient's face. With the tip at the angle of the jaw, the flange should align with the centre of the top teeth. Each device is colour-coded and sized by number.

Typical for an adult is the orange size, while the green may be used in teenagers. Smaller sizes are used in children.

Initially insert the oropharyngeal airway with the curved end pointed towards the palate of the mouth. As it is inserted, rotate it 180° gently so it curves over the tongue.

Figure 4.4: Sizing of an oropharyngeal airway device.

Indications for insertion

Insert an OPA for patients whose airway cannot be opened by a head tilt–chin lift and jaw thrust manoeuvre. OPAs tend to be used in emergencies or in theatre when the patient has obstructed prior to intubation.

Contraindications to and complications from inserting oropharyngeal airways

- Use with care in patients with oral trauma, because the insertion of the oropharyngeal airway device can lead to further oral trauma.
- They are poorly tolerated by patients who are semi-awake, as they induce the gag reflex. Nasopharyngeal airways are better tolerated in this context.

4.1.2 Nasopharyngeal airway

Type of airway device

The nasopharyngeal airway (NPA) provides a patent airway from the nose to the nasopharynx (see *Figure 4.5*). The distal end should sit beyond the base of the tongue.

Indications for insertion

- Much like oropharyngeal airways, nasopharyngeal airways are used for patients whose airway cannot be opened by a head tilt–chin lift and jaw thrust manoeuvre.

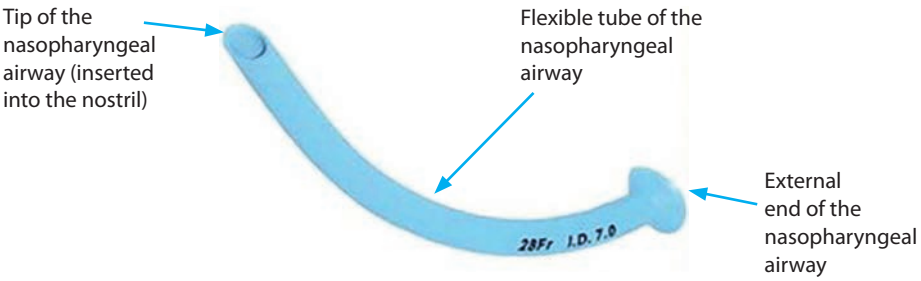


Figure 4.5: Key features of a nasopharyngeal airway device[20].

- A nasopharyngeal airway can be used in patients for whom inserting an OPA would be contraindicated. It is usually better tolerated by patients and can stay in for longer.

Method of insertion

1. Nasopharyngeal airways must be sized appropriately to the patient: match the length of the nasopharyngeal airway to the distance between the patient's nose and their ear tragus (*Figure 4.6*).
2. Once measured, choose an appropriately sized airway device and cover it with lubricating gel.
3. Advance the device gently along the nasal passage. Generally, the right nostril is used because this makes the insertion easier (this is because of the natural curve of the NPA and how it fits along the nasal passage).

Figure 4.6: Measuring of the NPA[21].

Contraindications to and complications from inserting a nasopharyngeal airway

The insertion of a nasopharyngeal device can cause trauma to the nasal passage. Complications can include:

- epistaxis (nose bleeding)
- damage to the base of the skull.

Inserting a nasopharyngeal airway is contraindicated in patients with facial injuries or with evidence of

basal skull fractures. Features of a patient having a basal skull fracture include (alongside a history of a head injury):

- the presence of darkened rings around the eyes (this sign is called raccoon eyes)
- bruising around the mastoid bone (Battle's sign)
- blood present at the tympanic membrane on otoscopy (known as a haemotympanum)
- cerebrospinal fluid (CSF) leaking from the ears (CSF otorrhoea) and ears (CSF rhinorrhoea).

4.2 Supraglottic airway devices

The 'glottis' is the opening between the vocal cords and so supraglottic devices sit above the glottis[22] (see *Figure 4.7*). Conversely, subglottic airway devices sit below the vocal cords.

There are two types of supraglottic airway device – the laryngeal mask airway and the i-gel.

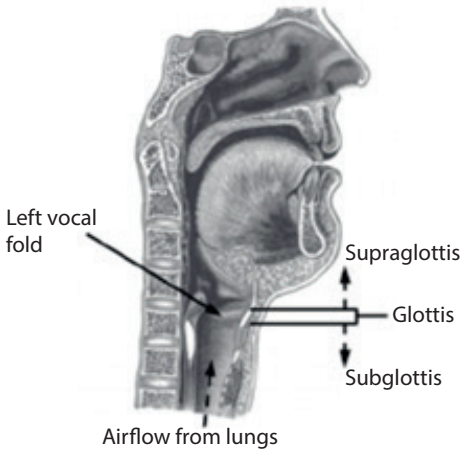


Figure 4.7: The position of the glottis. Airway devices that sit above this are termed supraglottic airway devices, and those that sit below are termed subglottic airway devices[23].

4.2.1 Laryngeal mask airway

The laryngeal mask airway (LMA) is a plastic tube attached to an elliptical mask with an inflatable cuff (see *Figure 4.8*). The mask is inserted into the patient's mouth so that it forms a seal around the patient's glottis (unlike ET tubes, that are placed past the glottis and into the trachea). The cuff is then inflated, forming an airtight seal. The positioning of the LMA is demonstrated in *Figure 4.9*.

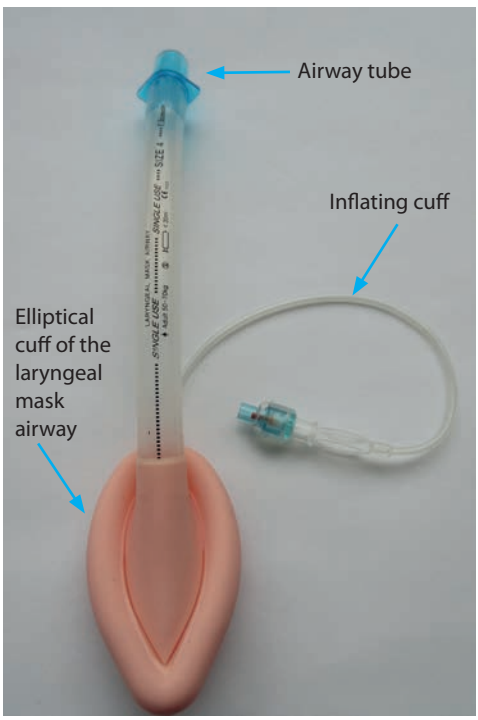


Figure 4.8: A laryngeal mask airway. The blue port on the right is for inflation of the cuff.

Method of insertion

1. The patient is provided with 100% oxygen for 2–3 minutes, and induction of anaesthesia follows.
2. A jaw thrust manoeuvre will lift the tongue while the mouth is open.
3. Insert the tip of the LMA with the backplate against the palate, pushing gently until you meet

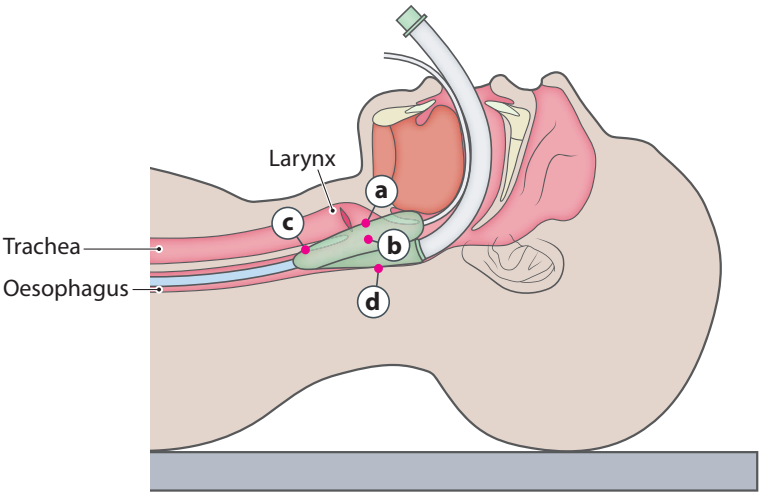


Figure 4.9: Positioning of the LMA after insertion. (a) anterior side of the LMA; (b) lateral side of the LMA; (c) tip of the LMA; (d) backplate of the LMA.

resistance (the cuff should be at the perimeter of the glottis, forming a seal once inflated).

4. The cuff is inflated to form a tight seal around the glottis.
5. Check the LMA is in the correct position and the patient is being adequately ventilated by looking at the capnography trace (this should demonstrate adequate CO_2 expiration), inspecting for chest expansion and auscultating the lung fields.

Benefits of using an LMA

1. The insertion of an LMA does not require laryngoscopy (as is required with an endotracheal intubation). Therefore, the technique for LMA insertion is easier to learn and a useful skill for any practitioner.
2. LMAs are on the resuscitation trolley alongside other airway devices as they are relatively easy to insert, meaning that advanced life support providers can use them without the presence of an anaesthetist.
3. They provide some protection from aspiration, whereas oro-/nasopharyngeal airways provide none.
4. LMAs can be used to rescue failed intubation (see *Section 4.3.2*).

Contraindications to and complications from using an LMA

- LMAs do not provide complete protection against aspiration.
- If not inserted properly, LMAs can cause oral mucosal damage.

4.2.2 i-gel airway device

The i-gel is a second generation supraglottic airway device (*Figure 4.10*) with a non-inflatable cuff, made from a soft, gel-like, thermoplastic elastomer. There are some differences in the preparation and insertion technique for i-gel® compared to an LMA.

The non-inflatable i-gel cuff creates an anatomical seal around the pharyngeal, laryngeal and perilaryngeal structures. It incorporates a gastric channel (except size 1) which allows for the passing of a gastric tube to empty the stomach of fluid content; this gastric channel provides an early warning of regurgitation and may reduce its impact. An integral bite block also reduces the possibility of airway channel occlusion.

Figure 4.10: An i-gel airway device. The i-gel is a registered trademark of Intersurgical.

4.3 Subglottic airway devices

Subglottic airway devices may be placed through the mouth/nose or through the trachea (at the front of the neck).

There are two types of subglottic airway device:

1. Endotracheal tube
2. Tracheostomy and cricothyroidotomy

4.3.1 Endotracheal tube

An endotracheal (ET) tube is a hollow plastic tube that is inserted into the trachea, past the vocal cords. It has a balloon at the distal end that, when inflated, forms an airtight seal inside the trachea (see *Figure 4.11*). A laryngoscope is required to insert the ET tube – we will discuss what this is in the next section.

In adults, ET tubes are cuffed to protect against the risk of aspiration and to allow for effective ventilation. Paediatric ET tubes may be cuffed or uncuffed, depending on the patient's age. Young children have the narrowest point of their airway at the cricoid cartilage and pressure from an inflated cuff can cause mucosal injury and subsequent development of subglottic stenosis or oedema. In order to avoid post-extubation stridor (and failed extubation), an uncuffed tube may be used.

Note key features in the ET tube (*Figure 4.11*). The black lines are just proximal to the distal cuff. They should be placed at the level of the vocal cords. Centimetre markings are along the length of the tube, in order to secure the ET tube precisely and prevent movement, which might cause, for example, unilateral right main bronchus intubation. The typical depth of an ET tube is

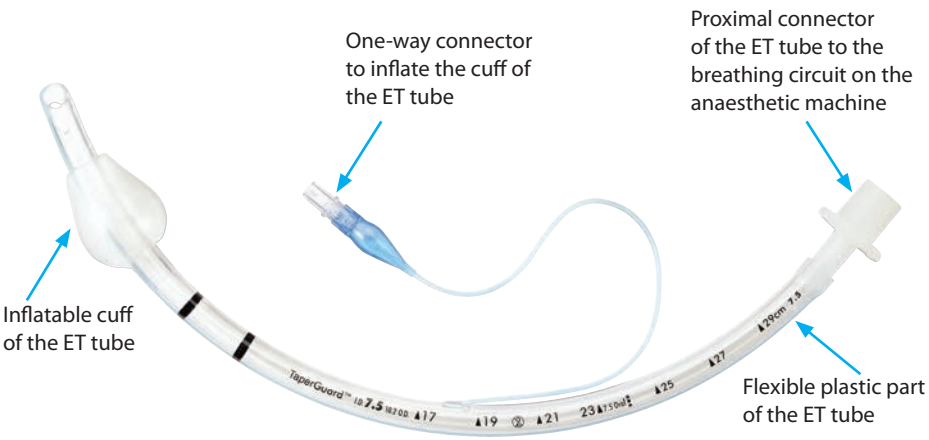


Figure 4.11: Features of an ET tube (a standard, single-lumen ET tube as used in GA).

KEY NOTES

What is a bougie?

A bougie is a malleable plastic rod, with a flexible end, that is smaller in diameter and much longer than an ET tube. The bougie helps the anaesthetist intubate in individuals with very small or narrow airways. The bougie is inserted past the vocal cords and within the trachea, the ET tube can be 'slid' over the bougie and placed within the airway, allowing tracheal intubation to occur. This is possible because the bougie is thinner and more malleable, and acts as a stylet for ET tube placement. *Figure 4.12* demonstrates the bougie.

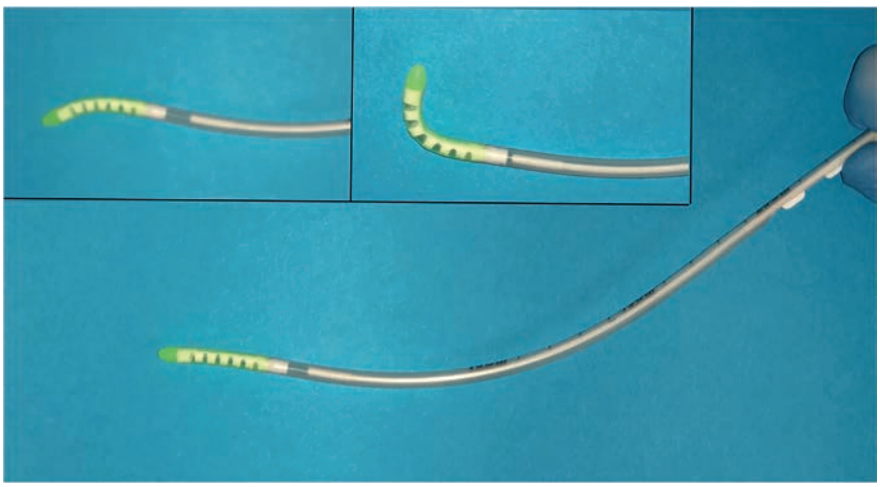


Figure 4.12: A bougie used for ET intubation. The bougie is a thin metal rod, with a curved end. It acts to 'guide' the ET tube into the correct position in individuals with a narrow throat[24].

23cm in men and 21cm in women – as shown by the centimetre markings on the tube.

The ET tube in *Figure 4.11* is a standard single-lumen ET tube used in GA. There are also nasal ET tubes, used mainly in maxillofacial procedures where oral surgical access is important, and double-lumen ET tubes used in thoracic surgery (because a double-lumen tube allows for the ventilation of one lung at a time if required).

What is a laryngoscope?

A laryngoscope is a device that is inserted into the mouth which allows the placement of the ET tube through the glottis.

There are a variety of different laryngoscopes available, and they have different pros and cons dependent on the context in which they are used.

The most commonly used laryngoscope is the Macintosh, which has a curved blade designed to fit into the oropharynx, and a small rounded tip which helps to lift the epiglottis. A light source at the end of the blade illuminates the laryngeal structures, allowing for direct visualisation and intubation. *Figure 4.13* shows the characteristic features of this device and *Figure 4.14* shows the anaesthetist's view when the laryngoscope is correctly placed. The blade tip is placed in the vallecula, and the epiglottis lifted to allow for passage of the ET tube through the glottis.

The ease of getting a view of the vocal cords with a laryngoscope can be anticipated in the airway section of a preoperative assessment. If the assessment indicates an anticipated difficult airway, or if the anaesthetist is finding it difficult to view the vocal cords during laryngoscopy (called

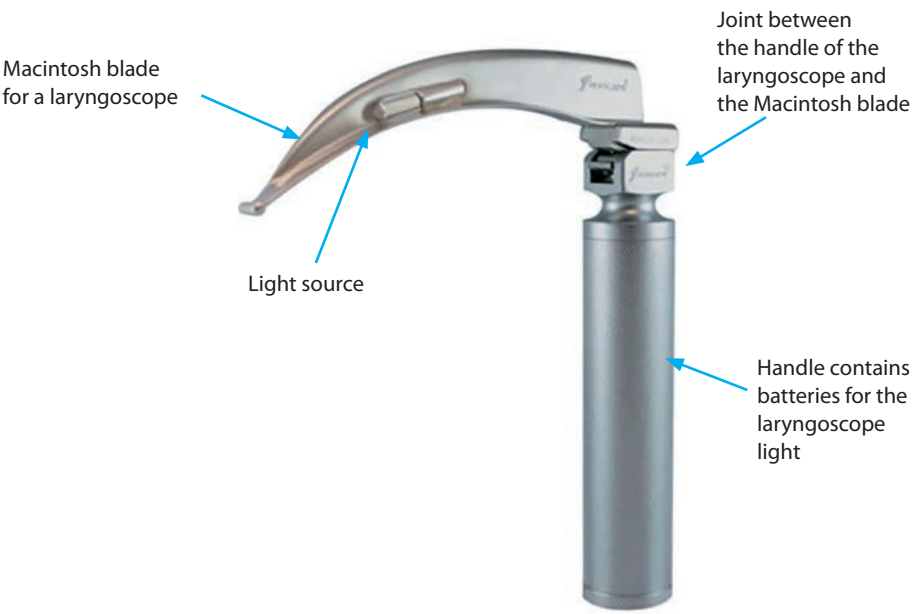


Figure 4.13: A direct laryngoscope used to intubate patients with an ET tube. The laryngoscope is held in the left hand, with the right hand holding the mouth open[25].

Figure 4.14: An anaesthetist's view of the vocal cords during tracheal intubation.

KEY NOTES

What is a video-assisted laryngoscope?

A video-assisted laryngoscope has an inbuilt video camera. Rather than the anaesthetist directly viewing the vocal cords, as shown in *Figure 4.14*, a real-time display on a screen (provided from a camera at the laryngoscope tip inside the oral cavity) is used to conduct intubation. This is useful for intubating difficult airways, because it allows indirect visualisation of the glottis opening with less movement of the cervical spine or mandible.

an unanticipated difficult airway), we may utilise a bougie or change our technique. If we change our technique, this may involve a different blade size or type, or alternative equipment such as a video laryngoscope.

Process of intubation

1. The patient is provided with 100% oxygen for 2–3 minutes and induction of anaesthesia follows. We call this period of oxygen delivery **pre-oxygenation**.
2. With the patient supine, the laryngoscope is inserted into the right side of the patient's mouth. It is advanced, gently pushing the tongue to the left side until the blade tip reaches the vallecula. The laryngoscope is then lifted upwards and away to elevate the larynx and allow visualisation of the tracheal inlet.
3. The ET tube is inserted through the vocal cords until the black lines on the ET tube are about to disappear from view.
4. Inflate the cuff of the ET tube to form an airtight seal (*Figure 4.15*).

Confirming the correct placement of an ET tube is paramount – check five key things (remember these using the mnemonic **CASTE**):

- **C**apnography trace should have started and identified that the patient is producing carbon dioxide consistently.
- **A**uscultate both lungs, listening for equal air entry bilaterally and that there are **S**ymmetrical chest movements. Check specifically for symmetry in the lung movements because the tube may have moved / be placed into one of the bronchi (this is usually the right bronchi as it's straighter than the left and therefore, easier for the tube to migrate into).
- Check for the presence of **T**ube misting. Condensation in the ET tube provides confidence that air from the lungs is moving through the ET tube.
- Finally, auscultate the **E**pigastric region, listening for stomach gurgling and observing for abdominal distension. The presence of either of these signs indicates that the tube may have been placed in the oesophagus. Note unidentified oesophageal intubation is life-threatening.

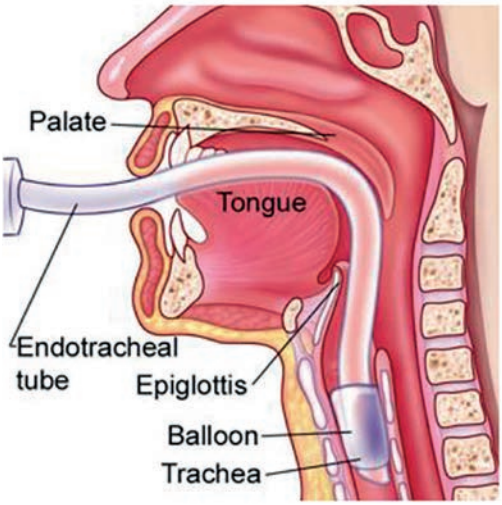


Figure 4.15: Position of ET tube after tracheal intubation[26].

If the anaesthetist is unsure that the ET tube is in the correct position, they should always remove it and reattempt tracheal intubation whilst maintaining oxygenation. This is because incorrect intubation can have disastrous consequences. Accidental intubation of the oesophagus will cause the patient to become hypoxic and desaturate, which is ultimately fatal. Intubation of one bronchus can cause barotrauma/volutrauma of the lungs.

Complications from insertion

- Insertion of the laryngoscope blade risks trauma to structures within the mouth and oropharynx. Dental damage, sore throat and hoarseness may occur.
- As previously discussed, accidental endobronchial or oesophageal intubation can occur if the ET tube is misplaced. This should be identified quickly using the checks detailed above.

4.3.2 Tracheostomy and cricothyroidotomy

Tracheostomy and cricothyroidotomy are subglottic airway procedures. A tracheostomy tube is inserted between the first and second tracheal rings, while a cricothyroidotomy inserts an airway through the cricothyroid membrane of the larynx. In general cricothyroidotomies are done in an emergency (as they are quick to conduct), while tracheostomies are planned, and used for prolonged ventilation.

Indications for a tracheostomy

There are three main indications:

1. Longer-term mechanical ventilation – a tracheostomy in ICU is usually performed for this reason
2. Facilitating weaning from mechanical ventilation
3. Upper airway obstruction, e.g. in ENT/maxillofacial oncology resections.

The insertion of a tracheostomy device is a routinely performed procedure on ICU. This is because a tracheostomy is less stimulating of laryngeal reflexes, such as cough and gag, than an ET tube, and facilitates mechanical ventilation without high doses of sedatives.

Complications of a tracheostomy

Early complications:

- The hole that forms the tracheostomy can become blocked with secretions or blood clots
- Displacement of the tracheostomy tube, or placement of the tube within a false passage
- Pneumothorax from insertion.

Late complications:

- Stenosis – long-term tracheostomies are associated with subglottic stenosis (narrowing of the airway below the epiglottis). This complication has been reported in up to 2% of all patients receiving a tracheostomy.

Indications for a cricothyroidotomy

The single indication for its performance is in an emergency where all other methods of oxygenation have failed and emergency airway access is required in order to save life.

Difficult airways

Previous sections have discussed airway assessment and how it helps to predict potentially difficult airway management. In the context of ET intubation, the patient may require repositioning and the passing of a bougie. If this is not possible, alternative methods of oxygenation and anaesthesia need to be considered. When oxygenation is not possible, it is necessary to consider a tracheostomy/cricothyroidotomy procedure.

When the preoperative assessment indicates potential difficulty, multiple plans are made with extra anaesthetists and extra equipment, in order to ensure safe anaesthesia and airway management. This may include video laryngoscopy and awake/asleep fibreoptic endoscopic intubation[27].

The Difficult Airway Society has created guidelines[28] for oxygenation in the context of an *unanticipated* difficult airway (see *Figure 4.16*). As per the

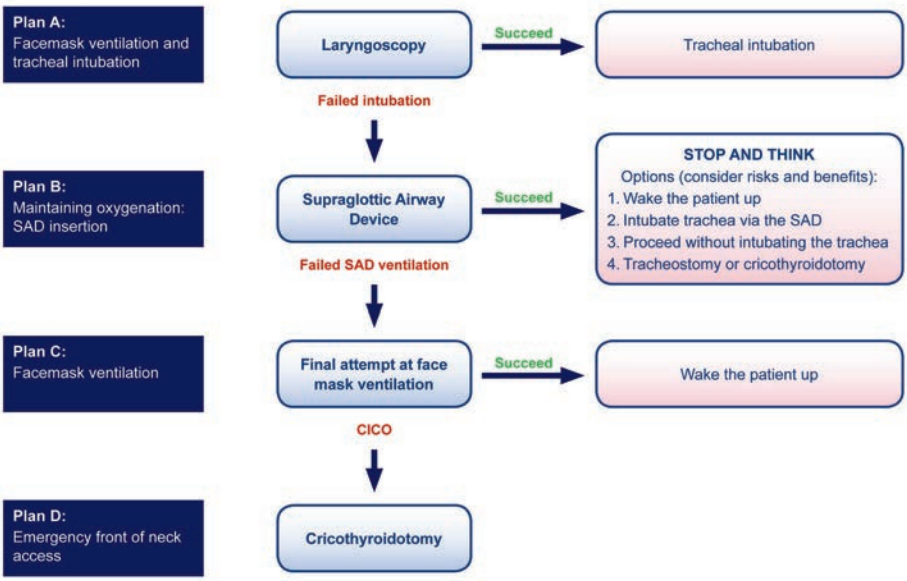
KEY NOTES

Emergency front of neck access

Emergency front of neck access (FONA) involves securing the patient's airway via the anterior aspect of the neck to provide emergency alveolar oxygenation. This includes cricothyroidotomy and tracheostomy. It forms the very last, life-saving stage in airway management when other techniques have failed to establish a patent airway. Indications for FONA include situations when attempts to manage the airway through other techniques have failed, or urgent situations with high-risk airways. This includes patients with upper airway obstruction from head and neck tumours, traumatic injuries to the face and neck, and severe airway oedema secondary to burns or anaphylaxis.

guideline, if intubation attempts have failed (up to three attempts allowed), insertion of a supraglottic airway device, e.g. laryngeal mask airway (LMA), is the next step. If this fails, bag–mask ventilation (when a ventilation bag, with a mask, is placed over the nose and mouth) is commenced in order to wake the patient.

If neither intubation nor ventilation is possible (can't intubate, can't oxygenate – CICO), cricothyroidotomy will be required and will be life-saving.



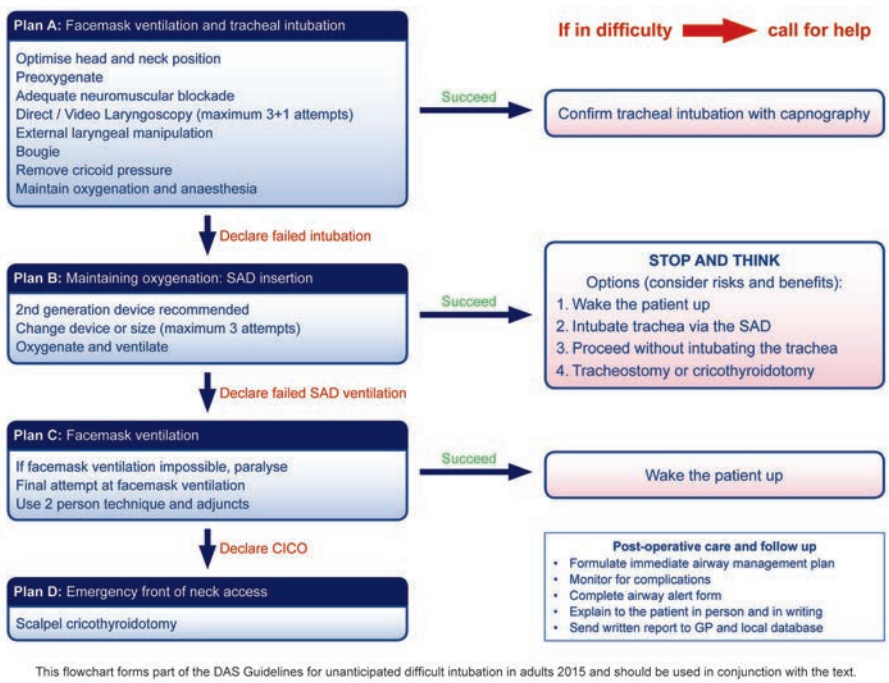


Figure 4.16: Difficult Airway Society guidelines[28] for the management of unanticipated difficult intubation in adults.